MAY 08 1981

Docket Nos. 50-317
and 50-318

Mr. A. E. Lundvall, Jr.
Vice President - Supply
Baltimore Gas & Electric Company
P. O. Box 1475
Baltimore, Maryland 21203

Dear Mr. Lundvall:

The Commission has issued the enclosed Amendments No. 54 and 37 to Facility Operating Licenses No. DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant, Units No. 1 and 2. These amendments consist of changes to the Technical Specifications in response to your applications dated January 22 and November 10 and 25, 1980 as supplemented by numerous other letters.

The amendments:

. add operability, trip setpoint and surveillance requirements for automatic initiation of the auxiliary feedwater system;

. increase the surveillance requirements on the auxiliary feedwater pumps and related flow paths.

Some portions of your proposed Technical Specifications have been modified to meet our requirements. These modifications have been discussed with and agreed to by your staff. The remaining Technical Specifications proposed by your letter of November 10, 1980 were addressed by Amendments No. 53 and 36 issued April 21, 1981.

The enclosed Safety Evaluation also documents our review of your responses to the staff's short-term and long-term recommendations that resulted from our reliability evaluation of the Calvert Cliffs auxiliary feedwater systems. These recommendations were the subject of our October 22, 1979 letter. Based on our review, we find your responses to our recommendations acceptable.

The detailed review of the safety grade instrumentation system required to automatically initiate the auxiliary feedwater systems will be issued at a later time.

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ML010430

OFFICE							
SURNAME							
DATE							

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY * USGPO: 1980—329-824

At the request of your staff, the effective date of these amendments has been delayed for two weeks in order to allow time for your staff to prepare the necessary changes to your operating procedures.

Copies of the related Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,

Original signed by
Robert A. Clark

Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing

Enclosures:
1. Amendments Nos. 54 and 37 to DPR-53 and DPR-69
2. Safety Evaluation
3. Notice of Issuance

cc: w/enclosures
See next page

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OFFICE	ORB#3:DL	ORB#3:DL	ORB#3:DL	AD:OR:DL	OELD		
SURNAME	PMKreutzer	EConner/ltr	RAClark	TMNovak	JWolfhard		
DATE	4/28/81	4/30/81	5/30/81	5/1/81	5/6/81		

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

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ORB#3 Rdg
PMKreutzer

Docket No. 50-317 and 50-318

Docketing and Service Section
Office of the Secretary of the Commission

SUBJECT: BALTIMORE GAS AND ELECTRIC COMPANY, Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2.

Two signed originals of the Federal Register Notice identified below are enclosed for your transmittal to the Office of the Federal Register for publication. Additional conformed copies (12) of the Notice are enclosed for your use.

☐ Notice of Receipt of Application for Construction Permit(s) and Operating License(s).

☐ Notice of Receipt of Partial Application for Construction Permit(s) and Facility License(s): Time for Submission of Views on Antitrust Matters.

☐ Notice of Availability of Applicant's Environmental Report.

☐ Notice of Proposed Issuance of Amendment to Facility Operating License.

☐ Notice of Receipt of Application for Facility License(s); Notice of Availability of Applicant's Environmental Report; and Notice of Consideration of Issuance of Facility License(s) and Notice of Opportunity for Hearing.

☐ Notice of Availability of NRC Draft/Final Environmental Statement.

☐ Notice of Limited Work Authorization.

☐ Notice of Availability of Safety Evaluation Report.

☐ Notice of Issuance of Construction Permit(s).

☐ Notice of Issuance of Facility Operating License(s) or Amendment(s).

☒ Other: Amendment Nos. 54 and 37
Referenced document have been provided PDR.

Division of Licensing, ORB#3
Office of Nuclear Reactor Regulation

Enclosure:
As Stated

OFFICE→	ORB#3:DL					
SURNAME→	PMKreutzer/pn					
DATE→	5/ /81					

NRC FORM 102 7—79

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

May 8, 1981

Docket Nos. 50-317
and 50-318

Mr. A. E. Lundvall, Jr.
Vice President - Supply
Baltimore Gas & Electric Company
P. O. Box 1475
Baltimore, Maryland 21203

Dear Mr. Lundvall:

The Commission has issued the enclosed Amendments No. 54 and 37 to Facility Operating Licenses No. DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant, Units No. 1 and 2. These amendments consist of changes to the Technical Specifications in response to your applications dated January 22 and November 10 and 25, 1980 as supplemented by numerous other letters.

The amendments:

. add operability, trip setpoint and surveillance requirements for automatic initiation of the auxiliary feedwater system;

. increase the surveillance requirements on the auxiliary feedwater pumps and related flow paths.

Some portions of your proposed Technical Specifications have been modified to meet our requirements. These modifications have been discussed with and agreed to by your staff. The remaining Technical Specifications proposed by your letter of November 10, 1980 were addressed by Amendments No. 53 and 36 issued April 21, 1981.

The enclosed Safety Evaluation also documents our review of your responses to the staff's short-term and long-term recommendations that resulted from our reliability evaluation of the Calvert Cliffs auxiliary feedwater systems. These recommendations were the subject of our October 22, 1979 letter. Based on our review, we find your responses to our recommendations acceptable.

The detailed review of the safety grade instrumentation system required to automatically initiate the auxiliary feedwater systems will be issued at a later time.

At the request of your staff, the effective date of these amendments has been delayed for two weeks in order to allow time for your staff to prepare the necessary changes to your operating procedures.

Copies of the related Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,

Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing

Enclosures:
1. Amendments Nos. 54 and 37
   to DPR-53 and DPR-69
2. Safety Evaluation
3. Notice of Issuance

cc: w/enclosures
See next page

Baltimore Gas and Electric Company

cc:
James A. Biddison, Jr.
General Counsel
Baltimore Gas and Electric Company
P. O. Box 1475
Baltimore, MD 21203

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Mr. Leon B. Russell
Plant Superintendent
Calvert Cliffs Nucledar Power Plant
Maryland Routes 2 & 4
Lusby, MD 20657

Bechtel Power Corporation
Attn: Mr. J. C. Judd
Chief Nuclear Engineer
15740 Shady Grove Road
Gaithersburg, MD 20760

Combustion Engineering, Inc.
Attn: Mr. P. W. Kruse, Manager
Engineering Services
P. O. Box 500
Windsor, CT 06095

Public Document Room
Calvert County Library
Prince Frederick, MD 20678

Director, Department of State Planning
301 West Preston Street
Baltimore, MD 21201

