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BGE

A Member of the Constellation Energy Group

January 27, 2000

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
License Amendment Request: Modification of Containment Closure During Core Alterations/Fuel Handling and Loss of Shutdown Cooling

Pursuant to 10 CFR 50.90, the Baltimore Gas and Electric Company hereby requests an Amendment to Operating License Nos. DPR-53 and DPR-69 to modify the conditions of containment closure during core alterations/fuel handling and loss of shutdown cooling in Calvert Cliffs Units 1 and 2. The reason for this proposed amendment is to improve personnel safety and the progress of outages by allowing greater egress from and access to the Containment during refueling outages. A new containment outage door assembly will be installed on the outside of the equipment hatch opening to provide quicker closure, improve safety when the door is open, and allow more flexibility when staging material in the Containment during an outage. Changes to the way the personnel air lock and the containment purge system are operated during maintenance activities on the Shutdown Cooling System are also part of the proposed amendment (see Attachment 1 for a complete discussion).

REQUESTED CHANGES

We propose to change Technical Specifications 3.9.3 and 3.9.4 to allow the new containment outage door to remain open during core alterations and fuel handling, during maintenance and testing activities on the Shutdown Cooling System, and to be used as an alternate to the existing equipment hatch to close the equipment hatch opening when containment closure is required. The proposed changes will also allow the personnel air lock and the containment purge valves to remain open during maintenance activities on the Shutdown Cooling System. We also propose to revise Technical Specification 3.9.3 to indicate that four bolts is the minimum number required to secure the equipment hatch for closure. In addition, we propose deleting the words "when there is 23 feet of water above the fuel" from Limiting Condition for Operation 3.9.3.c.2 since this requirement is already part of the applicability statement. These changes are shown on the markups in Attachment (3). The final Technical Specification pages may be renumbered to accommodate added and/or deleted pages.

ASSESSMENT AND REVIEW

We have considered the possibility of significant hazards associated with this change and have determined that there are none (see Attachment 2 for a complete discussion). We have also determined that operation with the proposed amendment would not result in any significant change in the types, or

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significant increases in the amounts, of any effluents that may be released offsite, nor would it result in any significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed amendment. The Plant Operations and Safety Review Committee and Offsite Safety Review Committee have reviewed this proposed change and concur that operation with the proposed changes will not result in an undue risk to the health and safety of the public.

SCHEDULE

This change is requested to be approved and issued by March 1, 2001. We believe this amendment presents some operational advantages, does not adversely impact plant safety, and should be approved.

Should you have questions regarding this matter, we would be pleased to discuss them with you.

Very truly yours,

Charles H. Cruse

STATE OF MARYLAND :

: **TO WIT:**

COUNTY OF CALVERT :

I, Charles H. Cruse, being duly sworn, state that I am Vice President, Nuclear Energy Division, Baltimore Gas and Electric Company (BGE), and that I am duly authorized to execute and file this License Amendment Request on behalf of BGE. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other BGE employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Charles H. Cruse

Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of Calvert, this 27th day of January, 2000.

WITNESS my Hand and Notarial Seal: Denise D. Snelis
Notary Public

My Commission Expires: 2/1/2002
Date

CHC/DJM/dlm

Attachments:
(1) Background and Analysis
(2) Determination of Significant Hazards
(3) Technical Specifications Marked-Up Pages
(4) Illustration of Equipment Hatch Opening
(5) Illustration and Description of the New Containment Outage Door Assembly

cc:
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ATTACHMENT (1)

BACKGROUND AND ANALYSIS

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
January 27, 2000

Containment closure is an action taken in Modes 5 and 6 to provide a "functional barrier to fission products" (Nuclear Energy Institute report NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management"). Generic Letter 88-17, "Loss of Decay Heat Removal," also defines containment closure as "at least one integral barrier to the release of radioactive material." This amendment proposes to change when and how closure for the equipment hatch opening is achieved during core alterations/fuel handling and during maintenance and testing activities on the Shutdown Cooling (SDC) System, as well as allowing the personnel air lock door and the containment purge valves to remain open while performing maintenance on the SDC System.

EXISTING EQUIPMENT DESCRIPTION

There are five containment penetrations that provide for containment access and ventilation during Modes 5 and 6: the equipment hatch opening; the personnel air lock; the emergency air lock; and containment purge system supply, and exhaust ducts. The purpose of the containment equipment hatch opening, the personnel air lock, and the emergency air lock during Modes 5 and 6 is to allow personnel and equipment movement into and out of the Containment. The containment purge system provides ventilation during shutdown periods for the safety of personnel working in the Containment. These penetrations are closed to provide containment integrity at power (Modes 1-4), and are capable of being closed to provide containment closure when the reactor is shut down (Modes 5 and 6).

