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March 28, 2003

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
Request for Exemption to 10 CFR 50.44 and 10 CFR Part 50, Appendix E, Section VI and Proposed License Amendments for Relaxation of Post-Accident Hydrogen Monitoring and Control Requirements

Pursuant to 10 CFR 50.12, "Specific Exemptions," the Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP) requests an exemption from the requirements of 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light-Water-Cooled Power Reactors," and 10 CFR Part 50, Appendix E, Section VI, "Emergency Response Data System." The purpose of the exemption is to remove the requirements for Hydrogen Control Systems from the CCNPP design basis.

In addition, pursuant to 10 CFR 50.90, we request an amendment to Renewed Operating License Nos. DPR-53 and DPR-69 to remove the post-accident hydrogen monitoring and control requirements.

REQUESTED CHANGE

The proposed amendment revises Technical Specification 3.3.10, Post-Accident Monitoring Instrumentation, and Technical Specification Table 3.3.10-1, Post-Accident Monitoring Instrumentation to delete references to the containment hydrogen analyzers. Additionally, the proposed amendment will delete Technical Specification 3.6.7, Hydrogen Recombiners.

Attachment (1) provides the justification for the exemption request and proposed amendment. Attachment (2) provides the discussion of significant hazards. Attachment (3) provides the existing Technical Specification pages marked-up to show the proposed change. The Technical Specification Bases will be revised to reflect the proposed amendment.

ASSESSMENT AND REVIEW

We have evaluated the significant hazards considerations associated with this proposed amendment, as required by 10 CFR 50.92, and have determined that there are none (See Attachment 2 for a complete discussion). We have also determined that operation with the proposed amendments will not result in any significant change in the types or significant increases in the amounts of any effluents that may be

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released offsite, and no significant increases in individual or cumulative occupational radiation exposure. Therefore, the proposed amendments are eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact assessment is needed in connection with the approval of the proposed amendments.

SAFETY COMMITTEE REVIEW

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 September 1, 2003 in order to facilitate physical work during 2004 refueling outage. This date is a convenience to CCNPP and is not a operational necessity.

PRECEDENTS

- Turkey Point Plant, Units 3 & 4 - Issuance of Exemption From Hydrogen Control Requirements (TAC Nos. MB0332 and MB0333), dated December 12, 2001
- Oconee Nuclear Station, Units 1, 2, & 3 - Issuance of Exemption From Hydrogen Control Requirements (TAC Nos. MA9635, MA9636 and MA9637), dated July 17, 2001

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

Very truly yours,

STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I, Peter E. Katz, being duly sworn, state that I am Vice President - Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP), and that I am duly authorized to execute and file this License Amendment Request on behalf of CCNPP. 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 CCNPP employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of Calvert, this 28th day of March, 2003.

WITNESS my Hand and Notarial Seal:

Notary Public

My Commission Expires: 02/01/06

Date

PEK/EMT/bjd

Attachments: (1) Background and Justification
(2) Determination of Significant Hazards
(3) Marked-up Technical Specification Pages

cc: J. Petro, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
G. S. Vissing, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

BACKGROUND AND JUSTIFICATION

TECHNICAL JUSTIFICATION

The Hydrogen Control Systems installed at CCNPP conform to the requirements of 10 CFR50.44, and are sized to control the hydrogen concentration inside the Containment below the hydrogen flammability limit of 4.0 volume percent (4.0 vol%) following a design basis LOCA. Hydrogen control design basis is provided in the CCNPP Updated Final Safety Analysis Report (UFSAR), Sections 6.8 and 14.21. Measurement and reporting of the hydrogen volume percentage is required by 10 CFR Part 50, Appendix E, Emergency Response Data System.

The Hydrogen Control Systems in each unit consist of air mixing components, two hydrogen monitors, the hydrogen purge system, and two electric hydrogen recombiners.

