



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 3, 1995

Mr. Robert E. Denton
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT,
UNIT NO. 1 (TAC NO. M90122) AND UNIT NO. 2 (TAC NO. M90123)

Dear Mr. Denton:

The Commission has issued the enclosed Amendment No. 203 to Facility Operating License No. DPR-53 and Amendment No. 181 to Facility Operating License No. DPR-69 for the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated August 2, 1994.

The amendments revise the TSs regarding the emergency diesel generators (EDGs) by modifying the surveillance requirements to include verification that the EDG high crankcase pressure trip is bypassed when a Safety Injection Actuation Signal is present. A footnote is also included which indicates that the verification of the high crankcase pressure trip bypass is not required on a particular EDG until the modification implementing the bypass has been completed for the EDG. The footnote further indicates that the modifications are to be completed by February 28, 1996.

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

Sincerely,

Daniel G. McDonald, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-317
and 50-318

Enclosures: 1. Amendment No. 203 to DPR-53
2. Amendment No. 181 to DPR-69
3. Safety Evaluation

cc w/encls: See next page

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Mr. Robert E. Denton
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 and 2

cc:

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Calvert County Board of
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DATED: March 3, 1995

AMENDMENT NO. 203 TO FACILITY OPERATING LICENSE NO. DPR-53-CALVERT CLIFFS
UNIT 1

AMENDMENT NO. 181 TO FACILITY OPERATING LICENSE NO. DPR-69-CALVERT CLIFFS
UNIT 2

Docket File

PUBLIC

PDI-1 Reading

S. Varga, 14/E/4

J. Zwolinski, 14/H/3

L. Marsh

C. Vogan

D. McDonald

OGC

D. Hagan, T-4 A43

C. Liang, 8/E/23

G. Hill (4), T-5 C3

C. Grimes, 11/E/22

ACRS (4)

OPA

OC/LFDCB

PD plant-specific file

C. Cowgill, Region I

C. Berlinger

cc: Plant Service list

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 203
License No. DPR-53

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated August 2, 1994, 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-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. 203, 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Ledyard B. Marsh, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 3, 1995



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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-318

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 181
License No. DPR-69

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated August 2, 1994, 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-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. 181, 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Ledyard B. Marsh, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 3, 1995

Mr. Robert E. Denton
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 and 2

cc:

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ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 203 FACILITY OPERATING LICENSE NO. DPR-53

AMENDMENT NO. 181 FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NOS. 50-317 AND 50-318

Revise Appendix A as follows:

Remove Page
3/4 8-5

Insert Page
3/4 8-5

3/4.8 ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c. At least once per 184 days by verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in ≤ 10 seconds.*
- d. At least once per **REFUELING INTERVAL** by:
 - 1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service.
 - 2. Verifying the generator capability to reject a load of ≥ 500 hp without tripping.
 - 3. Simulating a loss of offsite power in conjunction with a safety injection actuation test signal, and:
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts from ambient condition on the auto-start signal, energizes the emergency busses with permanently connected loads, energizes the auto-connected emergency loads through the load sequencer and operates for ≥ 5 minutes while its generator is loaded with the emergency loads.*
 - c) Verifying that the high jacket coolant temperature, high crankcase pressure, and low jacket coolant pressure trips are automatically bypassed on a Safety Injection Actuation Signal.**
 - 4. Verifying the diesel generator operates for ≥ 60 minutes while loaded to ≥ 2500 kW.
 - 5. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000 hour rating of each diesel generator.

* All engine starts for the purpose of this Surveillance Requirement may be preceded by an engine pre-lube period recommended by the manufacturer so that mechanical wear and stress on the diesel engine is minimized.

** The high crankcase pressure trip bypass verification is applicable after the trip bypass is installed on the diesel engine being tested. Modifications are to be completed by February 28, 1996.