Mr. R. M. Douglass, Manager
Quality Assurance Department
Fort Smallwood Road Complex
P. O. Box 1475
Baltimore, MD 21203

Mr. T. L. Syndor, General Supervisor
Operations Quality Assurance
Calvert Cliffs Nuclear Power Plant
Maryland Routes 2 & 4
Lusby, MD 20657

Ms. Mary Harrison, President
Calvert County Board of County Commissioners
Prince Frederick, MD 20768

U. S. Environmental Protection Agency
Region III Office
Attn: EIS Coordinator
Curtis Building (Sixth Floor)
Sixth and Walnut Streets
Philadelphia, PA 19106

Mr. Ralph E. Architzel
Resident Reactor Inspector
NRC Inspection and Enforcement
P. O. Bos 437
Lusby, MD 20657

Mr. Charles B. Brinkman
Manager - Washington Nuclear Operations
Combustion Engineering, Inc.
4853 Cordell Avenue, Suite A-1
Bethesda, MD 20014

Mr. J. A. Tierman, Manager
Nuclear Power Department
Calvert Cliffs Nuclear Power Plant
Maryland Routes 2 & 4
Lusby, MD 20657

Director, Criteria and Standards Division
Office of Radiation Programs (ANR-460)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Mr. W. J. Lippold, Supervisor
Nuclear Fuel Management
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
P. O. Box 1475
Baltimore, Maryland 21203

Mr. R. E. Denton, General Supervisor
Training & Technical Services
Calvert Cliffs Nuclear Power Plant
Maryland Routes 2 & 4
Lusby, MD 20657

cc w/enclosure(s) and incoming
dated: 1/22/80, 11/10/80, 11/25/80

Administrator, Power Plant Siting Program
Energy and Coastal Zone Administration
Department of Natural Resources
Tawes State Office Building
Annapolis, MD 21204

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 54
License Nos. DPR-53

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

   A. The applications for amendment by Baltimore Gas and Electric Company (the licensee) dated January 22 and November 10 and 25, 1980, as supplemented by numerous other letters, comply 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-53 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 54, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective on June 1, 1981.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Clark, Chief
Operating Reactor Branch #3
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 8, 1981

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-318

CALVERT CLIFFS NUCLEAR POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 37
License Nos. DPR-69

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

   A. The applications for amendment by Baltimore Gas and Electric Company (the licensee) dated January 22 and November 10 and 25, 1980, as supplemented by numerous other letters, comply 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-69 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 37, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective on June 1, 1981.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Clark, Chief
Operating Reactor Branch #3
Division of Licensing

Attachment:
Changes to the Technical Specifications

Date of Issuance: May 8, 1981

ATTACHMENT TO LICENSE AMENDMENTS NO. 54 AND 37 NO.

FACILITY OPERATING LICENSES NO. DPR-53 AND DPR-69

DOCKETS NO. 50-317 AND NO. 50-318

Replace the following pages of the Appendix A Technical Specifications with the enclosed 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.

Pages

3/4 3-14
3/4 3-19
3/4 3-20
3/4 3-21
3/4 3-23
3/4 7-5

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
6. CONTAINMENT PURGE VALVES ISOLATION ##					
a. Manual (Purge Valve Control Switches)	2/Penetration	1/Penetration	2/Penetration	1, 2, 3, 4	6
b. Containment Radiation - High Area Monitor	4	2	3	6	8
7. LOSS OF POWER					
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	4/Bus	2/Bus	3/Bus	1, 2, 3	7*
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	4/Bus	2/Bus	3/Bus	1, 2, 3	7*

Containment purge valve isolation is also initiated by SIAS (functional units 1.a, 1.b, and 1.c).

Amendment No. 44, 52
Amendment No. 3, 27, 30

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
8. CVCS ISOLATION					
a. Manual (CVCS Isolation Valve Control Switches)	1/Valve	1/Valve	1/Valve	1, 2, 3, 4	6
b. West Penetration Room/Letdown Heat Exchanger Room Pressure - High	4	2	3	1, 2, 3, 4	7*
9. AUXILIARY FEEDWATER					
a. Manual	2	1	2	1, 2, 3	6
b. Steam Generator Level - Low	4	2	3	1, 2, 3	7

Amendment No. 54
Amendment No. 22, 37

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

FUNCTIONAL UNIT	TRIP VALUE	ALLOWABLE VALUES
8. CVCS ISOLATION		
West Penetration Room/ Letdown Heat Exchanger Room Pressure - High	$\leq$ 0.5 psig	$\leq$ 0.5 psig
9. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Steam Generator Level - Low	-39.6 to -49.5 in	-39.6 to -49.5 in

TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
1. Manual	
a. SIAS Safety Injection (ECCS)	Not Applicable
b. CSAS Containment Spray	Not Applicable
c. CIS Containment Isolation	Not Applicable
d. RAS Containment Sump Recirculation	Not Applicable
e. Auxiliary Feedwater Initiation	Not Applicable
2. Pressurizer Pressure-Low	
a. Safety Injection (ECCS)	$\leq$ 30*/30**
3. Containment Pressure-High	
a. Safety Injection (ECCS)	$\leq$ 30*/30**
b. Containment Isolation	$\leq$ 30
c. Containment Fan Coolers	$\leq$ 35*/10**
4. Containment Pressure--High	
a. Containment Spray	$\leq$ 60*/60** (1)
5. Containment Radiation-High	
a. Containment Purge Valves Isolation	$\leq$ 5

TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
6. Steam Generator Pressure-Low	
a. Main Steam Isolation	≤ 6.9
b. Feedwater Isolation	≤ 80
7. Refueling Water Tank-Low	
a. Containment Sump Recirculation	≤ 80
8. Reactor Trip	
a. Feedwater Flow Reduction to 5%	≤ 20
9. Loss of Power	
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	≤ 2.2***
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	≤ 8.4***
10. Steam Generator Level - Low	
a. Auxiliary Feedwater System	≤ 360*/360** (2)

TABLE NOTATION

*Diesel generator starting and sequence loading delays included.

**Diesel generator starting and sequence loading delays not included. Offsite power available.

***Response time measured from the incidence of the undervoltage condition to the diesel generator start signal.

(1) Header fill time not included.
(2) Includes time delay of 3 to 5 minutes.