SYSTEM DESCRIPTION

Hydrogen Monitors

The hydrogen monitors are designed to measure the hydrogen concentration inside Containment and to alert the operators in the Control Room of an instrument malfunction or high hydrogen concentration in the Containment. The monitors consist of two independent cabinets that monitor different areas of both units simultaneously.

Hydrogen Purge System

The hydrogen purge system is designed to control hydrogen concentrations below 4.0 vol% should both electric hydrogen recombiners fail to function properly. During power operation this system is used to vent the Containment to maintain pressure and airborne radioactivity.

Electric Hydrogen Recombiners

In each unit, one of two independent electric hydrogen recombiners is utilized as the primary means of hydrogen control after a LOCA. Each recombiner has the capacity to maintain the hydrogen concentration inside the Containment below 4.0 vol%, as required by Safety Guide 7.

Containment Air Mixing

Containment air mixing is not part of this request.

The containment air recirculation and cooling components and the Containment Spray System accomplish hydrogen mixing within the Containment. These systems and the internal structures of the Containment are designed to maintain a well-mixed Containment atmosphere, and to prevent hydrogen pocketing.

The equipment for mechanical containment air mixing (containment cooling and spray) starts on automatic signals following a LOCA to remove heat from the Containment atmosphere, as well as circulating air to minimize localized hydrogen buildup inside Containment.

IMPACT OF REQUESTED CHANGES ON HYDROGEN CONTROL

The requested changes in post-accident hydrogen control will not significantly impact the defense-in-depth protection provided against the release of radioactive material to the environment. This lack of impact is due to: (1) the existing safety margin in the Containment design, (2) the capability of the Containment to withstand a design basis and severe accident hydrogen buildup, and (3) the limited capacity of the Hydrogen Control System to mitigate potential Containment failure resulting from hydrogen buildup inside the Containment following severe accidents.

Impact of Hydrogen Control on Containment Safety Margin

Both CCNPP Containments are large, dry Containment designs with a design pressure of 50 psig and an estimated limiting pressure for failure of 132 psig. This type of pressurized water reactor (PWR) Containment is believed to be the least susceptible to damage from a hydrogen burn.

The hydrogen burn that occurred during the 1979 event at Three Mile Island 2 (TMI-2) confirms that hydrogen concentration inside a PWR Containment will not remain very long above the flammability limit without being ignited. The hydrogen concentration at TMI-2 peaked at about 8.1% and the burning of that hydrogen resulted in a Containment pressure of about 28 psig, well below the Containment design pressure of 60 psig (NSAC-22, 1981). The CCNPP Containment, with a similar design pressure of 50 psig, is expected to provide an adequate safety margin against hydrogen burn following a design basis accident, such that the Containment will not fail even without hydrogen control equipment.

Both the nuclear industry and the Nuclear Regulatory Commission (NRC) conducted numerous analyses and tests following the event at TMI-2 in 1979 to determine the Containment capability of PWR plants with a large, dry Containment. For example, NUREG/CR-5662 (1991) reports that the computed peak pressure in Containment due to global hydrogen burn is within TMI's estimated Containment capacity. This computation was based on a 75% fuel cladding metal-water reaction (MWR) (which can be expected to occur during severe accidents) for a group of PWR plants with large, dry Containments, similar to the CCNPP Containments. The NRC-sponsored study concludes that it seems unlikely that Containment integrity would be threatened by a hydrogen burn from a 75% MWR. The 75% MWR estimate was intended to be representative of a range of core melt accidents. The TMI-2 accident involved about 45% MWR which resulted in a hydrogen concentration of about 8.1% (NUREG/CR-4330, Volume 3, 1987). During the TMI-2 accident, Containment was not breached and damage inside Containment was essentially limited to plastics and other low melting point materials such as telephone cases and the crane operator's seat (NUREG/CR-4330, Volume 3, 1987). Based on this study, the NRC concluded that the large, dry Containments could withstand the Containment pressure following severe accidents and there was no need to backfit these Containments with igniters or to inert the Containment atmospheres.

