50-416

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

August 1, 1996

Mr. C. Randy Hutchinson
Vice President, Operations GGNS
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

SUBJECT: ISSUANCE OF AMENDMENT NO. 126 TO FACILITY OPERATING LICENSE NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1 (TAC NO. M94176)

Dear Mr. Hutchinson:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 126 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1, (GGNS). This amendment revises the Technical Specifications (TSs) in response to your application dated November 20, 1995, as supplemented by letter dated December 15, 1995.

The amendment revises and deletes surveillance requirements, notes, and action statements involved with the requirements for the drywell leak rate testing, and the air lock leakage and interlock testing in Subsections 3.6.5.1 (Drywell), 3.6.5.2 (Drywell Air Lock), and 3.6.5.3 (Drywell Isolation Valves) of the TSs. The details of the revisions to the TSs are discussed in the enclosed Safety Evaluation, which also provides the staff's evaluation of the revisions to the TSs.

Your application of November 20, 1995, was a revised request of your original applications of October 22, 1993, and February 10 and 14, 1994, as explained in the enclosed Safety Evaluation. The staff addressed the original applications in Amendment No. 119 dated February 16, 1995, in that only part of the requested revisions to the TSs were approved and the staff stated that it had not completed its review of the request for performance-based surveillance requirements up to 10 years for drywell bypass surveillance testing and this review would be deferred pending further discussion. This amendment completes the staff's review of this request for performance-based drywell bypass surveillance testing.

You stated in your application of November 20, 1995, that it revised the original applications by updating the requests to reflect the implementation of the Improved Standard Technical Specifications (ISTS) at GGNS. Amendment No. 119 was issued before the ISTS were approved in Amendment No. 120 on February 21, 1995. This updating was for the requested performance-based 10-year drywell bypass surveillance TS revisions not approved in Amendment No. 119 and for revisions to the surveillance requirements for the air lock leakage and interlock testing.

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You committed to assess the leaktightness of the drywell at least once each operating cycle by using the drywell purge compressors to cause an increase in the drywell pressure which commitment should be included in the next update of the Final Safety Analusis Report pursuant to 10 CFR 50.71(e).

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

Sincerely,

Jack N. Donohew, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosures: 1. Amendment No. 126 to NPF-29
2. Safety Evaluation

cc w/encls: See next page

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cc w/encls: See next page

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Docket File	PUBLIC	PD4-1 r/f	R. Lobel
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Document Name: GG94176.AMD *See previous concurrence

OFC	LA:PD4-1	PM:PD4-1	SCSB:BC*	SCSB:BC*	OGC*
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DATE	8/1 /96	8/1 /96	07/16 /96	07/16/96	07/25 /96
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY OPERATIONS, INC.

SYSTEM ENERGY RESOURCES, INC.

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

ENTERGY MISSISSIPPI, INC.

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 126
License No. NPF-29

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

   A. The application for amendment by Entergy Operations, Inc. (the licensee) dated November 20, 1995, as supplemented by the letter dated December 15, 1995, 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. NPF-29 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. , are hereby incorporated into this license. Entergy Operations, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Jack N. Donohew, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: August 1, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 126

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following pages of the Appendix A Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

REMOVE PAGES	INSERT PAGES
3.6-53	3.6-53
3.6-54	3.6-54
3.6-56	3.6-56
3.6-57	3.6-57
3.6-58	3.6-58

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.5.1.1	Verify bypass leakage is less than or equal to the bypass leakage limit. However, during the first unit startup following drywell bypass leak rate testing performed in accordance with this SR, the acceptance criterion is leakage $\leq$ 10% of the bypass leakage limit.	24 months following 2 consecutive tests with bypass leakage limit until 2 consecutive tests are less than or equal to the bypass leakage limit AND 48 months following a test with bypass leakage greater than the bypass leakage limit AND ------NOTE----- SR 3.0.2 is not applicable for extensions > 12 months. ---------- 120 months
SR 3.6.5.1.2	Visually inspect the exposed accessible interior and exterior surfaces of the drywell.	Once prior to performance of each Type A test required by SR 3.6.1.1.1
SR 3.6.5.1.3	Verify drywell air lock leakage by performing an air lock barrel leakage tests at $\geq$ 3 psid.	24 months

3.6 CONTAINMENT SYSTEMS

3.6.5.2 Drywell Air Lock

LCO 3.6.5.2 The drywell air lock shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
Entry and exit is permissible to perform repairs of the affected air lock components.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One drywell air lock door inoperable.	----------NOTES---------- 1. Required Actions A.1, A.2, and A.3 are not applicable if both doors in the air lock are inoperable and Condition C is entered. 2. Entry and exit is permissible for 7 days under administrative controls. ---------- A.1 Verify the OPERABLE door is closed. AND	1 hour (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Drywell air lock inoperable for reasons other than Condition A or B.	C.1 Verify a door is closed. AND C.2 Restore air lock to OPERABLE status.	1 hour 24 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.5.2.1	----------NOTE---------- Only required to be performed upon entry into drywell. ---------- Verify only one door in the drywell air lock can be opened at a time.	24 months