TABLE 4.3-2

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTAION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. SAFETY INJECTION (SIAS)				
a. Manual (Trip Buttons)	N.A.	N.A.	R	N.A.
b. Containment Pressure - High	S	R	M	1, 2, 3
c. Pressurizer Pressure - Low	S	R	M	1, 2, 3
d. Automatic Actuation Logic	N.A.	N.A.	M(1)(3)	1, 2, 3
2. CONTAINMENT SPRAY (CSAS)				
a. Manual (Trip Buttons)	N.A.	N.A.	R	N.A.
b. Containment Pressure -- High	S	R	M	1, 2, 3
c. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3
3. CONTAINMENT ISOLATION (CIS) #				
a. Manual CIS (Trip Buttons)	N.A.	N.A.	R	N.A.
b. Containment Pressure - High	S	R	M	1, 2, 3
c. Automatic Actuation Logic	N.A.	N.A.	M(1)(4)	1, 2, 3
4. MAIN STEAM LINE ISOLATION (SGIS)				
a. Manual SGIS (MSIV Hand Switches and Feed Head Isolation Hand Switches)	N.A.	N.A.	R	N.A.
b. Steam Generator Pressure - Low	S	R	M	1, 2, 3
c. Automatic Actuation Logic	N.A.	N.A.	M(1)(5)	1, 2, 3

Containment isolation of non-essential penetrations is also initiated by SIAS (functional units 1.a and 1.c).

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
5. CONTAINMENT SUMP RECIRCULATION (RAS)				
a. Manual RAS (Trip Buttons)	N.A.	N.A.	R	N.A.
b. Refueling Water Tank - Low	N.A.	R	M	1, 2, 3
c. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3
6. CONTAINMENT PURGE VALVES ISOLATION ##				
a. Manual (Purge Valve Control Switches)	N.A.	N.A.	R	N.A.
b. Containment Radiation - High Area Monitor	S	R	M	6
7. LOSS OF POWER				
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	N.A.	R	M	1, 2, 3
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	N.A.	R	M	1, 2, 3
8. CVCS ISOLATION West Penetration Room/ Letdown Heat Exchanger Room Pressure - High	N.A.	R	M	1, 2, 3, 4
9. AUXILIARY FEEDWATER				
a. Manual	N.A.	N.A.	R	N.A.
b. Steam Generator Level - Low	S	R	M	1, 2, 3

Containment purge valve isolation is also initiated by SIAS (functional units 1.a, 1.b and 1.c).

Amendment No. 40, 58.
Amendment No. 3, 22, 37

TABLE 4.3-2 (Continued)

TABLE NOTATION

(1) The logic circuits shall be tested manually at least once per 31 days.

(3) SIAS logic circuits A-5, B-5, A-10 and B-10 may be exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.

(4) CIS logic circuits A-5 and B-5 may be exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.

(5) SGIS logic circuits A-1 and B-1 may be exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least two steam turbine driven steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore at least two auxiliary feedwater pumps to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. Whenever a subsystem is inoperable for the performance of periodic testing (i.e. manual discharge valve closed for pump discharge head test) a dedicated operator will be stationed at the local station (i.e. closed valve), with direct communication to the Control Room, to return the subsystem to normal upon instruction from the Control Room. Upon completion of any testing, the subsystem (valve) will be returned to its proper position and verified in its proper position by an independent operator check.

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE;

a. At least once per 31 days by:

1. Verifying that each steam turbine driven pump develops a Total Dynamic Head of $\geq$ 2800 ft. on recirculation flow when the secondary steam supply pressure is greater than 800 psig.

2. Cycling each testable, remote operated valve that is not in its operating position through at least one complete cycle.

3. Verifying that each valve (manual, power operated or automatic) in the direct flow path is in its correct position.

b. Before entering MODE 3 after a COLD SHUTDOWN of at least 14 days by completing a flow test that verifies the flow path from the condensate storage tank to the steam generators.

c. At least once per 18 months by:

1. Verifying that each automatic valve in the flow path actuates to its correct position upon receipt of each auxiliary feedwater actuation test signal.

2. Verifying that each auxiliary feedwater pump starts as designed automatically upon receipt of each auxiliary feedwater actuation test signal.

PLANT SYSTEMS

CONDENSATE STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.7.1.3 The No. 12 condensate storage tank (CST) shall be OPERABLE with a minimum contained water volume of 150,000 gallons per unit.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

With the No. 12 condensate storage tank inoperable, within 4 hours either:

a. Restore the CST to OPERABLE status or be in HOT SHUTDOWN within the next 12 hours, or

b. Demonstrate the OPERABILITY of the No. 11 condensate storage tank as a backup supply to the auxiliary feedwater pumps and restore the No. 12 condensate storage tank to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.3.1 The No. 12 condensate storage tank shall be demonstrated OPERABLE at least once per 12 hours by verifying the contained water volume is within its limits when the tank is the supply source for the auxiliary feedwater pumps.

4.7.1.3.2 The No. 11 condensate storage tank shall be demonstrated OPERABLE at least once per 12 hours by verifying that the tank contains a minimum of 150,000 gallons of water and by verifying that the flow path for taking suction from this tank is OPERABLE with the manual valves in this flow path open whenever the No. 11 condensate storage tank is the supply source for the auxiliary feedwater pumps.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENTS NO. 54 AND 37 TO FACILITY
OPERATING LICNESES NO. DPR-53 AND DPR-69

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS NO. 1 AND 2

DOCKET NOS. 50-317 AND 50-318

Introduction

Early in the review of the Three Mile Island Unit No. 2 (TMI-2) accident, it became apparent that increased plant safety would result from automatic initiation of auxiliary feedwater system (AFWS) flow. This was short-term recommendation No. 2.1.7a of our July 1979 NUREG-0578. In the implementation letters dated September 13 and October 30, 1979, we provided clarification of requirement No. 2.1.7a and proposed control grade system installation by January 1, 1980 with the upgrading of the automatic initiation of AFWS flow to safety grade by January 1, 1981.

In a letter dated November 8, 1979, Baltimore Gas and Electric Company (BG&E or the licensee) pointed out that modifying the AFWS to be automatically initiated constituted an unreviewed safety question issue since AFWS flow was not considered in the Calvert Cliffs, Units No. 1 and 2 (CCNPP-1 and 2) main steamline break (MSLB) analyses. BG&E (and other licensees) contend that the addition of AFW flow during a MSLB accident will: (1) result in a positive reactivity insertion (due to increased cooldown) and, thus, a higher final return-to-power condition; and (2) a higher peak containment pressure than the values calculated in the analysis of record. BG&E proposed, by letter dated November 23, 1979, their control design for automatic initiation of AFWS flow.