A detailed, plant-specific Containment integrity analysis for CCNPP indicates that the lowest pressure failure mode of the Containment is 132 psig (median value) [CCNPP Individual Plant Examination (IPE), Page 4.4-3]. Hence, a safety margin exists for Containment integrity at post-LOCA hydrogen concentration levels following a severe accident LOCA, without the use of a Hydrogen Control System. The severe accident analysis bounds the design basis accident analysis.

With respect to equipment survivability, NUREG/CR-5662 states:

> Equipment survivability depends on the specific plant design and on the Containment environment during a specific accident. Large-scale Nevada test site experiments demonstrated that various types of plant equipment are capable of operating successfully when subjected to the severe thermal environments associated with large-volume hydrogen burns.
>
> The analytical and experimental study performed at Sandia National Laboratories showed that the simulated equipment can withstand a LOCA and single burns resulting from a 75% MWR in a large, dry Containment. However, the multiple burn due to the operation of ignition systems could pose a serious threat to safety-related equipment located in the ignition source compartment.

It should be noted that the CCNPP Containments do not have igniters. This reduces the potential for multiple burns.

In summary, PWR plants with large, dry, Containments possess sufficient safety margin against Containment rupture without using any Hydrogen Control System. This is true especially for hydrogen burns at the expected hydrogen concentration levels during severe accidents or following a design basis LOCA. Additionally, the NRC has determined that, since PWR plants with large, dry, Containments can withstand the pressure following severe accidents, there was no need to backfit these Containments with igniters or to inert the Containment atmospheres.

Impact of Hydrogen Control on Design Basis Accidents

The existing post-accident Hydrogen Control System meets the requirements of 10 CFR50.44 and 10 CFR Part 50, Appendix E to control the concentration of hydrogen that may be released into the Containment following postulated design basis accidents. The existing Hydrogen Control System is designed to ensure that the hydrogen concentration is maintained below 4.0 vol% following a design basis LOCA. The open Containment design with the addition of the Containment Cooling System and the Containment Spray System provides an excellent hydrogen mixing capability inside the Containment that would prevent hydrogen pocketing following a postulated design basis LOCA (described in UFSAR, Section 6.8). Containment spray and coolers are actuated by a safety injection actuation signal. When the plant is no longer in a safety injection actuation signal condition, plant procedures allow the containment spray to be turned off. At this point, the containment coolers continue to contribute to air mixing. These hydrogen mixing systems are not affected by this exemption request or proposed Technical Specification change.

The post-LOCA hydrogen generation model for CCNPP is described in UFSAR Section 14.21. Figure 14.21-1 shows the predicted production of hydrogen gas inside Containment as a function of time (days) after the occurrence of a design basis LOCA. The figure shows the contribution from each source of hydrogen, as well as the total production rate. Figure 14.21-4 shows the predicted rate of hydrogen concentration with removal by hydrogen recombiner. The recombiner is assumed to be started one day after a LOCA. The figure shows the hydrogen concentration reaching approximately 3.5 vol% at about 20 days. If hydrogen control equipment is not used in a design basis accident, hydrogen concentration will continue to rise beyond 4.0 vol%. As demonstrated by the TMI event, a hydrogen burn at considerably higher concentrations will produce a pressure rise well below the Containment design pressure of 50 psi.

Design basis accidents have been analyzed by the Calvert Cliffs' IPE, which was submitted to the Nuclear Regulatory Commission. Hydrogen control is not assumed as part of the IPE analysis, therefore, this license amendment request will not change any of the assumptions or conclusions expressed in that document.

Eliminating the requirement to activate the hydrogen purge system will reduce radiological releases to the public by keeping any released radioactivity in the Containment.