3/4.8 ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c. At least once per 184 days by verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in ≤ 10 seconds.*
- d. At least once per **REFUELING INTERVAL** by:
 1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service.
 2. Verifying the generator capability to reject a load of ≥ 500 hp without tripping.
 3. Simulating a loss of offsite power in conjunction with a safety injection actuation test signal, and:
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts from ambient condition on the auto-start signal, energizes the emergency busses with permanently connected loads, energizes the auto-connected emergency loads through the load sequencer and operates for ≥ 5 minutes while its generator is loaded with the emergency loads.*
 - c) Verifying that the high jacket coolant temperature, high crankcase pressure, and low jacket coolant pressure trips are automatically bypassed on a Safety Injection Actuation Signal.**
 4. Verifying the diesel generator operates for ≥ 60 minutes while loaded to ≥ 2500 kW.
 5. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000 hour rating of each diesel generator.

* All engine starts for the purpose of this Surveillance Requirement may be preceded by an engine pre-lube period recommended by the manufacturer so that mechanical wear and stress on the diesel engine is minimized.

** The high crankcase pressure trip bypass verification is applicable after the trip bypass is installed on the diesel engine being tested. Modifications are to be completed by February 28, 1996.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 203 TO FACILITY OPERATING LICENSE NO. DPR-53
AND AMENDMENT NO. 181 TO FACILITY OPERATING LICENSE NO. DPR-69
BALTIMORE GAS AND ELECTRIC COMPANY
CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-317 AND 50-318

1.0 INTRODUCTION

By letter dated August 2, 1994, the Baltimore Gas and Electric Company (BG&E or licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, Technical Specifications (TSs). The requested changes would revise the TSs of the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, by including the emergency diesel generators (EDGs) high crankcase pressure trips in those trips which are provided to protect the EDGs from abnormal conditions during normal operations and which are bypassed during an accident condition. The high jacket coolant temperature and the low jacket coolant pressure, which are currently bypassed during an accident condition, are designed to trip the EDGs to prevent damage and minimize out-of-service time. However, these protective trips which are functional during normal operations are not always indicative of imminent failure of an EDG and it is desirable to bypass them during an accident condition to assure that safety-related equipment necessary to mitigate the consequences of an accident has its required power source.

BACKGROUND

The safety-related function of the EDGs is to provide power to the equipment necessary to safely shut down or maintain the unit(s) in safe shutdown during nonaccident conditions or to provide power to the Engineered Safety Features (ESF) equipment required to mitigate the consequences of design basis accident. The Calvert Cliffs site has three EDGs, with one EDG dedicated to each unit and its associated 4160 volt ESF buss, and the third EDG capable of being aligned to the second ESF buss of either unit. Two of the three EDGs are capable of supplying power to the loads required to mitigate the consequences of an accident in one unit and safely shut down the other unit, thus the single failure criterion is met in that one of the three EDGs can fail and the plant can be maintained in a safe condition.

When a sustained undervoltage or loss of offsite power is sensed on the ESF busses with the dedicated EDGs, the associated EDG will start, the normal

source of power is disconnected, the bus is stripped of its loads, the EDG is connected to the bus, and a shutdown sequencer will sequentially load the equipment necessary to safely shut down the unit. If an undervoltage is sensed on either of the ESF busses that is provided backup power by the swing EDG, the same sequence of events will occur with the swing EDG providing power to the ESF bus that had the low voltage. In the event that both of the ESF busses that rely on the swing EDG for backup power sense low voltage concurrently, the swing EDG will supply power to the ESF bus whose electrical under voltage signal is received first. The swing EDG can be manually transferred to the other ESF bus subsequent to the initial alignment.

Accident conditions will result in a Safety Injection Actuation Signal (SIAS) being initiated for the affected unit which will start the EDGs; however, the sequence of stripping and loading the required ESF equipment will not occur unless there is a loss of offsite power. If the SIAS is concurrent with a loss of offsite power, a loss-of-coolant sequencer will perform the necessary functions to strip both ESF busses and load the required ESF equipment. The shutdown sequencer on the nonaccident unit will perform its function as previously described. Should a single failure occur in the nonaccident unit, the swing EDG can be manually transferred from the accident unit to the other ESF bus on the nonaccident unit.