Our letters of December 21 and 27, 1979 address the BG&E concern. We agreed that AFWS flow may adversely affect the MSLB accident and requested a re-analysis of this accident to be submitted for our review prior to the final connection of the circuits involved to automatically initiate AFWS flow. The requested reanalysis was supplied by the BG&E letter of January 25, 1980 as supplemented by letter of May 21, 1980. This Safety Evaluation (SE) will review the effects of automatic initiation of AFWS flow on the likelihood of return to power (SE Section 2.1) and on the calculated peak containment pressure (SE Section 2.2) during the main steamline break accident. The adverse effects of delaying AFWS flow for several minutes on other transients and accidents will be addressed in SE Section 2.3.

The proposed TS changes for the AFWS application were submitted by letters dated January 22, and November 10 and 25, 1980. These changes will be addressed in Section 2.5.

Our letter of November 7, 1979 presented the staff reliability evaluation of the CCNPP AFWS and made short-term and long-term recommendations. BG&E's responses to these recommendations were submitted by letters dated December 13, 1979, January 15 and 22, March 28, November 9 and 18, 1980 and January 26, March 5 and 9, 1981. Our review of this information is presented in Section 2.4 of this SE.

The detailed review of the safety grade instrumentation system required to automatically initiate the AFWS is to be reviewed by the Franklin Research Center in Philadelphia, Pennsylvania, under NRC contract. The resultant Safety Evaluation will be issued at a later time.

2.0 Discussion and Evaluation

2.1 MSLB Accident - Return to Power

BG&E's analysis of the effects of return to power following a MSLB accident is presented in their January 25, 1980 letter. The starting conservative assumptions, according to BG&E for this analysis are:

- Only a three-minute delay in delivery of auxiliary feedwater flow to the steam generators was assumed, rather than a more realistic longer time delay accounting for the delay in AFWS signal initiation and the transit time of the feedwater flow to the steam generator,
- Credit is not taken for complete isolation of the main feedwater system, thereby resulting in a continuous flow of 5 percent of full flow of main feedwater to the affected steam generator,
- A conservative high auxiliary feedwater flow was assumed to be fed entirely to the damaged steam generator,
- Failure of one HPSI pump,
- Failure of one LPSI pump,
- The highest worth CEA is assumed to stick in the fully withdrawn position, and
- The end of life moderator temperature and Doppler (fuel temperature) coefficient values were used since these values result in the greatest positive reactivity change during cooldown.

The analysis assumed that the event is initiated by a circumferential rupture of a 34 inch main steam line at the steam generator nozzle. BG&E states that this break is limiting since it results in the greatest rate of temperature reduction in the reactor core region. Reactor trip and safety injection follow the pipe rupture. The reanalysis reported in the January 25, 1980 submittal uses the same assumptions and methods as previously used except that it stipulates automatic initiation of auxiliary feedwater flow in three minutes from initiation of the event.

The rationale for delaying the initiation of AFWS originates from the positive reactivity feedback which accompanies a postulated MSLB. During a postulated double-ended guillotine break of this steam line, the broken steam generator behaves as an enhanced heat sink, resulting in rapid cooldown of the primary system. This rapid cooldown has a noticeable impact on the moderator reactivity feedback, which results in a net positive reactivity insertion. A conservative assumption is made that the limiting control element assembly (CEA) is stuck in its fully withdrawn position.

Based on the licensee's generic analyses, the reactivity feedback was most limiting for a main steamline break initiated during full power operation. Subsequent to reactor trip, the calculations predict that there will not be a return to power resulting from the cooling effect of the auxiliary feedwater. The net energy removed from the primary system was conservatively assumed to be the product of the total steam generator secondary mass (M_{TOT}) times the latent heat of evaporation (h_{Fg}). Should liquid entrainment exit the break, then the energy removed from the primary system will be less severe. For a postulated guillotine break in a steam line, the time required to deplete the broken steam generator secondary inventory is approximately 70 seconds (for the full power condition). When the auxiliary feedwater is injected into the steam generator, the magnitude of the primary side cooldown is increased ($M_{TOT} \times h_{Fg}$; where M_{TOT} is increased). This feedback results in enhancing the primary side cooling and in an increased reactivity feedback. The mechanism available for reversing the reactivity insertion is the initiation of ECCS, which injects boron into the system.

The licensee's assessment of the effects of automatic initiation of AFWS during a postulated MSLB concluded that a delay in the initiation of AFWS of at least three minutes will ensure that there is no return to power. The purpose of the delay is to provide time for the ECCS injected borated water to lessen the magnitude of the moderator reactivity feedback attributed to the AFWS inventory.

The licensee's analytical method for analyzing steam line breaks is presently under staff review. The review at this time indicates reasonable assurance that the conclusions based on the submitted analyses will not be appreciably altered by the completion of the analytical methods review. The staff finds the return to power results following a MSLB accident with automatically initiated AFWS flow delayed at least three minutes are not more limiting than previous analysis results without automatic AFWS flow and are, therefore, acceptable.

BG&E states that single failures concurrent with the MSLB, other than those listed in the assumptions, as well as loss of offsite power concurrent with MSLB, are not and have not been part of the design basis as described in the FSAR and, therefore, were not considered. While not directly relevant to staff approval of the automatic actuation of AFW, the licensee's vulnerability to single failures has been examined because new licensing analyses were submitted. Our conclusion is that although the licensee has not documented a complete evaluation of potential single failures, sufficient conservatism exists in the analyses for Calvert Cliffs Units 1 and 2. In particular, the licensee has included in the assumptions the failure of the safety grade MFW isolation valves and MSIVs (the closure of which would cause coastdown of the MFW pumps and thus MFW isolation). While the licensee has not addressed the failure in the open position of relief or steam dump valves located on the intact steam generator, generic analyses of MSLB for similar PWRs have indicated that the worst single failure is the loss of a HPSI pump as was assumed in the licensee's present analysis. Lastly, the Systematic Evaluation Program (SEP) review we are performing for the Palisades plant is to address single failures for the MSLB in greater detail. Based on our review, we conclude that the licensee has adequately accounted for single failure at this time. We will factor in the SEP results for Palisades at the conclusion of the overall program.

The primary consequences resulting from loss-of-offsite power (LOOP) are a delay of emergency core cooling pumps (ECCS) injection and tripping of the reactor coolant pumps. During LOOP, ECCS injection is delayed approximately 25 seconds as the emergency diesel generators restore power to the ECCS pumps. LOOP also results in coastdown of the reactor coolant pumps.

