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

August 31, 1994

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

SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M88193) AND UNIT NO. 2 (TAC NO. M88194)

Dear Mr. Denton:

The Commission has issued the enclosed Amendment No. 194 to Facility Operating License No. DPR-53 and Amendment No. 171 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 in response to your application transmitted by letter dated November 5, 1993, as supplemented on March 11, 1994.

The amendments consist of two related changes. The first change revises the containment penetration Technical Specifications (TSs) to resemble the containment penetration TSs in NUREG-1432, "Standard Technical Specifications for Combustion Engineering Pressurized Water Reactors." The second revises the TSs to allow the containment personnel airlock to be open during fuel movement and core alterations. The TS Bases have also been revised to reflect the changes as the result of issuing these amendments.

DF01

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. 194 to DPR-53
2. Amendment No. 171 to DPR-69
3. Safety Evaluation

cc w/encls: See next page

cc:

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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,

ORIGINAL SIGNED BY:

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. 194 to DPR-53
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cc w/encls: See next page

*See previous concurrence

DOCUMENT NAME: G:\CC1-2\CC88193.AMD

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OFFICIAL RECORD COPY

DATED: August 31, 1994

AMENDMENT NO. 194 TO FACILITY OPERATING LICENSE NO. DPR-53-CALVERT CLIFFS UNIT 1
AMENDMENT NO. 171 TO FACILITY OPERATING LICENSE NO. DPR-69-CALVERT CLIFFS UNIT 2

Docket File
PUBLIC
PDI-1 Reading
S. Varga, 14/E/4
C. Miller, 14/A/4
M. Case
C. Vogan
D. McDonald
OGC
D. Hagan, 3302 MNBB
C. Liang, 8/E/23
G. Hill (4), P1-22
C. Grimes, 11/F/23
W. Long, 8/H/7
J. Lee, 10/D/4
ACRS (10)
OPA
OC/LFDCB
PD plant-specific file
C. Cowgill, Region I

cc: Plant Service list

050005

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. 194
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 November 5, 1993, as supplemented on March 11, 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.

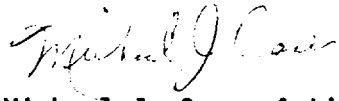
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.2. of Facility Operating License No. DPR-53 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 194 , 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



Michael J. Case, Acting 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: August 31, 1994

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. 171
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 November 5, 1993, as supplemented on March 11, 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. 171 , 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

Michael J. Case, Acting 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: August 31, 1994

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 194 FACILITY OPERATING LICENSE NO. DPR-53

AMENDMENT NO. 171 FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NOS. 50-317 AND 50-318

Revise Appendix A as follows:

DPR-53

Remove Pages	Insert Pages
3/4 8-6	3/4 8-6*
3/4 8-7	3/4 8-7
3/4 8-8	3/4 8-8*
3/4 8-11	3/4 8-11
3/4 8-12	3/4 8-12
3/4 8-17	3/4 8-17
3/4 9-3	3/4 9-3
3/4 9-4	3/4 9-4
3/4 9-5	3/4 9-5
B 3/4 9-1	B 3/4 9-1
B 3/4 9-2	B 3/4 9-2*
B 3/4 9-3	B 3/4 9-3*

DPR-69

Remove Pages	Insert Pages
3/4 8-6	3/4 8-6*
3/4 8-7	3/4 8-7
3/4 8-8	3/4 8-8*
3/4 8-11	3/4 8-11
3/4 8-12	3/4 8-12
3/4 8-17	3/4 8-17
3/4 9-3	3/4 9-3
3/4 9-4	3/4 9-4
3/4 9-5	3/4 9-5
B 3/4 9-1	B 3/4 9-1
B 3/4 9-2	B 3/4 9-2*
B 3/4 9-3	B 3/4 9-3*

*Pages affected by roll-over.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

Shutdown

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be **OPERABLE:**

a. One circuit between the offsite transmission network and the onsite Class 1E Distribution System, and

b. One diesel generator with:

1. A fuel oil day tank containing a minimum volume of 275 gallons of fuel,

2. A common Fuel Storage System consisting of:

a. No. 21 Fuel Oil Storage Tank containing a minimum volume of 74,000 gallons of fuel oil, and

b. No. 11 Fuel Oil Storage Tank containing a minimum volume of 32,000 gallons of fuel oil, and

3. A fuel transfer pump.

APPLICABILITY: **MODES** 5 and 6.

ACTION:

a. With less than the above minimum required A.C. electrical power sources **OPERABLE** for reasons other than the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 diesel generator:

1. Immediately* suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel, and

2. Immediately initiate corrective actions to restore the minimum A.C. electrical busses to **OPERABLE** status, and

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* Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

LIMITING CONDITION FOR OPERATION (Continued)

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

b. With less than the above minimum required A.C. electrical power sources **OPERABLE** for the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 emergency diesel generator:**

1. Verify either two 500 kV offsite power circuits or a 500 kV offsite power circuit and the 69 kV SMECO offsite power circuit are available and capable of being used. This availability shall be verified prior to removing the **OPERABLE** emergency diesel generators and once per shift thereafter,

2. Suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel,

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

4. An emergency diesel generator shall be **OPERABLE** and aligned to provide power to the emergency busses within seven days.

5. Within two weeks prior to the planned unavailability of an **OPERABLE** emergency diesel generator, a temporary diesel generator shall be demonstrated available.

6. A temporary diesel generator shall be demonstrated available by starting it at least once per 72 hours.

7. If **ACTIONS** b) 1 through b) 6 are not met, restore compliance with the **ACTIONS** within 4 hours or restore an **OPERABLE** emergency diesel generator within the next 4 hours.

** The provisions of **ACTION** b) are no longer applicable following the installation of two additional emergency diesel generators.

LIMITING CONDITION FOR OPERATION (Continued)

c. With No. 11 Fuel Oil Storage Tank inoperable, demonstrate the **OPERABILITY** of No. 21 Fuel Oil Storage Tank by: 1) performing Surveillance Requirement 4.8.1.1.2.a.2 (verifying 74,000 gallons) within 1 hour; and 2) verifying the flow path from No. 21 Fuel Oil Storage Tank to the diesel generator within 1 hour.

d. With No. 21 Fuel Oil Storage Tank inoperable, restore No. 21 Fuel Oil Storage Tank to **OPERABLE** status within 72 hours or suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated **OPERABLE** by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 except for Requirement 4.8.1.1.2.a.5.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.2 ONSITE POWER DISTRIBUTION SYSTEMS

A.C. Distribution - Shutdown

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, the following A.C. electrical busses shall be **OPERABLE** and energized from sources of power other than a diesel generator but aligned to an **OPERABLE** diesel generator:

1 - 4160 volt Emergency Bus

1 - 480 volt Emergency Bus

2 - 120 volt A.C. Vital Busses

APPLICABILITY: **MODES** 5 and 6.

ACTION:

a. With less than the above complement of A.C. busses **OPERABLE** and energized for reasons other than the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 diesel generator:

1. Immediately* suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel, until the minimum required A.C. busses are restored to **OPERABLE** and energized status, and

2. Immediately initiate corrective actions to restore the minimum A.C. electrical busses to **OPERABLE** and energized status, and

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

* Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

LIMITING CONDITION FOR OPERATION (Continued)

b. With less than the above minimum required A.C. electrical power sources **OPERABLE** for the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 emergency diesel generator:**

1. Verify either two 500 kV offsite power circuits or a 500 kV offsite power circuit and the 69 kV SMECO offsite power circuit are available and capable of being used. This availability shall be verified prior to removing the **OPERABLE** emergency diesel generators and once per shift thereafter,

2. Suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel,

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

4. An emergency diesel generator shall be **OPERABLE** and aligned to provide power to the emergency busses within seven days.

5. Within two weeks prior to the planned unavailability of an **OPERABLE** emergency diesel generator, a temporary diesel generator shall be demonstrated available.

6. A temporary diesel generator shall be demonstrated available by starting it at least once per 72 hours.

7. If **ACTIONS** b) 1 through b) 6 are not met, restore compliance with the **ACTIONS** within 4 hours or restore an **OPERABLE** emergency diesel generator within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.2 The specified A.C. busses shall be determined **OPERABLE** and energized from A.C. sources other than the diesel generators at least once per 7 days by verifying correct breaker alignment and indicated power availability.

** The provisions of **ACTION** b. are no longer applicable following the installation of two additional emergency diesel generators.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.2 ONSITE POWER DISTRIBUTION SYSTEMS

D.C. Distribution - Shutdown

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D.C. electrical equipment and busses shall be energized and **OPERABLE:**

2 - 125-volt D.C. busses, and

2 - 125-volt battery banks, one of which may be the Reserve Battery, and one associated charger per bank supplying the above D.C. busses.

APPLICABILITY: **MODES** 5 and 6.

ACTION: With less than the above complement of D.C. equipment and busses **OPERABLE:**

a. Immediately* suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel, and movement of heavy loads over irradiated fuel until the minimum required D.C. equipment and busses are restored to **OPERABLE** status, and

b. Immediately initiate corrective actions to restore the minimum D.C. equipment and busses to **OPERABLE** status, and

c. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 125-volt D.C. busses shall be determined **OPERABLE** and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 125-volt battery banks and chargers shall be demonstrated **OPERABLE** per Surveillance Requirement 4.8.2.3.2.

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* Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

3/4.9 REFUELING OPERATIONS

3/4.9.3 DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least 100 hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

ACTION: With the reactor subcritical for less than 100 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least 100 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

3/4.9 REFUELING OPERATIONS

3/4.9.4 CONTAINMENT PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. Each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, or manual valve, or

2. Be capable of being closed by an **OPERABLE** automatic containment purge valve.

c. A minimum of one door in each airlock is closed* but, both doors of the containment personnel airlock may be open if:

1. One personnel airlock door is **OPERABLE**,

2. The plant is in **MODE** 6,

3. There is 23 feet of water above the fuel, and

4. A designated individual is available immediately outside the personnel airlock to close the door.

APPLICABILITY: During **CORE ALTERATIONS** and movement of irradiated fuel within the containment.

ACTION:

a. With the requirements of the above specification not satisfied, immediately** suspend all operations involving **CORE ALTERATIONS** and movement of irradiated fuel within the containment.

b. The provisions of Specification 3.0.3 are not applicable.

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* The emergency escape hatch temporary closure device is an acceptable replacement for that airlock door.

** Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

SURVEILLANCE REQUIREMENTS

4.9.4 Each of the above required containment penetrations shall be determined to be either in its required condition or capable of being closed by an **OPERABLE** automatic containment purge valve within 72 hours prior to the start of and at least once per 7 days during **CORE ALTERATIONS** and movement of irradiated fuel in the containment by:

a. Verifying the penetrations are in their required condition, or

b. Testing the containment purge valves per the applicable portions of Specification 4.6.4.1.2.

3/4.9 REFUELING OPERATIONS

BASES

3/4.9.1 BORON CONCENTRATION

The limitations on minimum boron concentration ensure that: 1) the reactor will remain subcritical during **CORE ALTERATIONS**, and 2) a uniform boron concentration is maintained for reactivity control in the water volumes having direct access to the reactor vessel. A K_{eff} of no greater than 0.95 which includes a conservative allowance for uncertainties, is sufficient to prevent reactor criticality during refueling operations.

3/4.9.2 INSTRUMENTATION

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

3/4.9.3 DECAY TIME

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

3/4.9.4 CONTAINMENT PENETRATIONS

During **CORE ALTERATIONS** or movement of irradiated fuel within containment, release of fission product radioactivity to the environment must be minimized. During **MODES** 1, 2, 3, and 4, this is accomplished by maintaining **CONTAINMENT INTEGRITY** as described in LCO 3.6.1. In other situations, the potential for containment pressurization as a result of an accident is not present, therefore, less stringent requirements are needed to isolate the containment from the outside atmosphere. Both containment personnel airlock doors may be open during movement of irradiated fuel in the containment and during core alterations provided one airlock door is **OPERABLE**, the plant is in **MODE** 6 with 23 feet of water above the fuel, and a designated individual is continuously available to close the airlock door. This individual must be stationed at the Auxiliary Building side of the outer airlock door. Operability of a containment personnel airlock door requires that the door is capable of being closed, that the door is unblocked, and no cables or hoses are being run through the airlock. The requirement that the plant be in **MODE** 6 with 23 feet of water above the fuel ensures that there is sufficient time to close the personnel airlock following a loss of shutdown cooling before boiling occurs.

The containment structure serves to contain fission product radioactivity which may be released from the reactor core following a Design Basis Accident (DBA), such that offsite radiation exposures are maintained within the requirements of 10 CFR Part 100. Additionally, this structure provides radiation shielding from the fission products which may be present in the containment atmosphere following accident conditions.

BASES

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity condition during **CORE ALTERATIONS.**

3/4.9.6 REFUELING MACHINE OPERABILITY

The **OPERABILITY** requirements for the refueling machine ensure that: (1) the refueling machine will be used for movement of CEAs and fuel assemblies, (2) the refueling machine has sufficient load capacity to lift a CEA or fuel assembly, and (3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly and CEA over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses. The Spent Fuel Cask Handling Crane, which has a critical load capacity of 125/15 ton, meets the "single-failure-proof" criteria of NUREG-0554 and NUREG-0612.

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

The requirement that at least one shutdown cooling loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the **REFUELING MODE**, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification.

The requirement to have two shutdown cooling loops **OPERABLE** when there is less than 23 feet of water above the core ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

BASES

In **MODE** 6, shutdown cooling flow must provide sufficient heat removal to match core decay heat generation rates and maintain the core exit temperature within the **MODE** limit. Thus, as decay heat production is reduced with time, shutdown cooling flow may be proportionally reduced. Pursuant to NRC Generic Letter 88-17, flow reduction is necessary for operations near the mid-point of the hot leg piping to prevent vortex formation at the shutdown cooling suction nozzle. Prevention of vortex formation reduces the potential for a loss of shutdown cooling due to airbinding of the low pressure safety injection (LPSI) pump(s) operating to provide shutdown cooling flow. In accordance with the recommendations of NRC Bulletin 88-04, "Safety Related Pump Loss," a minimum flow rate requirement of 1500 gpm is imposed. This protects the vendor-recommended minimum continuous duty flow rate of 1340 gpm for the LPSI pumps. The 1500 gpm minimum flow rate is also more than adequate to preclude a boron dilution event in **MODE** 6 operation and in no way restricts the ability to increase flow as necessary to remove decay heat.

3/4.9.9 CONTAINMENT PURGE VALVE ISOLATION SYSTEM

The **OPERABILITY** of this system ensures that the containment purge valves will be automatically isolated upon detection of high radiation levels within the containment. The **OPERABILITY** of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4.9.11 WATER LEVEL-REACTOR VESSEL AND SPENT FUEL POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.12 SPENT FUEL POOL VENTILATION SYSTEM

The limitations on the Spent Fuel Pool Ventilation System ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The **OPERABILITY** of this system and the resulting iodine removal capacity are consistent with the assumptions of the accident analyses.

3/4.9.13 Deleted by Amendment No. 166.

3/4.8 **ELECTRICAL POWER SYSTEMS**

3/4.8.1 A.C. SOURCES

Shutdown

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be **OPERABLE:**

a. One circuit between the offsite transmission network and the onsite Class 1E Distribution System, and

b. One diesel generator with:

1. A fuel oil day tank containing a minimum volume of 275 gallons of fuel,

2. A common Fuel Storage System consisting of:

a. No. 21 Fuel Oil Storage Tank containing a minimum volume of 74,000 gallons of fuel oil, and

b. No. 11 Fuel Oil Storage Tank containing a minimum volume of 32,000 gallons of fuel oil, and

3. A fuel transfer pump.

APPLICABILITY: **MODES** 5 and 6.

ACTION:

a. With less than the above minimum required A.C. electrical power sources **OPERABLE** for reasons other than the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 diesel generator:

1. Immediately* suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel, and

2. Immediately initiate corrective actions to restore the minimum A.C. electrical power sources to **OPERABLE** status, and

* Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

LIMITING CONDITION FOR OPERATION (Continued)

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

b. With less than the above minimum required A.C. electrical power sources **OPERABLE** for the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 emergency diesel generator:**

1. Verify either two 500 kV offsite power circuits or a 500 kV offsite power circuit and the 69 kV SMECO offsite power circuit are available and capable of being used. This availability shall be verified prior to removing the **OPERABLE** emergency diesel generators and once per shift thereafter,

2. Suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel,

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

4. An emergency diesel generator shall be **OPERABLE** and aligned to provide power to the emergency busses within seven days.

5. Within two weeks prior to the planned unavailability of an **OPERABLE** emergency diesel generator, a temporary diesel generator shall be demonstrated available.

6. A temporary diesel generator shall be demonstrated available by starting it at least once per 72 hours.

7. If **ACTIONS** b) 1 through b) 6 are not met, restore compliance with the **ACTIONS** within 4 hours or restore an **OPERABLE** emergency diesel generator within the next 4 hours.

** The provisions of **ACTION** b) are no longer applicable following the installation of two additional emergency diesel generators.

LIMITING CONDITION FOR OPERATION (Continued)

c. With No. 11 Fuel Oil Storage Tank inoperable, demonstrate the OPERABILITY of No. 21 Fuel Oil Storage Tank by: 1) performing Surveillance Requirement 4.8.1.1.2.a.2 (verifying 74,000 gallons) within 1 hour; and 2) verifying the flow path from No. 21 Fuel Oil Storage Tank to the diesel generator within 1 hour.

d. With No. 21 Fuel Oil Storage Tank inoperable, restore No. 21 Fuel Oil Storage Tank to **OPERABLE** status within 72 hours or suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated **OPERABLE** by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 except for Requirement 4.8.1.1.2a.5.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.2 ONSITE POWER DISTRIBUTION SYSTEMS

A.C. Distribution - Shutdown

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, the following A.C. electrical busses shall be **OPERABLE** and energized from sources of power other than a diesel generator but aligned to an **OPERABLE** diesel generator:

1 - 4160 volt Emergency Bus

1 - 480 volt Emergency Bus

2 - 120 volt A.C. Vital Busses

APPLICABILITY: **MODES** 5 and 6.

ACTION:

a. With less than the above complement of A.C. busses **OPERABLE** and energized for reasons other than the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 diesel generator:

1. Immediately* suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel, until the minimum required A.C. busses are restored to **OPERABLE** and energized status, and

2. Immediately initiate corrective actions to restore the minimum A.C. electrical busses to **OPERABLE** and energized status, and

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

* Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

LIMITING CONDITION FOR OPERATION (Continued)

b. With less than the above minimum required A.C. electrical power sources **OPERABLE** for the performance of Surveillance Requirement 4.8.1.1.2.d.1 on No. 12 emergency diesel generator:**

1. Verify either two 500 kV offsite power circuits or a 500 kV offsite power circuit and the 69 kV SMECO offsite power circuit are available and capable of being used. This availability shall be verified prior to removing the **OPERABLE** emergency diesel generators and once per shift thereafter,

2. Suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel,

3. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

4. An emergency diesel generator shall be **OPERABLE** and aligned to provide power to the emergency busses within seven days.

5. Within two weeks prior to the planned unavailability of an **OPERABLE** emergency diesel generator, a temporary diesel generator shall be demonstrated available.

6. A temporary diesel generator shall be demonstrated available by starting it at least once per 72 hours.

7. If **ACTIONS** b) 1 through b) 6 are not met, restore compliance with the **ACTIONS** within 4 hours or restore an **OPERABLE** emergency diesel generator within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.2 The specified A.C. busses shall be determined **OPERABLE** and energized from A.C. sources other than the diesel generators at least once per 7 days by verifying correct breaker alignment and indicated power availability.

** The provisions of **ACTION** b. are no longer applicable following the installation of two additional emergency diesel generators.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.2 ONSITE POWER DISTRIBUTION SYSTEM

D.C. Distribution - Shutdown

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D.C. electrical equipment and busses shall be energized and **OPERABLE:**

2 - 125-volt D.C. busses, and

2 - 125-volt battery banks, one of which may be the Reserve Battery, and one associated charger per bank supplying the above D.C. busses.

APPLICABILITY: **MODES** 5 and 6.

ACTION: With less than the above complement of D.C. equipment and busses **OPERABLE:**

a. Immediately* suspend all operations involving **CORE ALTERATIONS**, positive reactivity changes, movement of irradiated fuel and movement of heavy loads over irradiated fuel until the minimum required D.C. equipment and busses are restored to **OPERABLE** status, and

b. Immediately initiate corrective actions to restore the minimum D.C. equipment and busses to **OPERABLE** status, and

c. All containment penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an **OPERABLE** automatic purge valve. A minimum of one door in each airlock shall be closed and the equipment door shall be closed and held in place by a minimum of four bolts.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 125-volt D.C. busses shall be determined **OPERABLE** and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 125-volt battery banks and chargers shall be demonstrated **OPERABLE** per Surveillance Requirement 4.8.2.3.2.

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* Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

3/4.9 REFUELING OPERATIONS

3/4.9.3 DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least 100 hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

ACTION: With the reactor subcritical for less than 100 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least 100 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

3/4.9 REFUELING OPERATIONS

3/4.9.4 CONTAINMENT PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. Each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, or manual valve, or

2. Be capable of being closed by an **OPERABLE** automatic containment purge valve.

c. A minimum of one door in each airlock is closed* but, both doors of the containment personnel airlock may be open if:

1. One personnel airlock door is **OPERABLE**,

2. The plant is in **MODE** 6,

3. There is 23 feet of water above the fuel, and

4. A designated individual is available immediately outside the personnel airlock to close the door.

APPLICABILITY: During **CORE ALTERATIONS** and movement of irradiated fuel within the containment.

ACTION:

a. With the requirements of the above specification not satisfied, immediately** suspend all operations involving **CORE ALTERATIONS** and movement of irradiated fuel within the containment.

b. The provisions of Specification 3.0.3 are not applicable.

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* The emergency escape hatch temporary closure device is an acceptable replacement for that airlock door.

** Performance of **ACTION** a. shall not preclude completion of actions to establish a safe conservative position.

SURVEILLANCE REQUIREMENTS

4.9.4 Each of the above required containment penetrations shall be determined to be either in its required condition or capable of being closed by an **OPERABLE** automatic containment purge valve within 72 hours prior to the start of and at least once per 7 days during **CORE ALTERATIONS** and movement of irradiated fuel in the containment by:

a. Verifying the penetrations are in their required condition, or

b. Testing the containment purge valves per the applicable portions of Specification 4.6.4.1.2.

3/4.9 REFUELING OPERATIONS

BASES

3/4.9.1 BORON CONCENTRATION

The limitations on minimum boron concentration ensure that: 1) the reactor will remain subcritical during **CORE ALTERATIONS**, and 2) a uniform boron concentration is maintained for reactivity control in the water volumes having direct access to the reactor vessel. A K_{eff} of no greater than 0.95 which includes a conservative allowance for uncertainties, is sufficient to prevent reactor criticality during refueling operations.

3/4.9.2 INSTRUMENTATION

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

3/4.9.3 DECAY TIME

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

3/4.9.4 CONTAINMENT PENETRATIONS

During **CORE ALTERATIONS** or movement of irradiated fuel within containment, a release of fission product radioactivity to the environment must be minimized. During **MODES** 1, 2, 3, and 4, this is accomplished by maintaining **CONTAINMENT INTEGRITY** as described in LCO 3.6.1. In other situations, the potential for containment pressurization as a result of an accident is not present, therefore, less stringent requirements are needed to isolate the containment from the outside atmosphere. Both containment personnel airlock doors may be open during movement of irradiated fuel in the containment and during core alterations provided one airlock door is **OPERABLE**, the plant is in **MODE** 6 with 23 feet of water above the fuel, and a designated individual is continuously available to close the airlock door. This individual must be stationed at the Auxiliary Building side of the outer airlock door. Operability of a containment personnel airlock door requires that the door is capable of being closed, that the door is unblocked, and no cables or hoses are being run through the airlock. The requirement that the plant be in **MODE** 6 with 23 feet of water above the fuel ensures that there is sufficient time to close the personnel airlock following a loss of shutdown cooling before boiling occurs.

The containment structure serves to contain fission product radioactivity which may be released from the reactor core following a Design Basis Accident (DBA), such that offsite radiation exposures are maintained within the requirements of 10 CFR Part 100. Additionally, this structure provides radiation shielding from the fission products which may be present in the containment atmosphere following accident conditions.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity condition during **CORE ALTERATIONS.**

3/4.9.6 REFUELING MACHINE OPERABILITY

The **OPERABILITY** requirements for the refueling machine ensure that: (1) the refueling machine will be used for movement of CEAs and fuel assemblies, (2) the refueling machine has sufficient load capacity to lift a CEA or fuel assembly, and (3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly and CEA over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses. The Spent Fuel Cask Handling Crane, which has a critical load capacity of 125/15 ton, meets the "single-failure-proof" criteria of NUREG-0554 and NUREG-0612.

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

The requirement that at least one shutdown cooling loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the **REFUELING MODE**, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification.

The requirement to have two shutdown cooling loops **OPERABLE** when there is less than 23 feet of water above the core ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

3/4.9 REFUELING OPERATIONS

BASES

In **MODE** 6, shutdown cooling flow must provide sufficient heat removal to match core decay heat generation rates and maintain the core exit temperature within the **MODE** limit. Thus, as decay heat production is reduced with time, shutdown cooling flow may be proportionally reduced. Pursuant to NRC Generic Letter 88-17, flow reduction is necessary for operations near the mid-point of the hot leg piping to prevent vortex formation at the shutdown cooling suction nozzle. Prevention of vortex formation reduces the potential for a loss of shutdown cooling due to air binding of the low pressure safety injection (LPSI) pump(s) operating toprovide shutdown cooling flow. In accordance with the recommendations of NRC Bulletin 88-04, "Safety Related Pump Loss," a minimum flow rate requirement of 1500 gpm is imposed. This protects the vendor-recommended minimum continuous duty flow rate of 1340 gpm for the LPSI pumps. The 1500 gpm minimum flow rate is also more than adequate to preclude a boron dilution event in **MODE** 6 operation and in no way restricts the ability to increase flow as necessary to remove decay heat.

3/4.9.9 CONTAINMENT PURGE VALVE ISOLATION SYSTEM

The **OPERABILITY** of this system ensures that the containment purge valves will be automatically isolated upon detection of high radiation levels within the containment. The **OPERABILITY** of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4.9.11 WATER LEVEL-REACTOR VESSEL AND SPENT FUEL POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.12 SPENT FUEL POOL VENTILATION SYSTEM

The limitations on the Spent Fuel Pool Ventilation System ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The **OPERABILITY** of this system and the resulting iodine removal capacity are consistent with the assumptions of the accident analyses.

3/4.9.13 Deleted by Amendment No. 146.

3/4.9.14 CONTAINMENT VENT ISOLATION VALVES

The **OPERABILITY** and closure restrictions on the containment vent isolation valves are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the **REFUELING MODE**.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 194 TO FACILITY OPERATING LICENSE NO. DPR-53

AND AMENDMENT NO. 171 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 November 5, 1993, as supplemented March 11, 1994, the Baltimore Gas and Electric Company (BG&E or the licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, Technical Specifications (TSs). The Calvert Cliffs facilities are 2700 MWt Combustion Engineering pressurized water reactors having large (2 million cubic foot) dry concrete containments. The proposed amendments consists of two related TS changes. The first change modifies the Calvert Cliffs Nuclear Power Plant, Units 1 and 2, containment penetration requirements in TS Section 3.9.4 to resemble those in NUREG-1432, "Standard Technical Specifications for Combustion Engineering Plants (STS)." The second change would allow the containment personnel airlock (PAL) to be open during fuel movement and core alterations.

In relation to the second change requested, the current TSs require that a minimum of one PAL door, as well as other containment penetrations, be closed during fuel movement and core alteration. This requirement is to prevent the release of radioactive material in the event of a fuel handling accident. BG&E stated that during refueling outage, other work in the containment continues concurrently with fuel movement and core alterations. BG&E estimated that during the 1993 Unit 2 refueling outage, there were 10,000 entries made into containment. BG&E indicated that assuming an average of 4 person per PAL cycle, the PAL doors were cycled 250 times a day and the heavy use of the containment PAL during refueling has led to failures of the door hinge pin, the door seals, the packing of the equalizing valve, and other components, raising the concern that the door may not be operable in the event of an accident. BG&E further stated that there are large number of operators in the containment during refueling outage and in the event of an accident, it would take a number of PAL cycles to evacuate personnel from the containment releasing more containment air with each PAL cycle. The March 11, 1994, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

As noted in Section 1.0 above, the first proposed change relates to standardization of the containment penetrations requirements in TS 3.9.4. The current TS 3.9.4 specifies outage operations other than fuel handling in containment for which the simultaneous opening of both airlock doors is prohibited. These conditions include: (a) periods of positive reactivity changes, (b) movement of heavy loads over irradiated fuel in containment, and (c) periods of degraded electrical conditions.

The applicability of positive reactivity changes and movement of heavy loads over irradiated fuel were added to the TSs in the course of 1991 amendments (Unit 1 Amendment No. 155 and Unit 2 Amendment No. 135) which revised and clarified CONTAINMENT INTEGRITY requirements during outage conditions. The additional conditions for applicability were included in the 1991 amendments for consistency with a July 24, 1990, draft of the Combustion Engineering Standard Technical Specifications (STS). However, these conditions were not incorporated into the final STS. It was the final staff/Combustion Engineering Owners Group position that the new STS would not include a prohibition against both airlock doors being opened during periods of positive reactivity changes. This position was based on the conclusion that the boron concentration TS requirements provide sufficient controls to ensure protection against inadvertent criticality during refueling operations.

Therefore, the deletion of the restriction against opening both airlock doors during periods of positive reactivity changes is acceptable.

It was also the final staff/Owners Group position that the new STS would not include a prohibition against both airlock doors being opened during heavy lifts over irradiated fuel in containment. This position is based on the fact that control of heavy lifts over irradiated fuel is subject to plant-specific NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," analyses of load paths. Any restrictions necessary to protect irradiated fuel from accidental load drops would be developed as a result of those analyses. Although the NUREG-0612 reviews for Calvert Cliffs did result in some new plant-specific TS requirements for heavy load operations over the spent fuel pool, they did not identify the need for any special TSs for heavy loads in containment (Ref: NUREG-0612 safety evaluation (SE) issued May 27, 1983, and supplement issued August 7, 1989).

Therefore, the deletion of the restriction against opening both airlock doors during heavy lifts over irradiated fuel in containment is acceptable.

The limitation on opening of both airlock doors during periods of degraded electrical conditions would not be deleted by the proposed amendments, but would be incorporated into TS 3/4.8 "Electrical Power Systems," requirements. This change is of an editorial nature only (i.e., a relocation) and is therefore acceptable.

Therefore, based on the above, the staff has determined that the first proposed change is acceptable.

The second proposed change is to revise the TSs to permit both PAL doors to be simultaneously open during Mode 6 operations when there is at least 23 feet of water above the fuel. As previously noted, this would reduce PAL door wear and facilitate personnel access. The Calvert Cliffs facilities have experienced outage critical path delays due to PAL door problems resulting from heavy use. BG&E proposes that a designated individual be stationed at the auxiliary building side of the PAL to ensure that the doors are kept unblocked and to be available to close the PAL doors in event of an accident and evacuation of the containment is required. Also, the minimum decay time prior to handling of irradiated fuel in the reactor vessel would be increased from 72 to 100 hours, consistent with the revised fuel handling accident dose analysis which is discussed later in this SE.

Each of the Calvert Cliffs containments contain a PAL connecting the containment interior with the auxiliary building. The PAL is provided for the purpose of permitting personnel to enter and exit the containment while maintaining the integrity of the containment pressure boundary. Each PAL contains two airlock doors with a personnel chamber between the doors. In reactor operational modes 1, 2, 3, and 4, at least one of the two doors must be closed. Mechanical interlocks ensure that both doors cannot be opened at the same time. During shutdown and refueling operations, both doors may be opened at the same time (the interlock mechanism is intentionally disabled) unless (a) core alterations or movements of irradiated fuel in containment are in progress, (b) positive reactivity changes are occurring, (c) heavy loads are being moved over irradiated fuel, or (d) the electrical distribution system is degraded as described in TS 3.8.

Each containment is also provided with an Emergency Access Lock (EAL) in addition to the PAL. The EAL is a smaller airlock which connects the containment with the outside environs. During outages, EAL closure may be provided by a temporary closure device (e.g., a pluglike device that permits passage of cables and hoses). The proposed amendments apply only to the PALs.

The applicable staff positions regarding opening of PAL doors during Mode 6 (Refueling Operations) are stated in Section 3.9.3 (BASES) of the Improved Standard Technical Specifications (NUREG-1432, "Standard Technical Specifications for Combustion Engineering Plants" or "ISTS"). Text excerpted from the ISTS states:

> The containment air locks, which are part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 operation. During periods of shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for extended periods when frequent containment entry is necessary. During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, containment closure is required; therefore, the

door interlock mechanism may remain disabled, but one air lock door must always remain closed.

The requirements on containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted from escaping to the environment. The closure restrictions are sufficient to restrict fission product radioactivity release from containment due to a fuel handling accident during refueling.

During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel. Fuel handling accidents include dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies. The minimum decay time of [72] hours prior to CORE ALTERATIONS ensure that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are well within the guideline values specified in 10 CFR 100. The acceptance limits for offsite radiation exposure are contained in Standard Review Plan Section 15.7.4, Rev. 1, which defines "well within" 10 CFR 100 to be 25% or less of the 10 CFR 100 values.

As noted above, the basis for the staff position against simultaneous opening of both airlock doors during core alterations is to limit fission product leakage in the event of a Fuel Handling Accident. In performing analyses of the radiological consequences of a Fuel Handling Accident, the containment isolation criteria of Standard Review Plan (SRP) Section 15.7.4 are used. If fuel handling is prohibited when the containment is open, radiological consequences need not be calculated. If the containment will be open during fuel handling operations, automatic isolation by radiation detection instrumentation must be provided for penetrations and calculations must demonstrate acceptable consequences. However, automatic isolation of airlock doors is not practicable. Thus, the STS specify that airlock integrity be maintained during fuel handling in containment. However, the licensee has shown by analysis that the STS requirement need not be applied to Calvert cliffs.

BG&E performed an analysis of a fuel handling accident with the PAL doors open. In performing the analysis the BG&E used the assumptions and methodology prescribed by Regulatory Guide (RG) 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors." A 100-hour decay time was assumed in the analysis. The analysis demonstrated that the 0-2 hour site boundary thyroid dose would be less than 14.06 Rem and the 0-2 hour whole body (WB) site boundary dose would be less than 0.457 Rem. These consequences are within the SRP limits of 75 Rem thyroid and 6 Rem WB.

The staff did not review the licensee's analysis, but instead performed an independent analysis. The staff's analysis used the accident source term given in RG 1.4, assumptions contained in RG 1.25, and the review procedures specified in SRP Section 15.7.5. The staff assumed instantaneous puff release of noble gases and radioiodine from the gap of the broken fuel rods as gas bubbles pass up through the 23 feet of water covering the fuel. All airborne radioactivity reaching the containment atmosphere is exhausted within 2 hours into the environment. As stipulated in the proposed TS change request, all radioactive material in the fuel rod gap is assumed to have decayed for a period of greater than 100 hours.

The staff computed the offsite doses for the Calvert Cliffs exclusion area boundary using above assumptions and NRC computer code (ACTICODE 1984) and the control room operator doses using methodology given in SRP Section 6.4. These computed offsite and control room operator doses are well within the acceptance criteria given in SRP Section 15.7.5 and GDC 19, respectively. GDC-19 specifies that adequate radiation protection is to be provided to permit access and occupancy of the control room under accident conditions without personnel exposures in excess of 5 Rem WB or its equivalent to any part of the body for the duration of the accident. The resulting calculated values of the offsite and control room operator doses are listed in Table 1 and the assumptions used by the staff in calculating these doses are given in Table 2.

Therefore, based on the above, the staff has determined that the second request is acceptable.

3.0 SUMMARY

The licensee's and the staff's analyses of radiological consequences of a fuel handling accident, with the PAL open, confirm that dose acceptance criteria for the analyzed fuel handling accident are met. Also, standard controls are in place to ensure that the potential for other more severe events which could occur during outages, such as reactivity increases or a heavy load drop on irradiated fuel need not be postulated and analyzed. Accordingly, based on the details disscussed in Section 2.0, the staff finds that the requested revisions to the Calvert Cliffs Nuclear Power Plant, Units Nos. 1 and 2, TSs are acceptable.

4.0 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.

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 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 (58 FR 64602). 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:
W. Long
J. Lee

Date: August 31, 1994

TABLE 1

CALCULATED RADIOLOGICAL CONSEQUENCES
(rem)

Exclusion Area Boundary	Dose	SRP Limits
Whole Body	0.1	6
Thyroid	14	75
Control Room Operator		**GDC-19 Limits**
Whole Body	< 0.1	5
Thyroid	33	Equivalent to 5 rem whole body

TABLE 2

ASSUMPTIONS USED FOR CALCULATING RADIOLOGICAL CONSEQUENCES

Parameters	Quantity
Power Level, Mat	2754
Number of Fuel Rods Damaged	176
Shutdown Time, hours	100
Power Peaking Factor	1.65
Fission-Product Release Fractions	
Iodine	10
Noble gases	30
Pool Decontamination Factors	
Iodine	100
Noble Gases	1
Iodine Forms, %	
Elemental	75
Organic	25
Atmospheric Relative Concentration, sec/m	1.e-4
Fission-Product Release Duration, hours	2
Dose Conversion Factors	ICRP-30
CONTROL ROOM	
Atmospheric Relative Concentration, sec/m	7.7E-4
Filter Recirculation Rate, cfm	2.0E+3
Unfiltered Inleakage, cfm	1.2E+3
Filter Efficiency, %	90
Iodine Protection Factor	2.48
Control Room Volume, cubic foot	1.66E+5