1. The containment equipment hatch opening is a 19-foot circular opening in the side of the Containment leading directly to the outside environment at ground level (45 feet above sea level). The structure surrounding the opening is composed of a circular steel nozzle equipped with flanged surfaces on the inside and outside of Containment (a drawing is provided in Attachment 4). The purpose of the containment equipment hatch opening during Modes 5 and 6 is to allow personnel and equipment movement into and out of the Containment. Currently the Technical Specifications require that the equipment hatch opening be closed during certain outage evolutions, such as core alterations/fuel movement and maintenance on the SDC System. Closing the equipment hatch opening restricts equipment movement into and out of Containment, and slows other outage work.

   The device that closes the equipment hatch opening is called the equipment hatch. Closing the equipment hatch provides containment integrity during power operation (Modes 1 - 4), and currently provides containment closure during reactor shutdown (Modes 5 and 6). The equipment hatch is a solid, round flange weighing approximately 13 tons that, in its shut position, is mounted on the inside of the equipment hatch opening. It is built to withstand a pressure in Containment of 50 psig, the pressure postulated to result from a loss-of-coolant accident. When open, the equipment hatch is stored above the equipment hatch opening. Currently, when the equipment hatch opening must be closed during an outage, the equipment hatch is lowered with an electric winch and secured with at least four bolts. This process takes 1 to 1-1/2 hours.

2. The personnel air lock is a chamber connecting the Containment to the Auxiliary Building. It has two doors, one on the Auxiliary Building side of the containment wall and one on the Containment side. The personnel air lock is designed to allow personnel to enter Containment in Modes 1-4 and maintain containment integrity. Although only one door is required for containment integrity, both doors are usually shut in Modes 1-4. The doors are tested to withstand a pressure in the Containment of 50 psig, the pressure postulated to result from a loss-of-coolant accident. In Modes 5 and 6, a single door is used to establish containment closure.

3. The emergency air lock is similar in construction to the personnel air lock. During Modes 5 and 6 a temporary closure device can be fitted in the emergency air lock so cables and hoses can be run into the Containment without interfering with the operation of either the personnel air lock or the equipment hatch opening. The only Technical Specification conditions that the temporary closure device can be used for are core alterations and movement of irradiated fuel in Containment, because it will not withstand the pressure postulated to be generated in a worst-case loss of SDC incident.

4. The containment purge system is a piping system for bringing outside air into the Containment, and for exhausting containment air through the plant ventilation system. The supply and exhaust ducting each go through the containment wall in separate penetrations. The purge system has a flange in each penetration to provide the capability for containment integrity in Modes 1-4, and a single valve in each penetration to provide containment closure in Modes 5 and 6. The valves are tested to 12 psig; the flanges are tested to 50 psig.

NEW EQUIPMENT

The steel containment outage door assembly (shown in Attachment 5) will be installed on the outside of the containment equipment hatch opening. The operational part of the assembly is a hinged door that can be sealed in the closed position by handwheel-operated dogs. The door is sized to allow the passage of the reactor coolant pump motor on a trailer. The door assembly is designed to withstand a containment pressure of 12 psig, and will be tested for its capability to close and seal prior to being placed in service. The containment outage door frame is designed with flange connections that will allow the passage of hoses and cables into Containment. These penetrations on the containment outage door frame will be closed by either a blind flange or with a cable or hose fitting that will withstand a containment pressure of 12 psig. Currently, the temporary closure device installed in the emergency air look provides this function. After the changes proposed in this request are approved, we will not need to install the temporary closure device in the emergency air lock during routine outages. However, there may be situations where we would need or desire to use the temporary closure device. Therefore, this license amendment will not delete the Technical Specification wording allowing use of the temporary closure device.

PROPOSED TECHNICAL SPECIFICATION CHANGES

This submittal proposes to change Technical Specification Limiting Condition for Operation (LCO) 3.9.3.a to recognize the installation of the new containment outage door and allow its use as an alternative to the equipment hatch during core alterations/fuel handling. Additionally, the wording of the Technical Specification is being changed to indicate that four bolts are the *minimum* number required to secure the equipment hatch when it is used for containment closure.

Technical Specification LCO 3.9.3.c.2 is proposed to be changed to delete the words "when there is 23 feet of water above the fuel."

Technical Specification LCO 3.9.4.2.c is proposed to be changed to require that all containment penetrations are placed in the status described in LCO 3.9.3 to assure that they are either closed or are capable of being closed.

SAFETY ANALYSIS

Core Alterations/Fuel Handling

As part of containment closure, Technical Specification 3.9.3 currently specifies that the containment equipment hatch must be shut and held in place by four bolts during core alterations and movement of irradiated fuel (fuel handling) within the Containment. This requirement is a provision for the confinement of radioactive material inside the Containment in the event fuel is damaged while it is being handled. Although a fuel handling incident is not a pressure-producing incident, specifying a minimum number of four bolts will allow the optional use of more bolts if desired.