Continued operation of the reactor coolant pumps would have two effects on an MSLB transient:

- Running the reactor coolant pumps (RCPs) results in a greater degree of overcooling as the hot primary fluid is forced through the steam generators, and

- The reactor coolant pumps act as a driving head, forcing the ECCS injected borated water into the core.

Thus, losing offsite power affects the degree of system cooling and the time at which the ECCS-injected boron enters the reactor core. Overcooling and borated water injection are competing effects in which the former increases reactivity and the latter reduces reactivity. In reviewing past analyses of MSLB for other plants similar to the CCNPP units, we have determined that reduction in the RCS cooldown rate caused by coastdown of the RCP after LOOP has had a larger effect than slower boron injection to the core. Thus, we find that the MSLB accident is reduced in severity with a concurrent loss of offsite power.

We find automatic initiation of the auxiliary feedwater system to inject needed makeup water to the steam generators without the need for operator action will improve the nuclear safety of the Calvert Cliffs units. The staff plans to perform independent audit calculations by the end of FY 81 to provide further confirmation of our conclusions.

2.2 MSLB Accident - Peak Containment Pressure

Section B of BG&E's January 25, 1980 letter provides a response to questions posed by our letter of December 21, 1979. Specifically, BG&E was to assess the potential for containment overpressurization due to the anticipated continuous addition, at pump runout flow, of auxiliary feedwater to the affected steam generator following a postulated MSLB accident. Automating the auxiliary feedwater system would cause an increase in energy released to containment after a MSLB thereby increasing the containment pressure.

The FSAR analysis for containment response to a MSLB accident was based on the no load, single loop outlet nozzle break case with a 20% moisture content in the blowdown. The results of this analysis were a peak containment pressure of 44.5 psig and a peak temperature of 269°F. BG&E states that no AFWS flow was assumed in the original analysis based on operating procedures which require isolation of the affected steam generator prior to manual AFWS initiation.

In BG&E's reanalysis, the initial conditions were identical to those specified in FSAR Section 14.16.3. At 180 seconds into the accident, the AFWS runout flow rate of 2200 gpm was assumed to be fed to the ruptured steam generator only. This reanalysis shows that the

peak containment pressure remains 44.5 psig if AFWS flow is delayed for at least three minutes. It assumes the affected steam generator is not isolated resulting in a second increase of containment pressure up to 41.5 psig.

The staff concurs with the licensee's conclusion that the peak containment pressure will remain below the containment design pressure after the MSLB accident with the addition of auxiliary feedwater at the run-out flow rate three minutes after low steam generator level is reached.

Our review also included evaluation of the licensee's ability to determine and isolate the affected steam generator. The key parameter available to the operator following an MSLB would be low steam generator pressure in the affected steam generator. The MSLB analysis indicates automatic MSIV closure initiated at approximately three seconds after the break and a secondary side pressure of 570 psia (trip setpoint) in the affected steam generator versus approximately 600 psia in the intact steam generator. The mismatch becomes greater, approximately 140 psia in the affected steam generator versus about 525 psia in the intact steam generator at 60 seconds after the break. The plant operating procedures are written to enable a quick determination of the steam line rupture and affected steam generator. Once the determination is completed approximately ten seconds are required to manually isolate the affected steam generator stopping AFWS flow.

Based upon the above expected control room indications, we find sufficient justification to assume the operator will be alerted to the need to isolate the AFWS flow path to the affected steam generator before initiating AFWS flow manually or within 10 minutes if automatic initiation is relied upon.

2.3 Effects of Three Minute Delay of AFWS on Other Transients and Accidents

In addition to reviewing the effects of automatically initiating the AFWS in three minutes on the MSLB accident, we considered any adverse effects upon other transients and accidents. For example, assuming liquid discharge from a ruptured feedwater line, the reactor would lose one steam generator as a heat sink. A delay of AFWS injection could extend the heatup of the primary coolant system; however, the intact steam generator requires in excess of 10 minutes to boil dry and, therefore, provides an adequate heat sink for decay heat removal.

Calvert Cliff's Operating Procedures have historically required the initiation of AFWS as a manual action. Whenever credit for operator action was required, the analysis performed demonstrated the acceptability of the unit to withstand the postulated event being independent of operator action for a minimum of

10 minutes. We, therefore, conclude that automatic initiation of AFWS flow after three minutes into the transient or accident (versus 10 minutes assuming operator action) is appropriate and would not result in consequences more limiting than previously analyzed.

2.4 Evaluation of BG&E's Response to NUREG-0635 Recommendations

The TMI-2 accident and subsequent investigations and studies highlighted the importance of the AFWS in the mitigation of severe transients and accidents. As part of our assessment of the TMI-2 accident and related implications for operating plants, we evaluated the AFWS systems for all operating plants having nuclear steam supply systems (NSSS) designed by Westinghouse (NUREG-0611) or Combustion Engineering (NUREG-0635). Our evaluations of these system designs are contained in these NUREGs along with our recommendations for each plant and the concerns which led to each recommendation. The NUREG specific requirements for CCNPP were transmitted to BG&E by our letter dated November 7, 1979. The objectives of the evaluation were to: (1) identify necessary changes in AFW system design or related procedures at the operating facilities in order to assure the continued safe operation of these plants, and (2) to identify other system characteristics of the AFWS which, on a long term basis, may require system modifications. To accomplish these objectives we:

- Reviewed plant specific AFWS designs in light of current regulatory requirements (SRP) and

- Assessed the relative reliability of the various AFWS under various loss of feedwater transients (one of which was the initiating event of TMI-2) and other postulated failure conditions by determining the potential for AFWS failure due to common causes, single point vulnerabilities, and human error.

We concluded that the implementation of the following recommendations identified during this review will considerably improve the reliability of the AFWS for each operating plant.

The following generic recommendations did not apply to CCNPP: GS-1, GS-3, GS-7, GL-4, and GL-5. The basis for these recommendations can be found in Appendix III of NUREG-0635 and the system description which determined the basis for not applying these recommendations can be found in Section X of NUREG-0635.

2.4.1 Short Term Recommendations

Recommendation GS-2 - The licensee presently, by administrative procedure, locks open single valves or multiple valves in series in the AFWS pump suction piping and locks open other single valves or multiple valves in series that could interrupt all AFWS flow. Monthly inspections should be performed to verify that these valves are locked and in the open position. These inspections should be proposed for incorporation into the surveillance requirements of the plant Technical Specifications. See Recommendation GL-2 for the longer-term resolution of this concern.