3.6 CONTAINMENT SYSTEMS

3.6.5.3 Drywell Isolation Valves

LCO 3.6.5.3 Each drywell isolation valve, except for Drywell Vacuum Relief System valves, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

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

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by drywell isolation valves.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more penetration flow paths with one drywell isolation valve inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	8 hours (continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 126 TO FACILITY OPERATING LICENSE NO. NPF-29

ENTERGY OPERATIONS, INC., ET AL.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By the application dated November 20, 1995, as supplemented by the letter dated December 15, 1995, Entergy Operations, Inc. (EOI, the licensee) requested changes to Section 3.6, Containment Systems, of the Technical Specifications (TSs) for Grand Gulf Nuclear Station, Unit 1, (GGNS). The proposed changes affect the surveillance requirements and actions in response to an inoperability for the following Limiting Conditions for Operation (LCO) in the TSs: LCO 3.6.5.1, Drywell, LCO 3.6.5.2, Drywell Air Locks, and LCO 3.6.5.3, Drywell Isolation Valves.

The following are the specific changes proposed for the TSs:

1. For the drywell in LCO 3.6.5.1, the surveillance frequency interval for the drywell bypass leakage test in Surveillance Requirement (SR) 3.6.5.1.1 would be increased from 18 months to 10 years. For this interval change, an increased testing frequency would be required if bypass performance degrades (i.e., the leakage is greater than the limit) and the application of SR 3.0.2, the allowance to extend the surveillance interval by 25 percent, would be restricted to 12 months on the 10-year interval. This includes deleting the Note in SR 3.6.5.1.1.

2. For the drywell airlock in LCO 3.6.5.2, the following changes are requested: (a) the leak rate SR 3.6.5.2.2 would be transferred from the airlock LCO (3.6.5.2) to SR 3.6.5.1.3 in the drywell LCO (3.6.5.1), (b) the requirement in SR 3.6.5.2.2 for the air lock to meet a specific overall leakage limit would be deleted, (c) the Note in SR 3.6.5.2.2 that stated that an inoperable air lock door does not invalidate the previous air lock leakage test would be deleted, (d) the test pressure for the air lock leakage test in SR 3.6.5.2.2 would be reduced from 11.5 psig to 3 psid, and (e) the surveillance frequency interval for the air lock leakage and interlock testing, required in SRs 3.6.5.2.1 and 3.6.5.2.2, would be increased from 18 months to 24 months.

3. For the drywell airlock in LCO 3.6.5.2 and the drywell isolation valves in LCO 3.6.5.3, the Action Notes, which identify that the actions required by drywell LCO 3.6.5.1 must be taken when the drywell bypass leakage limit is not met, would be deleted. Action C.1 of LCO 3.6.5.2 and its associated completion time would also be deleted.

The licensee also submitted the corrections to the Bases of the TSs which take into account the above proposed changes to the TSs.

In the letter dated December 15, 1995, the licensee proposed a program to assess the drywell bypass leakage rate to assure continued operability of the drywell. The licensee committed, following approval of the proposed TS changes, to qualitatively assess the leaktightness of the drywell at least once each operating cycle in a manner that will provide reasonable assurance of the ability of the drywell to perform its design-basis pressure suppression function, that is, to demonstrate that the drywell is operable. The licensee has chosen to demonstrate this by using the drywell purge compressors to cause an increase in the drywell pressure. The first assessment would be performed during Operating Cycle 9 which starts after the upcoming Refueling Outage (RFO) 8. RFO 8 is scheduled to start in October 1996.

The letter of December 15, 1995, also provides information on the drywell isolation valves.

2.0 BACKGROUND

GGNS is a General Electric boiling water reactor (BWR), a BWR-6, with a Mark III containment. The drywell is enclosed within the primary containment and is discussed in Section 6.2 of the Updated Final Safety Analysis Report (UFSAR) for GGNS. The drywell contains the reactor coolant system and is designed to contain the pressure, mass, and energy released during the design basis loss-of-coolant-accident (LOCA). It is connected to the primary containment through vents in the drywell wall and the water in the suppression pool, which is both inside and outside the drywell, covers these vents to separate the drywell from the primary containment. During a LOCA, blowdown from the reactor coolant system will uncover these vents and flow to the primary containment through the suppression pool water.

The drywell airlock is designed to provide personnel access to the drywell and to maintain drywell integrity. The drywell isolation valves are on piping and air lines that penetrate the drywell to prevent leakage through these lines from the drywell during the LOCA.

By letter dated October 22, 1993, the licensee proposed changes to the GGNS TSs to revise the test interval for drywell bypass leakage rate testing and to revise the surveillances for drywell air lock testing. The licensee also proposed to modify certain drywell air lock tests.

The licensee supplemented the October 22, 1993, letter by submittals dated February 10 and 14, 1995. These submittals proposed a modification to the October 22, 1993, submittal to permit a one-time postponement of the drywell bypass leakage rate test until entry into the first plant startup from RFO 8; that is, the test would not be performed during the restart from RFO 7. The request for a postponement was based on the good previous performance (i.e., low bypass leakage) of the drywell in past tests (See Section 3.1.3 below).