3.0 EVALUATION

As previously noted, the request is to add the high crankcase pressure trip as one of the EDG trips to be bypassed by a SIAS. The purpose of this EDG protective trip is to minimize engine damage as the result of failure mechanisms which produce a high crankcase pressure. BG&E and the EDG manufacturer, Fairbanks Morse, have identified five failure modes which could result in a high crankcase pressure. These failure modes, which could occur as the result of a single random failure, are;

1. Broken piston rings
2. Cracked pistons
3. Blower seal failure
4. Liner water seal failure
5. Failed crankcase vacuum system

BG&E analyzed the consequences of each of the failure modes identified above. The first four failures could lead to further degradation of the effected EDG. The current protective trip would trip the affected EDG; however, the damage to the EDG would be such that the EDG would be out-of-service for an extended period of time to implement the necessary repairs. However, these failure modes would not lead to rapid destruction of an EDG.

The most common failure resulting in a high crankcase pressure, failed crankcase vacuum system, does not lead to further degradation. BG&E noted that several EDG shutdowns have resulted from this type of failure during testing. BG&E identified problems with an oriface plate and condensate in the crankcase as the cause of the crankcase vacuum system problems and implemented

corrective actions/modifications which were completed in 1988. Since that time there has been one trip which was due to oil in a sensing line to the crankcase. This was corrected last year and there have been no subsequent trips due to high crankcase pressure.

Although the first four failures will result in damage to the affected EDG, as previously noted, they do not lead to rapid destruction of the diesel engine. A high crankcase pressure is annunciated in the control room, by any one of the three pressure sensors, which alerts the operators of the abnormal crankcase condition. BG&E will modify the plant operating procedures to include monitoring the high crankcase pressure when a SIAS is present. The current procedures require that the other EDG protective trips that are bypassed when a SIAS is present be monitored. The additional requirement to monitor the crankcase high pressure will assure that the operator has sufficient time to react to unacceptable changes in this parameter.

The Institute of Electronic and Electrical Engineers (IEEE) Standard 387-1984, "IEEE Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations," as augmented by Regulatory Guide (RG) 1.9, "Selection, Design, Qualification, And Testing of Emergency Diesel Generator Units as Class 1E Onsite Electric Power Systems at Nuclear Power Plants," provide guidance for bypassing EDG protective trips during emergency conditions. The guidance indicates that trips may be bypassed under accident conditions provided that the operator has sufficient time to react appropriately to an abnormal EDG condition.

4.0 SUMMARY

As noted, BG&E has requested to modify TS 4.8.1.1.2.d.3.c surveillance requirements to include verification that the EDG high crankcase pressure trips are bypassed when a SIAS is present and the inclusion of footnotes indicating that the verification is not required on a particular EDG until the modification implementing the bypass has been completed for the EDG. In addition, the footnote will also indicate that the modifications will be completed by February 28, 1996. This request is based on the following: 1) a high crankcase pressure will not result in rapid destruction of an EDG, 2) the operators are alerted of the condition by a control room annunciator and the plant operating procedures will be modified to provide appropriate guidance to the operators, 3) allowing an EDG to operate with a high crankcase pressure condition will not impact the operability of the unaffected EDGs or other safety-related equipment necessary to mitigate the consequences of an accident assuring that the single failure criteria is met, and 4) the availability of the affected EDG during the initial phase of an accident will be increased.

The above evaluation, as summarized, indicates that the proposed changes are consistent with the guidance provided in IEEE Standard 387-1984, as augmented by RG 1.9, and the proposed changes are supported by the EDG vendor; therefore, we find that the proposed changes are acceptable.

5.0 STATE CONSULTATION

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

6.0 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 changes 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 (59 FR 47165). 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.

7.0 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 Contributor: D. McDonald

Date: March 3, 1995