Evaluation GS-2 - By letter dated March 9, 1981, the licensee confirmed that the only valves that could interrupt all AFWS flow are required to be locked open per Operating Instruction 32.

By letter dated January 22, 1980, the licensee proposed revisions to the Technical Specifications. These revisions state that each auxiliary feedwater pump shall be demonstrated operable at least once per 31 days by verifying that each valve (manual, power operated, or automatic) in the flow path is in its correct position. Pumping water from the condensate storage tank No. 12 whether to the steam generators or through the bypass line demonstrates that the valves in the common suction line are open. We find the response to this recommendation acceptable.

Recommendation GS-4 - Emergency procedures for transferring to alternate sources of AFWS supply should be available to the plant operators. These procedures should include criteria to inform the operator when, and in what order, the transfer to alternate water sources should take place. The following cases should be covered by the procedures:

- The case in which the primary water supply is not initially available. The procedures for this case should include any operator actions required to protect the AFWS pumps against self-damage before water flow is initiated, and,

- The case in which the primary water supply is being depleted. The procedure for this case should provide for transfer to the alternate water sources prior to draining of the primary water supply.

Evaluation GS-4 - By letter dated March 9, 1981, the licensee stated that should the primary water supply not initially be available the operator would not start the AFWS pump per Operating Instruction 32. One of the initial conditions for start-up of an AFWS pump is, "Water in No. 12 Condensate Storage Tank (CST) is available." Should the level in the CST-12 not be adequate, the operator is directed how to transfer to the alternate water supply (CST-11 or CST-21) prior to starting the AFWS pumps. This transfer is also addressed in Abnormal Operating Procedure (AOP)-15 for the case of CST-12 depletion during operations. In addition to the procedure, there is also a checklist available for this evolution. TS 3.7.1.3 requires that No. 12 CST always have 150,000 gallons available per operating unit. This is verified at least once per 12 hours. Therefore, the likelihood of No. 12 CST not having adequate level is remote. Based on the above information, we find adequate direction to prevent damage to the AFWS pumps should the primary water supply initially or subsequent to operation not be available.

Recommendation GS-5 - The as-built plant should be capable of providing the required AFW flow at least two hours from one AFWS pump train independent of any alternating current power source. If manual AFWS initiation or flow control is required following a complete loss of alternating current power, emergency procedures should be established for manually initiating and controlling the system under these conditions. Since the water for cooling of the lube oil for the turbine-driven pump bearings may be dependent on alternating current power, design or procedural changes shall be made to eliminate this dependency as soon as practicable. Until this is done, the emergency procedures should provide for an individual to be stationed at one turbine-driven pump in the event of the loss of all operating current power to monitor pump bearing and/or lube oil temperatures. If necessary, this operator would operate the turbine-driven pump in an on-off mode until alternating current power is restored. Adequate lighting powered by direct current power sources and communications at local stations should also be provided if manual initiation and control of the AFWS is needed. (See Recommendation GL-3 for the longer-term resolution of this concern.)

Evaluation GS-5 - BG&E responded by letter dated December 13, 1979, that the motor-operated steam supply valves to the turbine driven pump represent the only feature of the system that depends on alternating current power. The licensee responded further by letter dated January 26, 1981, stating that Emergency Operating Procedure-15 directs the operator to start the AFWS and manually open the steam admission valves if all AC power is lost. The AFWS regulating valves, used to control flow, are vital AC powered (backed up by DC batteries through an inverter). With respect to lighting and communication the licensee responded by letter dated March 9, 1981, and stated that the corridors on the 45' Elevation (the location of the reach rods for the steam admission valves) are illuminated during a station blackout by emergency lighting units with an 8 hour rating. The licensee plans to install additional lights in the vicinity of reach rods to augment that which is already available. They expect this work to be completed in six months.

Should all AC power be lost, an operator will be directed to proceed to the steam admission valves for the AFWS pumps and open them. The control room would know when the valves are being opened because the pump will immediately start, therefore, it is not necessary for the operator to communicate this fact to them. The operator will be aware that the valves are open because he performed the function. Therefore, he does not need verification from the control room.

Since procedures have been established to manually initiate the AFWS, since adequate lighting will be provided to facilitate the manual initiation and since walkie-talkies are available and there is a sound powered phone at each level in the stairwell for communications, we find the response to this recommendation acceptable.

Recommendation GS-6 - The licensee should confirm flow path availability of an AFWS flow train that has been out of service to perform periodic testing or maintenance as follows:

. Procedures should be implemented to require an operator to determine that the AFWS valves are properly aligned and a second operator to independently verify that the valves are properly aligned.

. The licensee should propose Technical Specifications to assure that prior to plant startup following an extended cold shutdown, a flow test would be performed to verify the normal flow path from the primary AFWS water source to the steam generators. The flow test should be conducted with AFWS valves in their normal alignment.

Evaluation GS-6 - By letter dated March 9, 1981, BG&E stated that any locked valve which is repositioned must be checked and then rechecked independently by a second operator to verify its position. We find the response to the first part of this recommendation acceptable.

By letter dated January 22, 1980, the licensee proposed revisions to the Technical Specifications stating that after a cold shutdown period of 14 days or greater, a flow test shall be performed to verify flow path from the primary water source tank to both steam generators. We conclude that the response to the second part of the recommendation is acceptable.

Recommendation GS-8 - The licensee should install a system to automatically initiate the AFWS. The system need not, in the short-term, be safety-grade; however, it should meet the criteria listed below, which are similar to Item 2.1.7.a of NUREG-0578. For the longer term, the automatic initiation signals and circuits should be upgraded to meet safety-grade requirements as indicated in Recommendation GL-1.

. The design should provide for the automatic initiation of the auxiliary feedwater system flow.

. The automatic initiation signals and circuits should be designed so that a single failure will not result in the loss of auxiliary feedwater system function.

. Testability of the initiating signals and circuits should be a feature of the design.

. The initiating signals and circuits should be powered from the emergency buses.

. Manual capability to initiate the auxiliary feedwater system from the control room should be retained and should be implemented so that a single failure in the manual circuits will not result in the loss of system function.

- The alternating current motor-driven pumps and valves in the auxiliary feedwater system should be included in the automatic actuation (simultaneous and/or sequential) of the loads to the emergency buses.

- The automatic initiation signals and circuits should be designed so that their failure will not result in the loss of manual capability to initiate the AFWS from the control room.