On February 16, 1995, the Nuclear Regulatory Commmission (NRC) issued Amendment No. 119 to the TSs which approved the one-cycle postponement of the drywell bypass leakage rate test and approved changes to TSs for air lock surveillances. This postponement was permitted for the purpose of providing more time for the staff to complete the review of the October 22, 1993, submittal.

By letter dated May 30, 1995, EOI, as the licensee for River Bend Station, also a BWR/6 with a Mark III containment, proposed changes to the River Bend TSs to allow the drywell bypass leakage rate tests to be performed on 5-year intervals. Illinois Power, the licensee for the Clinton Power Station, also a BWR/6 with a Mark III containment, had also requested a change to the drywell bypass leakage rate test interval by letter dated August 12, 1994. Because of the interest of these BWR/6 licensees, the NRC staff requested that the BWR/6 licensees work together on a common proposal.

Subsequently, the staff received a revised November 20, 1995, proposal from EOI for River Bend Station and GGNS. The revised submittal proposes an increase in the test interval of the drywell bypass leakage rate test and several changes to the drywell air lock surveillances for the stations. Attachment 5 to the revised application contains responses to questions from the staff review which were discussed with the licensee in telephone discussions following the original application of October 22, 1993.

By letter dated January 29, 1996, the staff approved the November 20, 1995, request by the licensee for River Bend Station to revise the bypass leakage rate surveillance testing interval from 18 months to 10 years and to modify several drywell air lock surveillances. This safety evaluation addresses the changes proposed for the GGNS TSs.

3.0 EVALUATION

The staff's evaluation of the proposed changes to the GGNS TSs is divided into three subsections, one for each of the following subsections of the TSs that was proposed to be changed: Drywell (LCO 3.6.5.1), Drywell Air Lock (LCO 3.6.5.2), and Drywell Isolation Valves (LCO 3.6.5.3). The licensee has proposed changes to SRs and Notes in each of the three LCO subsections.

3.1 Proposed Extension of Drywell Bypass Leakage Rate Test Surveillance Interval

The licensee proposed a change to the surveillance interval for the drywell bypass leakage test in SR 3.6.5.1.1 from 18 months to 10 years. Included with this proposal is the following:

- An increased testing frequency, compared to the 10-year interval, required if the drywell bypass exceeds the bypass leakage limit
- A restriction on the extension of the surveillance interval permitted by SR 3.0.2 (i.e., only a one-year extension, rather than 25 percent of the 10-year test interval or a 2.5-year extension)
- Delete the Note that the surveillance is not required until restart from RFO 8.

The acceptance criteria for SR 3.6.5.1.1 and the drywell bypass leakage limit, which are part of SR 3.6.5.1.1, are not being changed by the proposed changes to SR 3.6.5.1.1.

The staff finds the licensee's proposal acceptable when modified by its commitment, in the December 15, 1995, letter, to perform an operability assessment of the drywell at least once per operating cycle. The basis for this finding is discussed in the following sections and the details of the operability assessment are discussed in Section 3.1.3.7 below.

3.1.1 Description of Drywell Safety Function

The Mark III containment is a pressure suppression containment enclosing the drywell and is designed to condense steam and contain fission products released during a LOCA by the blowdown through the suppression pool and by means of the containment spray. It is only used in this country with the BWR/6 reactor design. The effectiveness of the pressure suppression containment depends on the ability to condense steam released from the primary reactor system during a LOCA. Condensation of the steam precludes overpressurization of the containment. The steam is condensed by directing its flow through a vent system from the drywell, through the suppression pool, to the containment.

The design of the Mark III containment makes allowance for a given amount of steam to bypass the suppression pool and enter the containment without being condensed by the suppression pool. If the bypass leakage were too large, the containment design pressure could be exceeded. There is some margin above the design pressure before the containment would fail; however, if the amount of steam leaking into the containment were large enough, not only could the containment fail, but bypassing the suppression pool could result in a radiation source term much larger than would otherwise be the case and much larger than was considered in the accident analysis for licensing GGNS in Section 15.6 of the UFSAR.

3.1.2 Drywell Bypass Limit

In UFSAR Section 6.2.1.1.5.2, allowable bypass leakage is defined as the amount of steam which could bypass the suppression pool without exceeding the design containment pressure of 15 psig. This allowable bypass leakage is determined by examining a spectrum of LOCA break sizes. The allowable leakage is expressed in terms of the parameter $A/\sqrt{K}$ where

A = Flow area of the leakage path, ft^2
K = Geometric and friction loss coefficient, dimensionless.

This parameter is dependent on the geometry of the drywell leakage paths with only a slight flow dependence, which is neglected.

SR 3.6.5.1.1 requires that, prior to startup after performing a drywell bypass leakage rate test, the drywell bypass leakage rate shall be $\leq$ 10 percent of the drywell bypass leakage rate limit. This is not being changed by the proposed amendment. The drywell bypass leakage rate limit is given in the Bases of the TSs for SR 3.6.5.1.1 as the following: $A/\sqrt{K} = 0.9\ ft^2$.

The TSs require that, prior to startup, the drywell bypass leakage rate limit must not be greater than 10 percent of the design limit. This margin below the design limit allows for degradation of the drywell integrity until the next test. The drywell leakage may increase during an operating cycle, but it should remain below the design limit.

The drywell bypass limit is based on a very small reactor system break which will not automatically result in a reactor depressurization. It is assumed that, after the break has occurred, the operator shuts the reactor down at a cooldown rate of 100 °F/hr. At this rate, it takes 6 hours to depressurize the reactor and terminate break flow to the drywell. It is assumed in the Grand Gulf analysis that one containment spray loop is initiated. Passive containment heat sinks (listed in UFSAR Table 6.2-9) are also credited. This is an important assumption because without containment spray and containment heat sinks the allowable $A/\sqrt{K}$ would be only 0.048 ft^2.

The GGNS design basis drywell leakage corresponds to approximately 35,000 scfm. This leakage rate is three orders-of-magnitude greater than the design basis primary containment leakage rate, which is stated in the November 20, 1995, submittal to be less than 10 scfm.

A preoperational drywell bypass leakage rate test was performed at GGNS using the drywell design pressure (30 psig) with the drywell isolated from the containment by capping the horizonal vents. The results of this test were acceptable. This is further discussed in Sections 3.1.3.2 and 3.1.3.3 below.

SR 3.6.5.1.1 currently requires that a test be performed at least every 18 months to measure the drywell bypass leakage rate. The test is performed at a pressure difference of 3 psid between the drywell and the wetwell. This pressure difference corresponds to the difference in the head of water when

the water level in the vent annulus is depressed to the top of the upper row of vents (see UFSAR Section 6.2.1.1.5.4). It is also the calculated pressure differential for the design basis accident for drywell bypass leakage.

The licensee proposed to increase this test interval to at least one test in 10 years.

The table on the next page provides the results of drywell bypass leakage tests at GGNS from 1982 through RFO 6 in 1993.

3.1.3 Drywell Bypass Leakage Safety Evaluation

The staff's acceptance of the proposed 10-year test interval is based on the licensee's capability to assure that the likelihood of significant bypass leakage is acceptably low. This is based on the design of the drywell and its penetrations, the TSs and administrative controls in place and the results of previous leakage tests, as well as deterministic and risk calculations. The staff gave considerable weight in its evaluation to the licensee's commitment to assess the drywell leakage at least once per cycle to assure that the drywell remains operable.

3.1.3.1 Overview

Primary sources of drywell bypass leakage are the drywell air lock, equipment hatch, penetrations, and vacuum relief system.

The drywell contains penetrations for piping systems; electrical cables for power, control and instrumentation; a personnel air lock and a drywell equipment hatch. Piping penetrations have automatic or remote manual isolation valves or valves that are required to be in the closed position when drywell integrity is required. The electrical penetrations for the electrical cables contain a sealing medium to limit leakage. For the drywell air lock, the TSs specify leakage rate testing and specify the leakage rate criteria. Integrity of the equipment hatch is part of the drywell integrity and, by LCO 3.6.5.1, the drywell equipment hatch is required to be closed for plant operation in Modes 1, 2, and 3. The vacuum relief system transfers noncondensibles back to the drywell from the primary containment during a LOCA to prevent a low pressure condition in the drywell.

The licensee has not proposed to change the requirements on the penetrations and the equipment hatch; however, it has proposed to modify the air lock requirements. An evaluation of the licensee's proposal for revising the drywell air lock TSs is provided in Section 3.2 of this evaluation.

3.1.3.2 Operating Experience

The experience at GGNS with drywell bypass leakage rate testing has been good. The results of this testing are summarized in the table on the next page. The

TABLE
RESULTS OF DRYWELL BYPASS LEAKAGE TESTS
GRAND GULF NUCLEAR STATION

TEST DATE	LEAKRATE scfm	RATIO OF LEAKAGE RATE TO DESIGN LIMIT %	CALCULATED A/√K ft^2
1/82	611	1.75	0.016
3/83	1621	4.63	0.042
6/84	2599	7.43	0.067
11/85	2315	6.61	0.060
11/86 (RFO 1)	1568	4.48	0.040
12/87 (RFO 2)	1500	4.29	0.039
4/89 (RFO 3)	1631	4.66	0.042
11/90 (RFO 4)	1591	4.55	0.041
5/92 (RFO 5)	618	1.77	0.016
11/93 (RFO 6)	869	2.48	0.022

maximum value of bypass leakage was 7.43 percent of the design limit. Ten drywell bypass leakage rate tests have been performed at GGNS and there have been no test failures.

Prior to commercial operation, in March of 1983, GGNS failed a drywell bypass leakage rate test. This was due to a partially open vent valve on a vendor supplied compressor and two open electrical conduits. These conduits were open as a result of ongoing construction activities and were scheduled to be sealed closed. However, this was overlooked before the test was performed. These penetrations were subsequently sealed and the drywell bypass leakage rate was measured to be within acceptable limits. The staff considers this incident to have little bearing on current operation since it is extremely unlikely that the circumstances could be repeated. The electrical penetrations are now permanently sealed, and even if an electrical penetration were reopened for some reason, the level of attention and procedural controls is much higher with the plant in an operational status as opposed to being under construction.

In addition to reviewing the leakage history of the GGNS drywell, the staff also reviewed the drywell operating experience at all four domestic BWR/6 facilities to determine if there were any operating issues which would indicate that extending the test interval may not be appropriate. Based on this review, no such issue was identified.

3.1.3.3 Drywell Structure

Section D of the licensee's November 20, 1995, submittal discussed leakage considerations related to the drywell structure. During preoperational testing the drywell was pressurized in large increments to its design pressure of 30 psig while deflections and strains and concrete crack patterns in the structure were recorded. The results showed that the structure was not stressed as much as predicted and there were no signs of concrete cracking (See UFSAR Section 3.8.3.7).

During the drywell bypass leakage rate test, the drywell is pressurized to only 3 psid. Thus, the staff expects no significant challenge to the integrity of the drywell structure. This is verified by a statement in the November 20, 1995, submittal that "[v]isual inspections of the drywell surface that have been performed since the [preoperational] structural tests have not revealed the presence of additional cracking or other abnormalities."

The staff does not consider leakage through the drywell structure to be a significant concern in extending the drywell bypass leakage rate testing frequency for GGNS. The TSs and Appendix J of 10 CFR Part 50 require a visual inspection of the exposed accessible interior and exterior surfaces of the drywell prior to the performance of each Appendix J Type A test.

The licensee may, at some time, modify the drywell structure or a pressure retaining component of the drywell. Following maintenance, a system is returned to operability and as stated in the Bases to SR 3.0.1:

> upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE.

The staff considers the requirement to determine operability following maintenance to be sufficient to assure that appropriate testing is conducted, as needed, following maintenance to ensure that the drywell remains operable (i.e., meets LCO 3.6.5.1) and capable of performing its safety function.

3.1.3.4 Piping Penetrations and Vacuum Relief System

Lines which penetrate the drywell have drywell isolation valves. These valves prevent leakage from the drywell into the primary containment. The isolation valves on those lines which penetrate the primary containment as well as the drywell are included in the category of primary containment isolation valves. Primary containment isolation valves are leakage rate tested according to the requirements of 10 CFR Part 50, Appendix J. Appendix J defines a total leakage rate limit for the containment isolation valves and other penetrations. There is no corresponding limit for the drywell isolation valves. In fact, the drywell isolation valves are not required to be separately leak tested.

A list of drywell isolation valves for GGNS is given in a table included in the December 15, 1995, letter from the licensee.

The magnitude of allowable drywell bypass leakage makes it unlikely that it will be exceeded due to leakage through a closed drywell isolation valve or valves. It is more likely that a drywell isolation valve, or valves, inadvertently left open would be necessary to exceed the limit. However, the licensee has presented several arguments to demonstrate that it is extremely unlikely that the drywell bypass leakage limit would be exceeded due to an inadvertently open drywell isolation valve. This is due to the large flow area necessary to exceed the allowable leakage value and the controls required by the TSs to assure that the valves are closed.

The controls on the drywell isolation valve position are the same as the controls for primary containment isolation valves. All automatic and remote manual isolation valves have position indication in the control room. Manual isolation valves and most check valves do not. The licensee stated, in Attachment 5 to the November 20, 1995, submittal, that automatic isolation valves that are not closed would either have an open indication (indicating that the valve is full open) or a dual indication (indicating the valve is somewhere between full open and full closed).

Each of the valves without position indication has a flow area of less than 8 inches. Calculations show that, even with all drywell isolation valves which are less than 8 inches in diameter in the open position, the bypass leakage design limit would not be exceeded.

The GGNS drywell vacuum relief system has four sets of isolation valves isolating three 10 inch drywell penetrations (numbers 338, 339 and 340). One drywell penetration is isolated by two sets of drywell post-LOCA vacuum relief subsystems in parallel, each consisting of one butterfly valve and one check valve. The other two penetrations are each isolated by drywell purge vacuum relief subsystems consisting of one butterfly valve and two check valves. The licensee provided the calculated effective $A/\sqrt{K}$ values in the November 20, 1995, submittal for these penetrations. The $A/\sqrt{K}$ values apply for forward flow (that is, from primary containment into the drywell) and are therefore conservative (i.e., lower) for flow in the opposite, or leakage, direction.

The licensee has shown that even with all four vacuum relief valves fully open, the bypass leakage rate is less than the design limit $A/\sqrt{K}$ of 0.9.

The TSs require verification at least every 7 days that each vacuum breaker is closed. The position of the butterfly drywell isolation valves in each vacuum relief subsystem is indicated in the control room. Should a vacuum relief subsystem not be closed, the TSs allow only 4 hours to restore it to a closed position or begin a plant shut down.

The licensee also postulated that one of the purge and exhaust penetration flow paths is fully open in addition to other drywell bypass leakage equal to the TSs value. This is an $A/\sqrt{K}$ value of approximately 0.7 (see the response to staff question 5(a) in Attachment 5 to the November 20, 1995, submittal). Thus, the design bypass leakage limit will not be exceeded in this case.

The TSs require that these valves be maintained closed in Modes 1, 2, and 3 except under certain specified conditions when they are allowed to be opened under administrative control. Closure of these valves is verified at least once every 31 days by using control room indication.

These examples demonstrate that there is significant margin to the drywell bypass leakage limit for the drywell isolation valves.

3.1.3.5 Air Lock and Equipment Hatch

The TSs require the drywell air lock to be leakage rate tested during every refueling outage. The test interval is currently 18 months to be consistent with the current operating cycles; however, the licensee has proposed to change this interval to 24 months to accommodate longer operating cycles. As discussed in Section 3.2.5 below, the staff finds this proposed change to be acceptable. In addition, the licensee has evaluated the effect of total loss of the drywell air lock seal for GGNS and has determined that the resulting leakage past the seals would not result in the drywell being unable to perform its safety function.

The drywell equipment hatch at GGNS has double compression seals and is leak tested under administrative controls before plant startup following an opening of the hatch.

The staff considers the controls on the air lock and the equipment hatch to be sufficient to provide reasonable assurance that the drywell bypass leakage rate limit will not be exceeded due to leakage through these paths.

3.1.3.6 Electrical Penetrations

In discussions with the staff, the licensee provided a description of the electrical penetrations and discussed the likelihood of failure of an electrical penetration in such a manner as to provide a significant leakage path. The licensee concluded, based on the geometry of the penetration and the sealant used, that significant bypass leakage is highly unlikely. The licensee stated that the sealant material is very similar in practice to Portland cement and is designed to resist accident pressure and temperature. In addition, the cable in the penetration limits the available flow path to some extent, even if there were no sealant.

As part of the recent rulemaking concerning the revisions to 10 CFR Part 50, Appendix J, the staff examined the leakage behavior of primary containment electrical penetrations and found that the operating experience justified an increase in the leakage rate test interval from the 2 years specified in the previous rule to a maximum of 10 years under the new rule (published in the Federal Register on September 26, 1995, and became effective October 26, 1995).

The staff, therefore, concludes that the likelihood of significant leakage through the electrical penetrations is very small.

3.1.3.7 Monitoring Drywell Leakage

The staff requested that the licensee propose a method of monitoring the drywell for significant leakage during operation. The licensee then proposed a method which provides a reasonable assurance that the TSs value of drywell bypass leakage will not be exceeded.

By letter dated December 15, 1995, the licensee committed to assess drywell leaktightness at least once per operating cycle. The assessment will provide a reasonable assurance that the drywell remains operable. The first assessment will be performed during Cycle 9, the first cycle for which the longer surveillance interval will be in effect.

The licensee will perform the assessment using the purge compressors to cause a pressure increase in the drywell. Although this is not as accurate as the test required by SR 3.6.5.1.1, the assessment will be capable of indicating whether the leakage is below the drywell bypass limit.

The operability assessment would be performed by running the compressors in the drywell purge system, which are required to be operated for at least 15 minutes every quarter in accordance with SR 3.6.3.3.2, to pressurize the drywell. As explained in the Bases of the TSs for LCO 3.6.3.3, Drywell Purge System, the drywell purge system is an engineered safety system which forces air from the primary containment (outside the drywell) into the drywell. Each of two compressors in the two-train system will pump 1000 scfm. At this low flow, compared to the TS value of 3,500 scfm (the 10 percent of the design basis drywell leakage of 35,000 scfm), the assessment is whether a compressor can increase the pressure in the drywell. The licensee has measured increased drywell pressure during the past surveillances on the drywell purge system and, because the scram setpoint for containment is 1.43 psig, as stated in TS Table 3.3.1.1-1, the licensee has stated that it must be careful not to pressurize the drywell above this setpoint and scram the reactor. A description of the operability assessment will be included in the next update of the UFSAR pursuant to 10 CFR 50.71(e).

3.1.3.8 Risk Considerations

Drywell performance plays a significant role in the risk analysis of a BWR/6. Radionuclides are released into the drywell atmosphere at vessel breach and during core concrete interaction. Early failure of the drywell is important because it would establish a pathway for radionuclides in the drywell to bypass the suppression pool. However, even with drywell failure or bypass, there still will be some reduction in the source term, especially if the containment spray system is operating.

A rather simple analysis of the effect of drywell bypass on containment behavior can be obtained by using the analysis of the Grand Gulf Nuclear Station given in NUREG-1150 "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants". The report NUREG/CR-4551, Vol. 6, Rev. 1, Part 1, "Evaluation of Severe Accident Risks: Grand Gulf Unit 1, Main Report" provides calculational results pertinent to the drywell at GGNS.

The conditional probability of drywell failure given core damage is 0.31. This is due to causes other than drywell bypass leakage. The probability of drywell bypass leakage in excess of the limit in the TSs is taken to be zero. The mean probability of coincident early drywell failure and containment failure is 0.23. Therefore, there are some accidents which result in early drywell failure which do not result in early containment failure. However, for simplicity and conservatism, one can assume that the 0.31 conditional probability of drywell failure is also the probability of containment failure.

Rather than using the probability of zero for drywell leakage, the staff conservatively assumed a value of 0.01 for the probability of a drywell bypass leakage path large enough to result in failure of the containment following a core damage event. This is a conservative estimate considering previous operating experience, the drywell design, and the controls on penetrations in place as discussed above, even considering the test interval increase from 18 months to 10 years. Thus, to a first approximation, the conditional probability of drywell failure (including bypass) increases from 0.31 to 0.32. This is a small increase and would have only a small effect on risk.

Therefore, the staff considers the increase in risk due to the increase in the test interval from 18 months to 10 years to be acceptable.

3.1.4 Staff Position

The staff reviewed the licensee's proposal to increase the test interval for drywell bypass leakage rate testing from 18 months to 10 years. The staff concludes that this extension in the test interval is acceptable. As discussed above, this is because of the demonstrated margin available due to (1) the relatively large amount of leakage (i.e., the drywell design basis bypass leakage) necessary to exceed the containment design pressure, (2) the criterion for measured leakage following a drywell test being 10 percent of the drywell bypass design limit, (3) the controls in place on penetrations to assure that they remain closed when required, and (4) the licensee's commitment to assess the drywell bypass leakage at least once per operating cycle in order to maintain a reasonable assurance that the drywell remains operable.

The acceptance criteria for SR 3.6.5.1.1 and the drywell bypass leakage limit, which are part of SR 3.6.5.1.1, are not being changed by the proposed changes to SR 3.6.5.1.1. The licensee has also proposed to define a state of degraded drywell performance in performing SR 3.6.5.1.1 and to require a change in the surveillance frequency for degraded performance. The proposed action for

degraded performance of drywell bypass leakage and the required reduced interval are the following:

- An interval of 48 months if there is a test with leakage greater than the acceptance limit,
- An interval of 24 months if there are two consecutive tests with leakage greater than the acceptance limit, and
- The 24 month interval is maintained until there are two consecutive tests with leakage not greater than the acceptance limit.

With the interval extended to 10 years, there could be 5 to 7 refueling outages during that interval and degraded performance should warrant more frequent tests as is required for the primary containment Type A leakage test in the recent rulemaking revising Appendix J to 10 CFR Part 50 (published in the Federal Register on September 26, 1995, and effective on October 26, 1995), where the interval between the Type A tests was increased to 10 years. The proposed criteria and reduced interval are consistent with the guidance in Regulatory Guide 1.163 accompanying Option B of 10 CFR Part 50, Appendix J for a Type A primary containment leakage rate test. Therefore, the staff concludes that these proposed changes are acceptable.

Also, the licensee proposed to limit the extension on the surveillance interval under SR 3.0.2 to 1 year instead of the 25 percent of the 10 year interval (or 2.5 years). This proposal is acceptable because 1 year is a more reasonable and conservative extension than the 2.5 years allowed by SR 3.0.2.

The licensee also proposed deleting the note in SR 3.6.5.1.1 which states that the drywell bypass leakage rate test is not required until entry into Mode 2 on the first plant startup from RFO 8. This note was added by Amendment No. 119, as discussed in Section 2.0 of this safety evaluation. The staff had not completed its review of the licensee's proposal to extend the drywell bypass leakage rate test interval to 10 years for Amendment No. 119; however, the staff agreed to a one time postponement of the test based on previous good performance of the drywell. The note is no longer applicable and the staff approves its deletion from the TSs.

3.2 Drywell Air Lock Technical Specifications Changes

3.2.1 Leakage Rate Surveillance Moved from Air Lock LCO (3.6.5.2) to Drywell LCO (3.6.5.1).

The licensee proposed to move the air lock leakage rate surveillance requirement in SR 3.6.5.2.2 to the drywell LCO because the licensee must assure that the drywell bypass leakage rate is still below its limit following this test to assure continued drywell operability. It will become SR 3.6.5.1.3. While this transfer will result in a different TS format from

the ISTS, the proposal is essentially an editorial change because transferring the SR does not change the requirements of the SR.

Transferring SR 3.6.5.2.2 to SR 3.6.5.1.3 removes the need for having Note 2 of LCO 3.6.5.1. Therefore, this note may be deleted (See Section 3.2.6).

Based on the above, the staff concludes that the proposed change to transfer SR 3.6.5.2.2 is acceptable.

3.2.2 Delete requirement for the drywell air lock to meet a specific overall leakage rate limit.

The licensee proposed to delete the overall drywell air lock leakage rate limit of 2 scfh from the current SR 3.6.5.2.2. The licensee stated in the November 20, 1995, submittal that a drywell air lock leakage rate limit does not reflect the ability of the drywell to perform its safety function because the drywell integrity is based on the overall leakage of which the air lock is one part. This is true; however, this is not the only purpose of this leakage requirement.

The drywell air lock leakage rate limit is also an indication of degradation of the door seals; however, as such it is not necessary to be listed in the TSs. The TS value of allowable drywell air lock leakage for GGNS is 2 scfh and this is insignificant compared to the drywell leakage rate limit of approximately 35,000 scfm.

Based on the above, the staff concludes that the overall drywell air lock leakage rate of 2 scfh may be removed from the TSs.

3.2.3 Delete Note in SR 3.6.5.2.2

The licensee has proposed to delete the Note for SR 3.6.5.2.2 which stated:

> An inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test.

The licensee stated that the note "incorrectly implied that the drywell leakage limit could be exceeded due to an inoperable door without taking the actions for an inoperable drywell." Since the licensee's interpretation of this note is plausible and conservative, the staff concludes that the licensee's proposal is acceptable.

3.2.4 Reduce Pressure for Air Lock Leakage Test

The licensee proposed to reduce the test pressure from 11.5 psig to 3 psid for SR 3.6.5.2.2. The use of this value would make the GGNS TSs consistent with the TSs of the other BWR/6s. The 3 psid corresponds to the design basis accident pressure for drywell leakage and is discussed in Section 3.1.2 above. Therefore, the staff concludes that the use of this lower pressure value in the TSs is acceptable.

3.2.5 Change Surveillance Test Interval for the Drywell Air Lock Leakage and the Air Lock Interlock Mechanism from 18 Months to 24 Months.

The licensee proposed to increase the surveillance frequency interval from 18 months to 24 months in SR 3.6.5.2.1 on the air lock interlock and SR 3.6.5.2.2 on the air lock leakage test. The test interval is currently 18 months to be consistent with the current operating cycles; however, the licensee has proposed to change this interval to 24 months to accommodate longer operating cycles. This change would be consistent with the guidance in Regulatory Guide 1.163 accompanying Option B to 10 CFR Part 50, Appendix J, for primary containment air locks (which was published in the Federal Register on September 26, 1995, and became effective on October 26, 1995). Therefore, the staff concludes that this change is acceptable.

3.2.6 Delete Note 2 from Actions for LCO 3.6.5.2

The licensee proposed to delete Note 2 which applied to the Actions required if the LCO 3.6.5.2 could not be met. The Note stated:

> Enter applicable Conditions and Required Actions of LCO 3.6.5.1, "Drywell," when air lock leakage results in exceeding overall drywell bypass leakage rate acceptance criteria.

A paraphrase of this Note is Action C.1 for LCO 3.6.5.2 and the licensee also proposed to delete Action C.1 and its completion time.

Because the air lock leakage surveillance required by SR 3.6.5.2.2 affects the overall drywell bypass leakage and drywell operability of LCO 3.6.5.1, it is necessary to have the above Note and Action C.1 in LCO 3.6.5.2. With the transfer of SR 3.6.5.2.2 to LCO 3.6.5.1, as discussed in Section 3.2.1 above, this Note and Action C.1 are no longer required because the air lock leakage surveillance is within LCO 3.6.5.1. All drywell leakage surveillance is required by LCO 3.6.5.1 and the surveillance requirements for this LCO should only be stated in the LCO. The staff agrees with this position of the licensee and concludes that the proposed changes to delete Note 2 and Action C.1 are acceptable.

With the deletion of Action C.1, the completion time for this action is also deleted and the Actions C.2 and C.3 are re-numbered.

3.3 Delete Note from Drywell Isolation Valves LCO

The licensee proposed to delete Note 4 in LCO 3.6.5.3 which applied to the Actions required if the LCO could not be met. The Note made the same statement given in the previous section.

This Note is not needed in LCO 3.6.5.3 for the same reasons stated for the removal of Note 2 from LCO 3.6.5.2 with the "drywell isolation valve leakage" replacing "the air lock leakage" in Section 3.2.6. The staff concludes that the proposed change is acceptable.

4.0 SUMMARY

The staff concludes that the licensee's proposal to increase the drywell bypass leakage rate test interval from 18 months to 10 years is acceptable.

This is based on the low increase in risk, the large margin for leakage, the controls in the TSs to assure closure of the penetrations, if required, and the licensee's commitment to assess the drywell bypass leakage, and thereby assure operability, at least once every operating cycle.

The staff also concludes that the proposed changes to the drywell air lock TSs are acceptable. The changes to the TSs will add flexibility to the plant without decreasing safety.

In the application of November 20, 1995, the licensee also provided corrections to the Bases of the TSs for the sections that were proposed to be changed. The staff has reviewed these corrections to the Bases as part of its review of the proposed changes to the TSs and has concluded that these corrections are valid.

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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 amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 *FR* 25704). Accordingly, the amendment meets 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 amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Richard Lobel

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