In summary, the Hydrogen Control Systems are designed to maintain the hydrogen concentration level below the flammability limit during design basis accidents. Without operation of the Hydrogen Control Systems, the hydrogen concentration inside Containment could be expected to rise above 4.0 vol% following a design basis LOCA, using the assumptions presently used for accident analysis. However, the TMI event shows that even at 8.1 vol% of hydrogen, the pressure developed as a result of hydrogen burning is below the design pressure of the Containment. Eliminating the hydrogen control requirements for CCNPP will have a positive impact on the health and safety of public and plant personnel. Intentional releases from the Containment atmosphere to the outside atmosphere through the hydrogen purge system will be eliminated. This eliminates the potential for an intentional release of radioactive material from the Containment.

Impact of Hydrogen Control on Severe Accidents

For severe accidents, i.e., those beyond the design basis in which the reactor core is significantly damaged, hydrogen concentrations in the Containment in the range of 8.0 vol% over short periods of time are possible. This was demonstrated by the TMI-2 accident in 1979. The Hydrogen Control System is designed to maintain the hydrogen concentration level below 4.0 vol% during design basis accidents that result in small amounts of hydrogen produced slowly over long periods of time, i.e., many days. For severe accidents during which containment hydrogen concentration will rapidly rise to above the 4.0 vol% level, the present Hydrogen Control System is ineffective, and would provide no benefit to hydrogen concentration control and Containment performance. An NRC-sponsored study (NUREG/CR-5567, 1990) corroborates this point by stating that Hydrogen Control Systems are designed to accommodate hydrogen accumulation for design basis events (oxidation of 5% Zircalloy surrounding the active fuel). These systems are not designed for the hydrogen generation that might accompany a severe core damage event. Consequently, the Hydrogen Control System was not included in the CCNPP IPE. This license amendment request will not change any of the assumptions or conclusions expressed in the IPE. Subsequent to the TMI-2 accident, improvements in equipment, operator training and procedures make it extremely unlikely that a severe core damaging event comparable to TMI-2 would occur at CCNPP.

In summary, the usefulness of the existing Hydrogen Control System is limited to design basis accidents. Studies resulting from the TMI-2 accident have demonstrated that the system is ineffective during severe accidents. The CCNPP IPE shows that the Containment will withstand the pressure generated by a hydrogen burn after a beyond design basis accident. Therefore the Containment capacity for a severe accident bounds the capacity for a design basis accident. Additionally, the activation of the hydrogen purge system could be detrimental to public health and safety due to the radiological releases involved.

IMPACT OF HYDROGEN MONITORING ON DESIGN BASIS AND SEVERE ACCIDENTS

Hydrogen monitors are installed in Containment to assess the degree of core damage and confirm that ignition has taken place for design basis events. With the elimination of concern for the design basis LOCA hydrogen release, hydrogen monitors are no longer required to mitigate a design basis accident and, therefore, do not meet the definition of a safety-related component as defined in 10 CFR 50.2.

Regulatory Guide 1.97 defines Category 1 variables as those that most directly indicate the accomplishment of a safety function for design basis accidents. The NRC has determined in its rulemaking to revise 10 CFR 50.44 (FR 50374, August 2, 2002) that, with the elimination of concern for the design basis LOCA hydrogen release, hydrogen monitors no longer meet the definition for Category 1. However, the NRC determined in the same rulemaking that the hydrogen monitors do meet the Regulatory Guide 1.97 definition of a Category 3 variable, which are those required to evaluate beyond design basis accidents.

Because hydrogen monitors are no longer considered safety-related but are needed to diagnose the course of beyond design basis accidents, this request proposes to remove them from the Technical Specifications but to maintain them as non-safety-related equipment. Should this proposal be approved, the maintenance of the hydrogen analyzers as non-safety-related equipment will be treated as a regulatory commitment.

The proposed exemption and proposed Technical Specification change do not affect the consequences of potential severe accidents related to combustible gasses in the Containment at CCNPP since (1) there is adequate margin in the Containment design, and (2) the existing Hydrogen Control System is adequately designed for design basis accidents but is undersized for severe accidents, and therefore provides no benefit for these events.

INDUSTRY EXPERIENCE

The regulatory requirements for containment Hydrogen Control Systems were based on knowledge that existed before the TMI-2 event in March 1979. Following TMI-2, the nuclear industry and the NRC initiated extensive analysis and testing to increase the scope of knowledge concerning hydrogen generation and hydrogen control following severe accidents. This new knowledge invalidated many of the assumptions and methods in the regulations. Based on the new knowledge, it became clear that Hydrogen Control Systems designed for design basis LOCA conditions were not adequate in severe accidents to maintain the hydrogen concentration below the postulated flammability limit of 4.1 vol%. Following TMI-2, the nuclear industry performed extensive analysis and testing which indicated that large, dry, Containments would withstand the burn of large amounts of hydrogen generated in severe accidents.

In addition, the NRC conducted analyses with respect to backfitting the installation of igniters to replace the hydrogen recombiners in nuclear units with large, dry, Containments. The NRC determined that the requirement for igniters could not be justified for nuclear units with this type of Containment. This was because large, dry, Containments have a greater ability to accommodate the combustion of a large quantity of hydrogen associated with a degraded core accident than the smaller Containments. Plants with large, dry Containments typically rely exclusively on the containment structure to withstand any postulated uncontrolled burn of hydrogen gas generated in severe accidents.

CONCLUSION

The existing post-accident Hydrogen Control System is of little benefit in severe accidents. The reduction in hydrogen concentration provided by the recombiners has no impact on Containment integrity for design basis accidents because hydrogen combustion will not produce pressure higher than the Containment design pressure.

The information provided by the hydrogen monitors concerning the hydrogen concentration is not needed for post-accident decision making associated with Containment integrity. The monitors are therefore not needed for a design basis accident response.

REGULATORY REQUIREMENTS

10 CFR 50.44

Standards for Combustible Gas Control System in Light-Water-Cooled Power Reactors (10 CFR50.44) establishes requirements for controlling the amount of hydrogen inside the Containment following a postulated loss-of-coolant accident (LOCA). These requirements provide specific assumptions and methods to define the amount of hydrogen generated, the rate at which the hydrogen is generated, and the requirements of a combustible gas control system to control the concentration of hydrogen in the Containment to below flammability limits following a design basis LOCA.

Specifically, the regulation requires the following:

A means for control of hydrogen gas that may be generated following a postulated LOCA by:

a) metal-water reaction involving the fuel cladding and the reactor coolant;

b) radiolytic decomposition of the reactor coolant; and,

c) corrosion of metals.

The hydrogen control measures must be capable of:

a) measuring the hydrogen concentration in the Containment;

b) ensuring a mixed atmosphere in the Containment; and,

c) controlling combustible gas concentrations in the Containment following a LOCA.

It must be shown that following a LOCA, but prior to effective operation of the combustible gas control system, either:

a) an uncontrolled hydrogen-oxygen recombination would not take place in the Containment; or,

b) the plant could withstand the consequences of uncontrolled hydrogen-oxygen recombination without loss of safety function.

A combustible gas control system to maintain the concentrations of combustible gases within Containment below flammability limits following a LOCA is required. Such systems may be of two types:

a) those allowing controlled release from Containment such as a purge system;

b) those that do not result in a significant release from Containment such as recombiners.

Such a system must control hydrogen as necessary following a LOCA to assure that Containment integrity is maintained.

10 CFR Part 50, Appendix E

Appendix E of 10 CFR Part 50, contains requirements to provide information on the concentration of hydrogen inside the Containment following accidents as part of the Emergency Response Data System.

Special circumstances are identified in 10 CFR 50.12(a)(2). The special circumstances most relevant to Calvert Cliffs Nuclear Power Plant (CCNPP) are:

- Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.
- The exemption would result in benefit to the public health and safety that compensates for any decrease in safety that may result from the grant of the exemption.
- There is present any other material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption.

EXEMPTION REQUEST

The requirements set forth in 10 CFR 50.12 provide that specific exemptions may be granted that:

- are authorized by law;
- are consistent with the common defense and security;
- will not present an undue risk to the public health and safety; and
- are accompanied by special circumstances.

As described below, the requested exemption to the requirements of 10 CFR 50.44 satisfies the requirements of 10 CFR 50.12. The purpose of this exemption request is to remove the requirements for hydrogen monitors, the hydrogen purge system, and the hydrogen recombiners from the CCNPP Technical Specifications and design basis.

Section (a)(1) [There is no undue risk to the public health and safety]

Eliminating the existing hydrogen control requirements does not affect the CCNPP Containment safety margin as Containment failure due to hydrogen combustion is not credible. Furthermore, the usefulness of the existing Hydrogen Control System is limited to design basis accidents that result in small amounts of hydrogen produced slowly over long periods of time (many days). The system has minimal benefit for severe accidents, and under certain circumstances may represent a potential hazard.

A detailed comparative analysis of Containment integrity for CCNPP indicates that the lowest limiting pressure for Containment failure is 132 psig (median value) (CCNPP IPE, Section 4.4). This capacity is well above the pressure experienced by TMI-2.

Section (a)(2)(ii) [Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule and is not necessary to achieve the underlying purpose of the rule]

The present compliance with 10 CFR 50.44 at CCNPP does not serve the underlying purpose of the rule and is not useful in achieving the underlying purpose of the rule. The underlying purpose of the rule was to provide assurance that the Containment would not fail due to combustible gas accumulation and ignition in accident situations where fission products were present in the Containment. The reliance on the design basis LOCA conditions as described in the rule was ineffective in achieving this result.

The TMI-2 accident produced hydrogen in quantities far exceeding the assumptions in 10 CFR 50.44, and, even though an uncontrolled hydrogen burn did occur, the Containment did not fail.

Probabilistic Risk Assessments (PRAs) quantify the probabilities and consequences of similar accidents. In the CCNPP IPE, the existing Hydrogen Control System was not credited in addressing hydrogen concentrations during severe accidents.

The present compliance with 10 CFR Part 50, Appendix E at CCNPP does not serve the underlying purpose of the rule and is not useful in achieving the underlying purpose of the rule. The underlying purpose of Appendix E is to detect hydrogen in Containment and to alert operators to start a recombiner and/or open the hydrogen purge. As discussed, there is no need to control the concentration of hydrogen in a large, dry Containment; therefore the detection system is not needed during a design basis accident.

Section (a)(2)(iv) [There is a benefit to the public health and safety]

Implementation of the exemption from the hydrogen control requirements would achieve a benefit to the public health and safety. Approval of this amendment request will minimize the potential for actuation of the hydrogen vent and the recombiners during severe accidents.

Section (a)(2)(vi) [There are present material circumstances not considered when the regulation (i.e., 10 CFR 50.44) was adopted]

Experience and information obtained over time provide a better perspective about hydrogen generation and the impact of hydrogen burning on Containment integrity and safety equipment during accidents. Two important material circumstances are (a) the effects and (b) the risks of hydrogen generation.

a. Effects of hydrogen generation

Traditionally, technical and regulatory evaluation perspectives have held that a hydrogen burn is to be avoided due to the uncertainties of Containment failure. The TMI-2 accident in March 1979 provided an important benchmark for the effects of a hydrogen burn on safety equipment and Containment integrity. The TMI-2 accident, which involved about a 45% core cladding-water reaction, resulting in about 8.1% hydrogen concentration, produced no Containment breach and minimal damage to equipment (NUREG/CR-4330, Volume 3, 1987). The TMI Containment peak pressure was about 28 psig, well below the Containment design pressure of 60 psig. Containment damage was essentially limited to plastics and other low melting point materials such as telephone cases and the crane operator's seat. The TMI-2 hydrogen burn thus provides actual experience which establishes a significantly higher threshold for Containment damage than was thought to be available when the regulations were promulgated.

b. Risks of hydrogen generation

Many PRA evaluations (e.g., plant-specific IPEs) and tools (e.g., MAAP code) have been developed which provide a better insight about the risks of hydrogen generation and burning during severe accidents than were available when the regulations were promulgated. This amendment request does not change the conclusions and assumptions of the CCNPP IPE.

CONCLUSION

As discussed above, this exemption request is in compliance with 10 CFR 50.12, specifically with applicable Sections (a)(1) and (a)(2)(ii). The discussion has demonstrated (1) that granting the exemption will not present an undue risk to public health and safety, and (2) that application of the rule in the particular circumstance would not serve the underlying purpose of the rule and is not necessary to achieve the underlying purpose of the rule. Additionally, special circumstances may also exist with respect to Section (a)(2)(iv) and Section (a)(2)(vi).

The proposed amendment deletes Technical Specification 3.6.7, Hydrogen Recombiners. In addition, the proposed amendment revises Technical Specification 3.3.10, Post Accident Monitoring Instrumentation, to delete references to the hydrogen monitors. As noted above, this equipment is no longer needed for accident mitigation and should no longer be in the Technical Specification. The proposed changes are shown on marked up pages in Attachment (3).

The margin of safety and the appropriate accident analyses are discussed above. As noted above, hydrogen control was not assumed as part of the IPE analysis and, therefore, this license amendment request will not change any of the assumptions or conclusions in the IPE analysis. Therefore, the hydrogen control equipment can be removed from the Technical Specification.

ATTACHMENT (2)

DETERMINATION OF SIGNIFICANT HAZARDS

DETERMINATION OF SIGNIFICANT HAZARDS

The proposed change to the Technical Specifications has been evaluated against the standards in 10 CFR 50.92. The proposed amendment revises Technical Specification 3.3.10, Post-Accident Monitoring Instrumentation, and Technical Specification Table 3.3.10-1, Post-Accident Monitoring Instrumentation to delete references to the containment hydrogen analyzers. Additionally, the proposed amendment will delete Technical Specification 3.6.7, Hydrogen Recombiners. The proposed change has been determined to not involve a significant hazards consideration, in that 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.*

   Components used in the control of hydrogen in the Containment (consisting of hydrogen recombiners, a hydrogen vent, and hydrogen detectors) are not considered accident initiators. Therefore, this change does not increase the probability of an accident previously evaluated.

   The purpose of the Hydrogen Control System is to ensure that hydrogen concentration is maintained below 4.0 volume percent so that Containment integrity is not challenged following a design basis loss-of-coolant accident (LOCA). The Calvert Cliffs Nuclear Power Plant Individual Plant Examination analyzed the probability of Containment failure under a variety of conditions. This proposed amendment does not alter the conclusions or assumptions of the Individual Plant Examination. The Calvert Cliffs Nuclear Power Plant Containment provides a safety margin against hydrogen burn following a design basis accident, such that the Containment will not fail even without hydrogen control equipment. Therefore, this change does not increase the consequences of accidents previously evaluated.

   Therefore, this change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

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

   The proposed change does not change the configuration of the plant beyond the Hydrogen Control System. Hydrogen generation following a design basis LOCA has been evaluated. Deletion of the Hydrogen Control System from the plant design basis and Technical Specifications does not alter the generation of hydrogen post-LOCA.

   Therefore, this change does not create the possibility of a new or different type of accident from any accident previously evaluated.

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

   The margin of safety in this case is the ability of Containment to withstand a pressure increase caused by the deflagration of hydrogen in the Containment. Industry experience and experimentation has shown that large, dry, well-ventilated Containments such as those at Calvert Cliffs can withstand pressures generated by ignition of hydrogen resulting from a LOCA. The Calvert Cliffs Nuclear Power Plant Containment provides a safety margin against hydrogen burn following a design basis accident, such that the Containment will not fail even without hydrogen control equipment.

   Therefore, this change does not significantly reduce the margin of safety.

ATTACHMENT (3)

MARKED-UP TECHNICAL SPECIFICATION PAGES

TABLE OF CONTENTS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ~~-------- NOTE -------- Not applicable to hydrogen monitor channels. --------------------~~ One or more Functions with two required indication channels inoperable.	C.1 Restore one indication channel to OPERABLE status.	7 days
~~D. Two hydrogen monitor indication channels inoperable.~~	~~D.1 Restore one hydrogen monitor indication channel to OPERABLE status.~~	~~72 hours~~
D → ~~E~~. Required Action and associated Completion Time of Condition C ~~or D~~ not met.	D ~~E~~.1 Enter the Condition referenced in Table 3.3.10-1 for the channel.	Immediately
E → ~~F~~. As required by Required Action D ~~E~~.1 and referenced in Table 3.3.10-1.	E ~~F~~.1 Be in MODE 3. AND E ~~F~~.2 Be in MODE 4.	6 hours 12 hours
F → ~~G~~. As required by Required Action D ~~E~~.1 and referenced in Table 3.3.10-1.	F ~~G~~.1 Initiate action in accordance with Specification 5.6.7.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTE-----
These Surveillance Requirements apply to each PAM instrumentation Function in Table 3.3.10-1.

SURVEILLANCE		FREQUENCY
SR 3.3.10.1	Perform CHANNEL CHECK for each required indication channel that is normally energized.	31 days
SR 3.3.10.2 Deleted	~~Perform a CHANNEL CALIBRATION on Containment Hydrogen Analyzers.~~	~~46 days on a STAGGERED TEST BASIS~~
SR 3.3.10.3	-----NOTE----- Neutron detectors, Core Exit Thermocouples, and Reactor Vessel Level Monitoring System are excluded from CHANNEL CALIBRATION. ----- Perform CHANNEL CALIBRATION on each indication channel ~~except Containment Hydrogen Analyzers~~.	 24 months

Table 3.3.10-1 (page 1 of 2)
Post-Accident Monitoring Instrumentation

	FUNCTION	REQUIRED INDICATION CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION E.1
1.	Wide Range Logarithmic Neutron Flux	2	F
2.	Reactor Coolant Outlet Temperature	2	F
3.	Reactor Coolant Inlet Temperature	2	F
4.	RCS Subcooled Margin Monitor	1	N/A
5.	Reactor Vessel Water Level	2	G
6.	Containment Water Level (wide range)	2	F
7.	Containment Pressure	2	F
8.	Containment Isolation Valve Position	2 per penetration flow path(a)(b)	F
9.	Containment Area Radiation (high range)	2	G
~~10.~~	~~Containment Hydrogen Analyzers~~	~~2~~	~~F~~
10 ~~11~~.	Pressurizer Pressure (wide range)	2	F

3.6 CONTAINMENT SYSTEMS

3.6.7 Hydrogen Recombiners

LCO 3.6.7 Two hydrogen recombiners shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One hydrogen recombiner inoperable.	A.1	---------NOTE -------- LCO 3.0.4 is not applicable. --------------------- Restore hydrogen recombiner to OPERABLE status.	30 days
B. Two hydrogen recombiners inoperable.	B.1	Verify by administrative means that the hydrogen control function is maintained.	1 hour <u>AND</u> Every 12 hours thereafter
	<u>AND</u>		
	B.2	Restore one hydrogen recombiner to OPERABLE status.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.7.1	Perform a system functional test for each hydrogen recombiner.	24 months
SR 3.6.7.2	Perform a CHANNEL CALIBRATION of all hydrogen recombiner instrumentation and control circuits.	24 months
SR 3.6.7.3	Visually examine each hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.	24 months
SR 3.6.7.4	Perform a resistance to ground test for each heater phase.	24 months