Evaluation GS-8 - By letter dated March 9, 1981, BG&E stated that all seven criteria have been met. We find the response to this recommendation acceptable on a control grade basis. We will review the design for safety grade system, under Recommendation GL-1, at a later time.

Recommendation - The licensee should propose modifications to Technical Specifications to require that manual valves that are normally closed or open will be tested periodically.

Evaluation - BG&E responded, by letter dated March 9, 1981, that valves critical to proper AFWS operability are locked in position. At least once per quarter the operability of remote operated valves is verified in accordance with the ASME Code Section XI. In addition, the TS require that every 31 days the plant is required to verify that each valve in the flow path is in its correct position. We find the licensee's response to this recommendation is acceptable.

2.4.2 Additional Short Term Recommendations

Recommendation-1 - The licensee should provide redundant level indications and low level alarms in the control room for the AFWS primary water supply to allow the operator to anticipate the need to make up water or transfer to an alternate water supply and prevent a low pump suction pressure condition from occurring. The low level alarm setpoint should allow at least 20 minutes for operator action, assuming that the largest capacity AFWS pump is operating.

Evaluation-1 - The licensee responded by letter dated December 13, 1979, stating that redundant primary water source tank low level set points alarms in the control room. The setpoint provides the operator with more than 20 minutes to line-up alternate water sources. By letter dated March 9, 1981, the licensee responded that the addition of redundant level indication for the primary water source tank cannot be completed by July 1, 1981, due to equipment ordering lead times.

They expect delivery of the required parts by April of 1982. Should these parts arrive in time for the 1982 outages, they will be installed at that time, if not they will be installed with the rest of the AFWS modifications with an expected completion time of late 1983. We conclude that the licensee's response to this recommendation is acceptable.

Recommendation-2 (This recommendation has been revised from the original recommendation in NUREG-0635) - The licensee should perform a 48-hour endurance test on all AFWS pumps, if such a test or continuous period of operation has not been accomplished to date. Following the 48-hour pump run, the pumps should be shut down and cooled down and then restarted and run for one hour. Test acceptance criteria should include demonstrating that the pumps remain within design limits with respect to bearing/bearing oil temperatures and vibration and that pump room ambient conditions (temperature, humidity) do not exceed environmental qualification limits for safety-related equipment in the room.

The licensee should provide a summary of the conditions and results of the tests. The summary should include the following: 1) A brief description of the test method (including flow schematic diagram) and how the test was instrumented (i.e., where and how bearing temperatures were measured). 2) A discussion of how the test conditions (pump flow, head, speed and steam temperature) compare to design operating conditions. 3) Plots of bearing/bearing oil temperature vs. time for each bearing of each AFWS pump/driver demonstrating that temperature design limits were not exceeded. 4) A plot of pump room ambient temperature and humidity vs. time demonstrating that the pump room ambient conditions do not exceed environmental qualifications limits for safety-related equipment in the room. 5) A statement confirming that the pump vibration did not exceed allowable limits during tests.

Evaluation-2 - By letter dated January 26, 1981, the licensee responded that a 72-hour endurance test was performed on No. 11 AFWS pump. Follwing the 72-hour run the pump was shut down, cooled down, and then run for an hour. The bearing/bearing oil temperatures and vibrations remained within design limits and the pump room environmental qualification limits for safety-related equipment in the room were not exceeded. The licensee's response is acceptable for No. 11 AFWS pump.

Subsequent to the licensee's test of pump No. 11 the staff reduced the requirement for the endurance test from 72 to 48 hours.

By letter dated March 9, 1981, the licensee stated that a 48-hour endurance test as described in this recommendation will be performed on AFWS turbine-driven pumps 12, 21 and 22 by May 1, 1981. We find the licensee's response to this recommendation acceptable.

The licensee has committed to install a third train with a motor-driven pump for each unit to comply with our long-term recommendations on the AFWS. The licensee stated that the endurance tests will also be conducted on the motor-driven pumps after they are installed.

Recommendation-3 - The licensee should implement the following requirements as specified by Item 2.1.7.b on page A-32 of NUREG-0578: "Safety-grade indication of auxiliary feedwater flow to each steam generator shall be provided in the control room.

The auxiliary feedwater flow instrument channels shall be powered from the emergency buses consistent with satisfying the emergency power diversity requirements for the auxiliary feedwater system set forth in Auxiliary Systems Branch Technical Position 10-1 of the Standard Review Plan, Section 10.4.9."

Evaluation-3 - The BG&E response was provided by letter dated December 15, 1980. BG&E is planning significant modifications to the AFWS including the addition of an electric-driven AFWS pump per unit. Also, a pipe rupture logic will be installed using AFWS flow as a parametric in the instrumentation. The above referenced letter commits to, in the short term, upgrading the existing flow indication system to meet all requirements for safety related equipment. We find the short-term upgrading of AFWS flow acceptable. We will review the planned modifications of AFWS flow at a later time.

Recommendation-4 - Licensees with plants which require local manual realignment of valves to conduct periodic tests on one AFW system train, and there is only one remaining AFW train available for operation should propose Technical Specifications to provide that a dedicated individual who is in communication with the control room be stationed at the manual valves. Upon instruction from the control room, this operator would realign the valves in the AFWS train from the test mode to its operational alignment.

Evaluation-4 - By letter dated January 22, 1980, the licensee proposed revisions to the TS stating that whenever the pump discharge manual valve is shut during periodic testing a dedicated individual will be stationed at the valve. This operator will be in communication with the control room and upon completion of periodic testing the valve will be returned to its proper position.

We find the response to this recommendation acceptable.

2.4.3 Long Term Recommendations

Recommendation-GL1 - Licensees with plants having a manual starting AFWS should install a system to automatically initiate the AFWS flow. This system and associated automatic initiation signals should be designed and installed to meet safety-grade requirements. Manual AFWS start and control capability should be retained with manual start serving as backup to automatic AFWS initiation.

Evaluation-GL1- BG&E has installed the control grade circuitry required to automatically start the two steam-driven AFWS pumps. They have also committed to upgrade and replace components as necessary to meet safety-grade requirements. Our review of the safety-grade components will be completed and issued at a later date.

Recommendation-GL2 - Licensees with plants in which all (primary and alternate) water supplies to the AFWS pass through valves in a single flow path should install redundant paralleled flow paths (piping and valves).

Licensees with plants in which the primary AFWS water supply passes through valves in a single flow path, but the alternate AFWS water supplies connect to the AFWS pump suction piping downstream of the above valve(s) should install redundant valves parallel to the above valve(s) or provide automatic opening of the valve(s) from the alternate water supply upon low pump suction pressure.