Technical Specification LCO 3.9.3.c.2 currently contains the words "... when there is 23 feet of water above the fuel." The water level requirement for core alterations and movement of irradiated fuel assemblies is contained in another Technical Specification and as such is part of the applicability statement for Technical Specification 3.9.3. Therefore, these words in the LCO are redundant and therefore should be removed from the LCO.

The current analysis for the fuel handling incident presented in the Calvert Cliffs Updated Final Safety Analysis Report Section 14.18, "Fuel Handling Incident," assumes that the personnel air lock is open for the duration of the incident and one volume of containment atmosphere containing activity is released from Containment unfiltered. The license amendment request to have the personnel air lock open during fuel handling and core alterations (Reference 1) was reviewed and approved by the Nuclear Regulatory Commission staff (Reference 2). The current analysis also assumes that the fuel has decayed for 100 hours prior to the incident (as described in Technical Requirements Manual Section 15.9.1) and there is at least 23 feet of water above the fuel (Technical Specification 3.9.6). The assumptions and methodology given in Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Incident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors," were used in the current analysis. The analysis results are maximum offsite doses of 14.06 rem to the thyroid, and 0.457 rem to the whole body, which are within the Standard Review Plan 15.7.4, Revision 1, guidelines of 75 rem to the thyroid and 6 rem to the whole body (25% of the 10 CFR Part 100 limits). Since the analysis assumes the radioactive release is unfiltered, the analysis will also apply to the containment outage door and is not changed if both the personnel air lock and the containment outage door are open at the same time. Actual offsite doses in the event of a fuel handling incident will be less because the containment outage door, the personnel air lock door, and the emergency air lock door will be promptly closed following a fuel handling incident. In a similar manner, the use of the containment outage door does not negatively impact the dose exposure of the control room operators following a fuel handling incident.

As stated earlier in "New Equipment," the installation of the containment outage door will allow the option of not installing the temporary closure device in the emergency air lock and restore the air lock to its original method of use during routine outages. The restoration of the emergency air lock and the installation of the containment outage door will enhance personnel safety by providing two, possibly three, (equipment hatch opening, personnel air lock, and the emergency air lock during routine outages) containment exit points instead of the present single point at the personnel air lock. In the event of an emergency, the open equipment hatch opening gives personnel a quick path to evacuate Containment.

Based on the analysis discussed above, if the containment outage door could not be closed, the offsite and Control Room doses would not increase beyond the analyzed doses because the release of radioactive material was analyzed conservatively assuming there is no containment closure.

Loss of Shutdown Cooling

An integral barrier must also be provided to prevent the spread of radioactivity outside the Containment resulting from a loss of SDC (Generic Letter 88-17). The term loss of SDC includes three Technical Specification conditions: accidental loss of SDC (Technical Specifications 3.9.4 and 3.9.5); maintenance on the SDC System (Technical Specification 3.9.4); and testing Containment Penetration 41 (Technical Specification 3.9.4). Should a total loss of SDC last long enough to start boiling in the core, the maximum pressure boiling can produce in Containment has been calculated to be 12 psig.

At Calvert Cliffs, the Containment is procedurally closed prior to any possibility of coolant boiling in the Reactor Coolant System (RCS). This provides containment closure with ample time margin to prevent the release of radioactive material and still allows flexibility in movement of people and materials into and out of Containment. Containment closure includes, among other things, shutting a personnel air lock door, an emergency air lock door, containment purge valves, and the equipment hatch or the containment outage door. The temporary closure device in the emergency air lock cannot be used for a loss of SDC incident because it cannot withstand the postulated pressure resulting from the incident.

Shutdown cooling to the reactor core is provided either by the SDC System or, during maintenance and testing on the SDC System, by a train of spent fuel pool cooling. During maintenance on the SDC System common header and testing Containment Penetration 41, the SDC pumps are turned off and the core is cooled by a combination of natural circulation and a Spent Fuel Pool Cooling System train. In this condition, Technical Specification 3.9.4 currently requires that containment penetrations providing direct access to the outside atmosphere be closed and that there is at least 23 feet of water over the core. Technical Specifications 3.9.4 and 3.9.5 require that containment penetrations providing direct access to the outside atmosphere be closed within four hours after an inadvertent loss of SDC.

When SDC is operating normally and no fuel is being handled, there is no Technical Specification requirement for containment closure, and containment penetrations can be open. However, there is a procedural restriction. Time to boil in the RCS is an important consideration and plant procedures require that the capability to close individual penetrations be within the calculated time to boil. For example, if closure of a penetration takes 20 minutes and time to boil is calculated to be 20 minutes, the penetration would be kept closed. The penetration could not then be opened unless the calculated time to boil was more than 20 minutes.

Shutdown cooling can be lost two ways: a general loss of electrical power or a failure of the system providing cooling. If the failure is in the system providing cooling and the event lasts long enough for boiling to occur in the RCS, containment air coolers will limit the pressure in the Containment to 7 psig. The worst case is when there is a general electrical failure (failure of offsite and onsite electrical sources), causing loss of power to the SDC pumps. If the event lasts long enough for boiling to occur in the RCS, containment pressure could increase to as much as 12 psig. The reason for this increased pressure is that a general electrical failure would also disable the containment air coolers and they would not be available for limiting the pressure increase. The calculation for the general electrical failure case conservatively assumes the reactor has been shut down for only 24 hours, boiling occurs as soon as electric power is lost, and that essential electrical power is restored within one hour. The containment outage door is designed to withstand the 12 psig pressure that would result from this proposed limiting case.

Maintenance on the SDC System during a unit outage when fuel is in the reactor requires a contingency plan to provide for alternate core cooling by cooling the water in the refueling pool. Alternate cooling is provided by aligning the Spent Fuel Pool Cooling System so that it also cools the refueling pool. If the alternate cooling is lost, the equipment hatch opening can be closed with the new containment outage door or with the equipment hatch within time to boil. For example, with loss of alternate cooling, the shortest time to boil with at least 23 feet of water over the top of the fuel assemblies and 100 hours after shutdown is conservatively 4-1/2 hours. In practice, the time to boil is usually longer. Using the equipment hatch, the equipment hatch opening can be closed in 1-1/2 hours or less. The containment outage door will be capable of being shut more quickly than the equipment hatch; testing of the new door will determine how much more quickly. Current expectations are that the new containment outage door can be shut in 20 minutes. This would include removal of any grating or truck ramps with use of a fork lift, then closing the door.

The frame of the new containment outage door is equipped with fittings that will allow electricity, compressed air, water, etc., to be run through the equipment hatch opening. Flanges, cable penetrations, and isolation valves at these penetrations will be designed to withstand containment pressure resulting from postulated boiling in the RCS. The cables and hoses that connect to these fittings will be easily removable if the equipment hatch must be used to close the equipment hatch opening. Currently, these cables and hoses are run through a temporary closure device in the emergency air lock. This temporary closure device impedes the use of the emergency air lock for personnel egress in an emergency. The installation of the containment outage door will allow the option of not installing the emergency air lock temporary closure device during routine outages. Use of the containment outage door and restoration of the emergency air lock will enhance personnel safety by providing two, possibly three, (equipment hatch opening, personnel air lock, and the emergency air lock during routine outages) containment exit points instead of the present single point at the personnel air lock.

During maintenance on the SDC System common header, the SDC pumps are turned off and the core is cooled by a combination of natural circulation and a Spent Fuel Pool Cooling System train. In this condition, Technical Specifications currently require that all containment penetrations providing direct access from containment atmosphere to the outside atmosphere be closed and that 23 feet of water be over the core. This water provides a large heat sink, making this requirement unnecessarily conservative. Closing the containment penetrations during SDC System maintenance could create a potential health hazard for the people working in Containment. In addition, closing all containment access interferes with the progress of maintenance work and slows the progress of the outage. Allowing the personnel air lock and the equipment hatch opening to be open and the purge system to be running during the SDC maintenance could alleviate the potential health hazard and could reduce the amount of time the unit is on alternate SDC. In the event of an emergency, the open equipment hatch opening gives personnel a quick path to evacuate Containment.

The proposed changes will allow the equipment hatch opening, the personnel air lock, and the containment purge system to be managed for changes in the status of SDC like they are managed during core alterations and movement of irradiated fuel assemblies within Containment. Administrative controls will be put in place similar to those placed on the personnel air lock to ensure that the equipment hatch opening will be closed when containment closure is required. The containment purge system isolation valves are closed automatically on a containment high radiation signal and can be shut by remote manual operation. The emergency air lock will have at least one door closed when containment closure is required by a SDC condition. The maximum calculated pressure that can develop in the Containment for the limiting loss of SDC case is 12 psig. All required penetration closure devices can withstand that pressure. A program will be in place that will require inspection of the seals and testing the closure and dogging functions of the door at the start of each outage to assure reliability of the containment outage door.

CONCLUSION

The proposed amendments will change some Technical Specifications associated with the closure of containment under various shutdown conditions. These Technical Specification changes are proposed to make the closure requirements more uniform during shutdown conditions. These changes recognize the fast-closing nature of the containment outage door, personnel air lock door, and the containment purge valves. The addition of the containment outage door will improve shutdown egress from the Containment in an emergency without increasing the consequences of either a fuel handling accident or loss of SDC incident.

REFERENCES

(1) Letter from Mr. R. E. Denton (BGE) to NRC Document Control Desk, dated, November 5, 1993, License Amendment Request: Personnel Airlock Open During Core Alterations

(2) Letter from Mr. D. G. McDonald, Jr. (NRC) to Mr. R. E. Denton (BGE) dated August 31, 1994, Issuance of Amendments for Calvert Cliffs Nuclear Power Plant, Unit No. 1 (TAC No. M88193) and Unit No. 2 (TAC No. M88194)

ATTACHMENT (2)

DETERMINATION OF SIGNIFICANT HAZARDS

The proposed change has been evaluated against the standards in 10 CFR 50.92 and has been determined to not involve a significant hazards consideration in operation of the facility in accordance with the proposed amendments:

1. *Would not involve a significant increase in the probability or consequences of an accident previously evaluated.*

   The proposed changes will modify the conditions of containment closure during core alterations/fuel handling and during maintenance/testing activities on the Shutdown Cooling (SDC) System. Specifically, the proposed changes will allow the new containment outage door, the personnel air lock door, and the containment purge valves to stay open during core alterations/fuel handling, and during maintenance and testing activities on the SDC System. The proposed change will also allow the new containment outage door to be used as an alternate to the existing equipment hatch to close the equipment hatch opening when closure is required. Additionally, the proposed changes will change the wording of the Technical Specifications to indicate that four bolts is the minimum number required to secure the equipment hatch when it is used for containment closure. The proposed changes also removes the water level requirement from Limiting Condition for Operation 3.9.3 since the water level requirement is part of the applicability statement for this Technical Specification.

   Closing the containment penetrations is considered to be a mitigator of the radiological consequences of a fuel handling incident and a loss of SDC, not an initiator. Therefore, allowing the containment outage door, personnel air lock, and the containment purge valves to be open during these outage activities does not involve a significant increase in the probability of an accident previously evaluated.

   The consequence of a fuel handling incident is the release of radioactivity from Containment. The potential offsite dose resulting from a fuel handling incident has been evaluated. Based on a minimum decay time of 100 hours prior to handling fuel (Technical Reference Manual Section 15.9.1), the calculated offsite doses resulting from a fuel handling incident are 14.06 rem to the thyroid, and 0.457 rem to the whole body, with the personnel air lock door open. All activity released from Containment over the length of the incident is assumed to be unfiltered. The calculated doses resulting from a fuel handling incident are less than 25% of the limits of 10 CFR Part 100 (75 rem thyroid and 6 rem whole body). This analysis will apply to the equipment hatch opening because the analysis assumes no containment closure. The amount of radioactivity released is bounded by the current analysis of record. Although natural air circulation will cause some containment air to go out through any opening in a fuel handling accident, there is no pressure produced to push the radioactivity out of Containment. Therefore, having the containment outage door open during core alterations and fuel handling does not involve an increase in the consequences of an accident previously evaluated. Additionally, if the equipment hatch is to be used, specifying a minimum number of four bolts will allow the optional use of more bolts, if desired.

   The consequence of a loss of SDC is the potential for release of radioactivity to the atmosphere outside Containment. Closing containment penetrations is a mitigator of that consequence. Administrative controls will be put in place to ensure that in an emergency containment closure can be quickly achieved. The emergency air lock will have at least one door closed when containment closure is required by a SDC condition. The containment purge system isolation valves are closed automatically on a containment high radiation signal and can be shut by remote manual operation. The maximum calculated pressure that can develop in the Containment for the limiting loss of SDC case is 12 psig. All required penetration closure devices can withstand that pressure. Therefore, allowing the personnel air lock doors, the containment outage door, and the purge isolation valves to remain open does not involve a significant increase in the consequences of a loss of SDC.

Therefore, the proposed Technical Specification changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *Would not create the possibility of a new or different type of accident from any accident previously evaluated.*

This requested change does not involve a significant change in the operation of the plant and no new accident initiation mechanism is created by the modification. Closing containment penetrations is considered to be a mitigator of the radiological consequences of any accident in the Containment, not an initiator. The equipment hatch opening, the personnel air lock, and the purge supply and exhaust are currently opened and closed during the course of an outage. The proposed changes allow them to remain open during a period when they are currently required to be closed. The closure function of the equipment hatch opening in Modes 5 and 6 will be performed by a hinged containment outage door; thus, closing the equipment hatch opening will be easier and will require fewer people and less time. The operation of the containment outage door is not a significantly different method of operation from that of other dogged doors at Calvert Cliffs. Using the containment outage door to close the equipment hatch opening instead of the equipment hatch also mitigates the consequences of the incident and does not initiate an accident.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. *Would not involve a significant reduction in the margin of safety.*

The margin of safety for containment closure during core alternation/fuel handling is based on the amount of offsite dose resulting from a fuel handling incident and the safety of personnel in the Containment at the time of the incident. An offsite dose calculation previously approved by the NRC for a fuel handling incident is 14.06 rem to the thyroid, and 0.457 rem to the whole body, with no containment closure established, and any activity released from the Containment assumed to be unfiltered. These calculated doses are less than 25% of the limits of 10 CFR Part 100. The analysis will apply to the containment outage door because the analysis assumes no containment closure. Emergency personnel egress from Containment will be through the open door, which is an improvement in personnel safety because this exit is not currently available. Additionally, trained personnel will be available to close the door and contain any radiation released inside Containment as result of a fuel handling incident. Leaving the containment outage door open during core alterations and fuel handling will not allow more than the calculated amount of radionuclides to escape from Containment; shutting the door following a fuel handling incident will increase the margin of safety by keeping the actual offsite dose lower than the calculated dose.

Therefore, allowing the containment outage door to be open during fuel handling would not involve a significant reduction in the margin of safety.

The margin of safety for containment closure in the case of loss of SDC is twofold: 1) the time required to close the Containment to prevent a radioactive release to the atmosphere outside Containment if SDC should be lost; and 2) the ability to retain the pressure generated by boiling of reactor coolant as a result of a loss of SDC.

Currently, all containment penetrations are required to be closed prior to taking the SDC System out-of-service for maintenance, or within four hours if SDC is lost. The radiological consequences of a loss of SDC incident do not occur immediately on loss of SDC. The containment purge isolation valves close rapidly on a high radiation signal or are closed by remote manual operation. The containment outage door and the personnel air lock doors are designed to be closed rapidly by site personnel. Other containment penetrations that could release radiation to the environment outside the Containment will be required to be closed. The maximum calculated pressure that can develop in the Containment as a result of a loss of SDC is 12 psig. The purge isolation valves, the personnel air lock doors, and the containment outage door are all designed to meet this pressure retaining requirement. The proposed changes do not increase the possibility of a release of radiation following a loss of SDC incident.

Therefore, the ability to provide containment closure is maintained and the margin of safety is not significantly reduced by this proposed activity.

ATTACHMENT (3)

TECHNICAL SPECIFICATIONS

MARKED-UP PAGES

3.9.3-1

3.9.4-1

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
January 27, 2000

3.9 REFUELING OPERATIONS

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. The equipment hatch ~~closed and held in place~~ by a minimum of four bolts; OR the containment outage door is capable of being closed under administrative control;

b. One door in the emergency air lock is closed;

---------------------------- NOTE ----------------------------
The emergency air lock temporary closure device can be used in place of an emergency air lock door.
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c. The personnel air lock shall be either:

1. closed by one personnel air lock door, or

2. capable of being closed by an OPERABLE personnel air lock door under administrative control ~~when there is 23 feet of water above the fuel.~~

d. Each penetration providing direct access from the containment atmosphere to the outside atmosphere either:

1. closed by a manual or automatic isolation valve, blind flange, or equivalent, or

2. capable of being closed by an OPERABLE Containment Purge Valve Isolation System.

APPLICABILITY: During CORE ALTERATIONS,
During movement of irradiated fuel assemblies within containment.

3.9 REFUELING OPERATIONS

3.9.4 Shutdown Cooling (SDC) and Coolant Circulation-High Water Level

LCO 3.9.4 One SDC loop shall be OPERABLE and in operation.

--------------------------- NOTES ---------------------------

1. The required SDC loop may be not in operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Reactor Coolant System boron concentration.

2. The shutdown cooling pumps may be removed from operation during the time required for local leak rate testing of containment penetration number 41 pursuant to the requirements of SR 3.6.1.1 or to permit maintenance on valves located in the common SDC suction line, provided:

   a. no operations are permitted that would cause a reduction to Reactor Coolant System boron concentration,

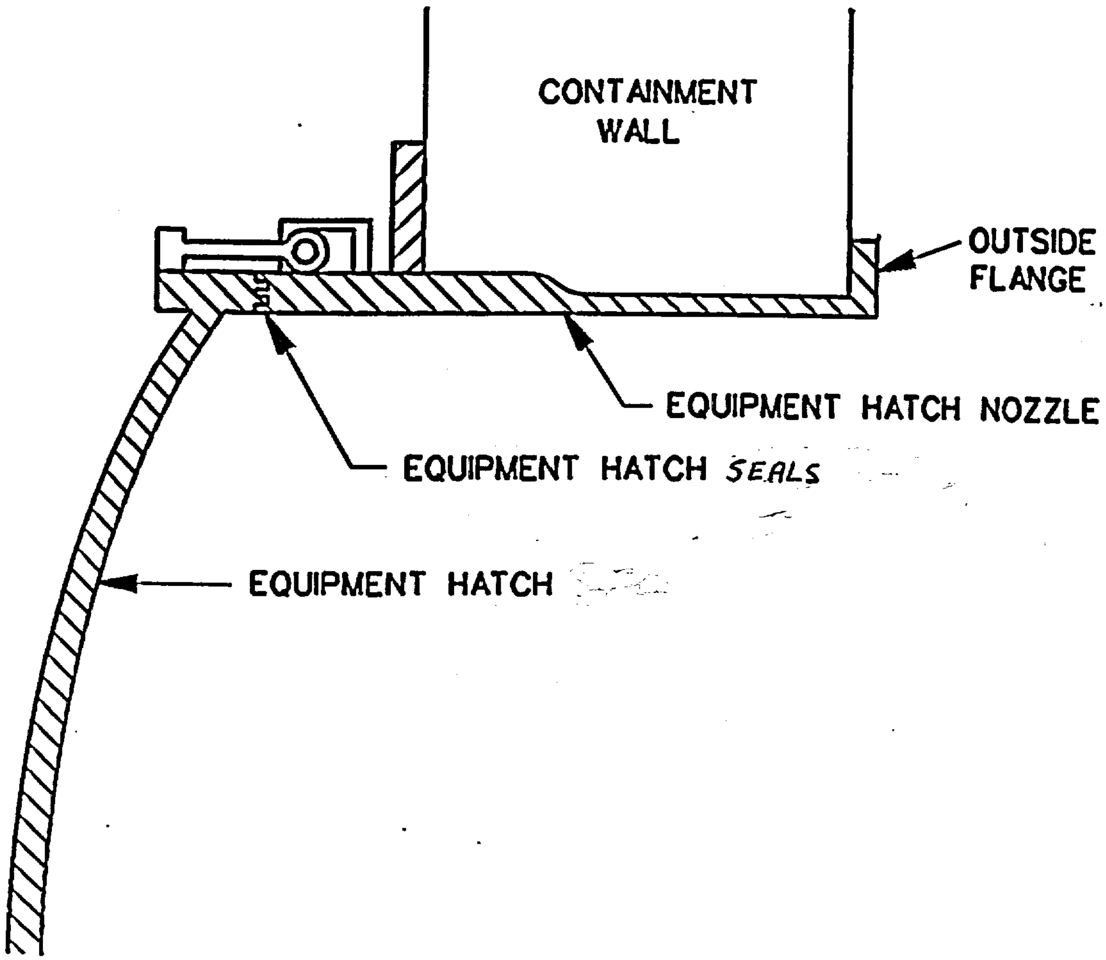
   b. CORE ALTERATIONS are suspended, and

   c. all containment penetrations are in the status described in LCO 3.9.3 ~~providing direct access from containment atmosphere to outside atmosphere are closed.~~

APPLICABILITY: MODE 6 with the water level ≥ 23 ft above the top of the irradiated fuel assemblies seated in the reactor vessel.

ATTACHMENT (4)

ILLUSTRATION OF EQUIPMENT HATCH OPENING



EQUIPMENT HATCH OPENING

ATTACHMENT (4)

ATTACHMENT (5)

ILLUSTRATION AND DESCRIPTION OF THE NEW CONTAINMENT OUTAGE DOOR ASSEMBLY

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
January 27, 2000

ATTACHMENT (5)

ILLUSTRATION AND DESCRIPTION OF THE NEW CONTAINMENT OUTAGE DOOR ASSEMBLY

The containment outage door assembly consists of a transition ring, a hatch frame, and a hinged hatch door. The assembly is designed and fabricated to meet American Society of Mechanical Engineers Section VIII requirements. The construction material will be Section VIII listed carbon steel. The loading on the equipment hatch perimeter where the assembly is mounted, with the door open and shut, has been calculated and found acceptable. Seismic loadings have also been calculated and found acceptable.

The Adapter Ring/Transition Ring Assembly

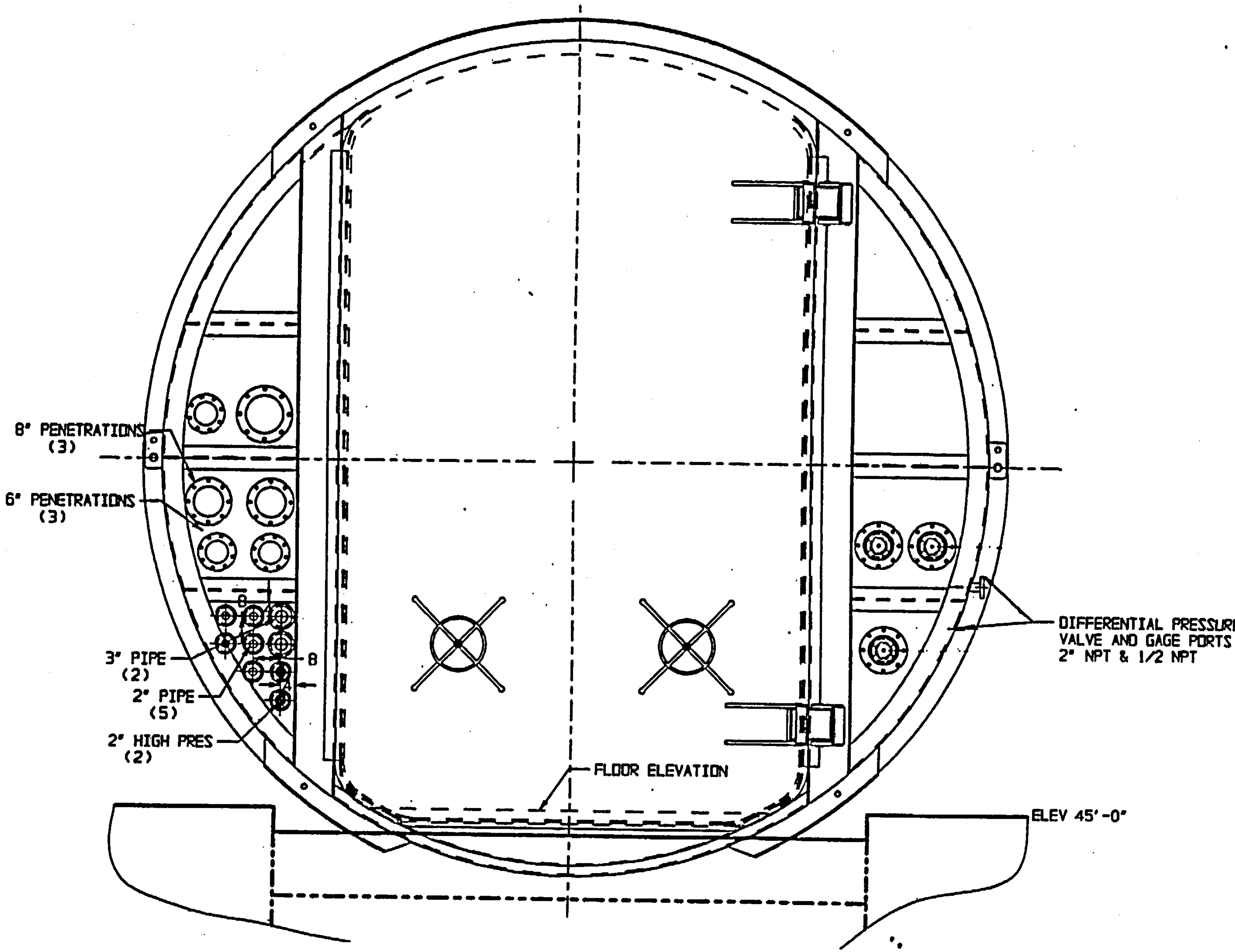
The adapter ring enables the attachment of the hatch frame to the outside end of the equipment hatch opening. The ring is a circular piece of carbon steel plate that is welded to the outside end of the carbon steel equipment hatch. A transition ring is welded to the adapter ring. The transition ring incorporates a dual tongue arrangement that mates with gasketed grooves in the door frame. A test port will be provided to enable the periodic leak rate testing of the gasketed seal.

The Door Frame

The door frame is constructed of steel stiffened with horizontal beams. It is mounted on the transition ring and the joint is sealed utilizing a dual tongue-and-groove rubber gasket. In the frame is an opening for the door and penetrations for the passage of service lines.

The Containment Outage Door

The containment outage door is made of steel plate stiffened with horizontal "T" beams. The door is equipped with double gasketed grooves. These grooves will seal the door when compressed by double knife edges mounted on the hatch frame. A test port in the door will allow periodic leakage rate testing of the seal. Rotating steel dogs are arranged around the perimeter of the door to provide even sealing of the door. The rim of the door is stiffened by an angle to keep the pressure load and gasket compression load distributed equally among the dogs. The door will be hung plumb on two machined hinges to allow easy movement by one person. The dogs can be rotated to the closed position by two handwheels mounted on both the inside and outside of the door. As the dogs rotate, they will ride up on bronze wedges, creating a compression seal between the knife edges and the gaskets. The hinges are designed to allow this movement of the door toward the frame. The force required to compress the gaskets can be provided by one person working through a geared mechanism. A door stop latch will provide a means of securing the door against seismic loading when the door is in the open position.



CONTAINMENT OUTAGE DOOR
CLOSED POSITION

ATTACHMENT (5)