The licensee should propose Technical Specifications to incorporate appropriate inspections to verify the valve positions.

Evaluation-GL2 - At CCNPP, the primary AFWS supply passes through a single flow path with two valves before the alternate AFWS supply connects to the suction piping.

By letter dated February 2, 1981, the licensee stated that the internals will be removed from the first valve downstream of the primary water source tank and that a normally open bypass valve will be installed around the second valve downstream of the primary water source tank.

By letter dated March 9, 1981, the licensee stated that the requested TS changes forwarded on January 22, 1980 require that every 31 days the plant must verify that each valve in the AFWS flow path is in its correct position. The response to this recommendation is acceptable. However, by letter dated March 5, 1981, the licensee proposed an alternate modification to the suction piping wherein the internals would be removed from the first valve downstream of the primary water source tank and position indication would be provided in the Control Room for the second valve. We are reviewing this proposal and will provide our evaluation at a later date.

Recommendation-GL3 - At least one AFWS pump and its associated flow path and essential instrumentation should automatically initiate AFWS flow and be capable of being operated independently of any alternating current power source for at least two hours. Conversion of direct current power to alternating current is acceptable.

Evaluation-GL3 - The licensee responded by letter dated December 13, 1979, that the motor operated auxiliary feedwater pump turbine steam supply valves represent the only feature of the system that depends on alternating current power. BG&E has installed the circuitry to automatically initiate AFWS flow by starting both steam-driven pumps. In order to satisfy the long-term requirement on AC independence the existing steam supply AC motor-operated valves will be replaced with AC controlled fail-open air-operated valves. Therefore, loss of AC will cause these steam supply valves to fail open starting the turbine driven AFWS pumps. We find the response to this recommendation, with the pending modifications, acceptable.

Recommendation-4 - The motor operated steam inlet valves and other equipment affected by the environmental effects of the main steam and feed line breaks discussed in Sections 2.1.1 and 2.2.4 should be qualified to the environmental conditions that will be present.

Evaluation-4 - By letter dated November 18, 1980, BG&E proposed auxiliary feedwater system modifications in response to our long-term AFWS requirements. As proposed, an electric motor-driven AFWS pump will be added to back-up the existing turbine driven AFWS pump. A crossover line between each unit's motor-driven pump discharge header to the opposite unit's discharge header will also be provided. By letter dated March 9, 1981, the licensee stated that all equipment, proposed for installation in the November 18, 1980 letter, will be environmentally qualified in accordance with the existing requirements.

The proposed modifications will result in the ability to deliver adequate auxiliary feedwater in the event of the occurrence of either of the steam line pipe breaks covered by this recommendation plus a single active failure. We find the response to this recommendation acceptable.

Recommendation-5 - The licensee should evaluate the following concerns:

a) The AFWS pump discharge lines and turbine driven AFWS steam supply lines combine into different single lines through which all AFWS water or steam must flow. (See Figure 1). A pipe break in either of these single flow paths would cause loss of the entire AFWS function.

b) The Calvert Cliffs AFWS do not meet the high energy line break criteria in SRP 10.4.9 and Branch Technical Position 10.1; namely, that the AFWS should maintain the capability to supply the required flow to the steam generator(s) assuming a pipe break anywhere in the AFWS pump discharge lines concurrent with a single active failure.

The licensee should evaluate the postulated pipe breaks stated above and (1) determine any AFWS design changes or procedures necessary to detect and isolate the break and direct the required feedwater flow to the steam generator(s) before they boil dry or (2) describe how the plant can be brought to a safe shutdown condition by use of other systems which would be available following such postulated events.

Evaluation-5 - By letter dated November 18, 1980, the licensee proposed auxiliary feedwater system modifications in response to our long-term AFWS requirements. By letter dated March 9, 1981, the licensee stated that the design and procedural changes required to implement the AFWS modifications have been reviewed to ensure that they will maintain the capability to supply the required flow to the steam generator(s) assuming a pipe break anywhere in the AFWS pump discharge lines concurrent with a single active failure. The design and procedural changes are sufficient to ensure the capability to detect and isolate the break, and direct the required feedwater flow to the steam generator(s) before they boil dry. We find the response to this recommendation acceptable.

Recommendation on "Basis for Auxiliary Feedwater System Flow Requirements" - As a result of recent staff reviews of operating plant AFWS, the staff concluded that the design bases and criteria provided by licensees for establishing AFWS requirements for flow to the steam generator(s) to assure adequate removal of reactor decay heat are not well defined or documented.

Evaluation - We required that the licensee provide AFWS flow design bases information as applicable to the design basis transients and accident conditions. We have reviewed the licensee's response to this recommendation and have performed independent calculations and find the licensee's flow design bases acceptable.

2.5 Technical Specifications Changes

The proposed TS changes under review are from BG&E's applications dated January 22 and November 10 and 25, 1980. Some portions of the proposed TS changes or related TS pages should be modified to meet our requirements or for increased clarification. Such modifications have been discussed with and agreed to by the BG&E staff.

Pages 3/4 3-4, 3/4 3-19, 3/4 3-20 and 3/4 3-21

The automatic initiation of AFWS requirements should be added to the ESFAS Tables 3.3-3, 3.3-4 and 3.3-5.

Page 3/4 3-23

The surveillance requirements for automatic initiation of AFWS should be added to Table 4.3-2.

Pages 3/4 7-5 and 3/4 7-5a

The surveillance requirements needed to prove the operability of the AFWS should be expanded to include automatic initiation, flow path verification and valve alignment.

3.0 Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR 51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

4.0 Safety Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significnt hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: May 8, 1981

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-317 AND 50-318

BALTIMORE GAS AND ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 54 and 37 to Facility Operating License Nos. DPR-53 and DPR-69 issued to the Baltimore Gas and Electric Company (the licensee), which revised Technical Specifications for operation of the Calvert Cliffs Nuclear Power Plant, Units Nos. 1 and 2 (the facility) located in Calvert County, Maryland. The amendment is effective on June 1, 1981.

The amendments add operability trip setpoint and surveillance requirements for automatic initiation of the auxiliary feedwater system and increase the surveillance requirements on the auxiliary feedwater pumps and related flow paths.

The applications for the amendments comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR 51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the applications for amendments dated January 22 and November 10 and 25, 1980, (2) Amendments Nos. 54 and 37 to License Nos. DPR-53 and DPR-69, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and at the Calvert County Library, Prince Frederick, Maryland. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 8th day of May, 1981.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing