September 24, 1997

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GMarcus
RLobel

Mr. Lew W. Myers
Vice President - Nuclear, Perry
Centerior Service Company
P.O. Box 97, A200
Perry, OH 44081

SUBJECT: AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NO. NPF-58 - PERRY NUCLEAR POWER PLANT, UNIT 1 (TAC NO. M94493)

Dear Mr. Myers:

The Commission has issued the enclosed Amendment No. 88 to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit 1. This amendment revises the Technical Specifications in response to your application dated January 16, 1996, supplemented December 6, 1996, and August 15, 1997.

This amendment revises the test interval for the drywell bypass leakage rate test from 18 months to 10 years.

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

Sincerely,

original signed by:

Jon B. Hopkins, Sr. Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures: 1. Amendment No. 88 to License No. NPF-58
2. Safety Evaluation

cc w/encls: See next page

DOCUMENT NAME: G:\PERRY\P94493.AMD

OFFICE	PD33-LA	E	PD33-PM	E	OGC
NAME	CBoyle		JHopkins		
DATE	09/24/97		08/22/97		09/ /97

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

September 24, 1997

Mr. Lew W. Myers
Vice President - Nuclear, Perry
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P.O. Box 97, A200
Perry, OH 44081

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cc w/encls: See next page

L. Myers
Centerior Service Company

Perry Nuclear Power Plant
Unit Nos. 1 and 2

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

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 88
License No. NPF-58

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

   A. The application for amendment by The Cleveland Electric Illuminating Company, Centerior Service Company, Duquesne Light Company, Ohio Edison Company, OES Nuclear, Inc., Pennsylvania Power Company, and Toledo Edison Company (the licensees) dated January 16, 1996, supplemented December 6, 1996, and August 15, 1997, 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-58 is hereby amended to read as follows:

(2) <u>Technical Specifications</u>

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 88, are hereby incorporated into this license. The Cleveland Electric Illuminating Company 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 and shall be implemented not later than 90 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Jon B. Hopkins

Jon B. Hopkins, Senior Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 24, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 88

FACILITY OPERATING LICENSE NO. NPF-58

DOCKET NO. 50-440

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	Insert
3.6-60	3.6-60
--	3.6-60a
3.6-61	3.6-61
3.6-63	3.6-63
3.6-64	3.6-64
3.6-65	3.6-65

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 bypass leakage testing performed in accordance with this SR, the acceptance criterion is ≤ 10% of the drywell bypass leakage limit.	24 months following 2 consecutive tests with bypass leakage greater than the bypass leakage limit <u>AND</u> 48 months following a test with bypass leakage greater than the bypass leakage limit <u>AND</u> ------NOTE----- SR 3.0.2 extensions are limited to 12 months. -------------- 120 months
SR 3.6.5.1.2	Visually inspect the exposed accessible interior and exterior surfaces of the drywell.	Three times during each 10-year service period, at approximately equal intervals.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.5.1.3	Quantify air lock door seal leakage rate when the gap between the door seals is pressurized to ≥ 2.5 psig.	Once within 72 hours after each drywell air lock door closing.
SR 3.6.5.1.4	------------------NOTE------------------ An inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test. -- Quantify drywell air lock leakage by performing an air lock barrel leakage test at ≥ 2.5 psig.	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.	1 hour
	<u>AND</u>	
		(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.	1 hour
	AND		
	C.2	Restore air lock to OPERABLE status.	24 hours
D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	12 hours
	AND		
	D.2	Be in MODE 4.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.5.2.1	Deleted.	
SR 3.6.5.2.2	Verify drywell air lock seal air header pressure is ≥ 60 psig.	7 days
SR 3.6.5.2.3	-----------------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
SR 3.6.5.2.4	Deleted.	
SR 3.6.5.2.5	Verify, from an initial pressure of 60 psig, the drywell air lock seal pneumatic system pressure does not decay at a rate equivalent to > 3 psig for a period of 24 hours.	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, except for the 24 inch and 36 inch purge supply and exhaust valve penetration flow path, 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.	8 hours
	<u>AND</u>		
			(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NO. NPF-58

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.

PERRY NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By application dated January 16, 1996, The Cleveland Electric Illuminating Company (the licensee), requested changes to the technical specifications (TSs) for the Perry Nuclear Power Plant (PNPP), Unit 1. The proposed changes would revise the TSs as follows:

1. The drywell bypass test surveillance interval is increased from 18 months to 10 years with an increased testing frequency required if performance degrades;

2. The leakage rate surveillances for the drywell air lock door seals and barrel (Surveillance Requirements [SRs] 3.6.5.2.1 and 3.6.5.2.4) are relocated to the drywell SRs. Some accompanying notes are also eliminated;

3. The requirements to specify leakage rate limits for the drywell air lock seal (SR 3.6.5.2.1) and drywell air lock barrel (SR 3.6.5.2.4) leakage rate tests in the TSs are eliminated;

4. A note stating that an inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test is removed (SR 3.6.5.2.4); and

5. The surveillance test interval for the drywell air lock barrel leakage rate test and the air lock interlock mechanism test is extended from 18 months to 24 months.

The licensee also proposed a periodic assessment of the drywell bypass leakage rate to assure continued operability.

2.0 BACKGROUND

In 1993, several BWR/6 licensees with Mark III containments had expressed interest in, or proposed changes to, their TSs to permit extending the test interval for drywell bypass leakage rate testing. Because of the interest of these BWR/6 licensees, the NRC staff, in 1995, requested that the BWR/6 licensees work together on a common proposal.

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As a first step toward a common proposal, the staff, on September 12, 1995, met with representatives of the PNPP licensee and representatives of the licensees of the other BWR/6 plants to discuss increasing the drywell bypass leakage test interval.

Subsequently, by letter dated January 16, 1996, The Cleveland Electric Illuminating Company (the licensee) proposed to implement a performance-based drywell bypass leak rate testing program which had the potential to extend the drywell bypass leakage test interval from 18 months to 10 years. In a letter dated March 1, 1996, the licensee proposed to change the TSs to permit a one-time deferral of the drywell bypass leakage rate test for Refueling Outage 5 to enable the NRC staff to complete the review of the January 16, 1996, submittal. In a letter dated March 8, 1996, the staff approved the TS change which permitted the one-time deferral of the test.

By letter dated October 16, 1996, the staff requested additional information in order to complete the review of the January 16, 1996, submittal. Due to concerns surrounding the scheduling of drywell bypass leak rate tests once every 10 years, the staff sought some assurance of continuing drywell containment integrity. By letter dated December 6, 1996, the licensee committed to perform a qualitative assessment of drywell bypass leak tightness on at least an operating cycle frequency. Subsequently, by letter dated August 15, 1997, the licensee informed the staff that this commitment was placed into the Updated Safety Analysis Report (USAR).

The supplemental information did not change the request or affect the notice of proposed no significant hazards consideration.

The staff has completed its review and has concluded, for the reasons given in this evaluation, that the test interval for the drywell bypass leakage rate test may be extended from 18 months to 10 years for the PNPP. The staff also finds the proposed changes to the drywell air lock TSs to be acceptable. Our evaluation is given below.

3.0 EVALUATION

3.1 Proposed Extension to the Drywell Bypass Leakage Rate Test Surveillance Interval

The licensee proposes a change to the surveillance frequency for the drywell bypass leakage test (SR 3.6.5.1.1) from 18 months to 10 years with an increased testing frequency required if performance degrades. The change would also permit an extension of the test interval.

The licensee has proposed that following a drywell bypass test for which the leakage is greater than the drywell bypass leakage limit, tests will be required at an increased frequency of at least once every 4 years. This is consistent with the guidance in Regulatory Guide 1.163 concerning performance-based primary containment leakage rate testing.

Following two consecutive failed drywell leakage rate tests, the frequency will be 24 months until two successful consecutive tests are performed.

Extensions to the test interval, in accordance with SR 3.0.2, will be limited to 12 months.

The staff finds the licensee's proposal acceptable when modified by its commitment to perform an OPERABILITY assessment of the drywell at least once per cycle, as discussed below.

3.2 Description of Drywell Safety Function

The Mark III is a pressure suppression containment which is designed to condense steam and contain fission products released during a loss-of-coolant accident (LOCA). The Mark III containment 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 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 was 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.

3.3 Drywell Bypass Limit

The PNPP UFSAR, Section 6.2.1.1.5.2, defines allowable bypass leakage 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; and
K = Geometric and friction loss coefficient, dimensionless.

K is dependent on the geometry of the drywell leakage paths with only a slight flow dependence, which is ignored.

The PNPP TSs require that, prior to startup after performing a drywell bypass leakage rate test, the drywell bypass leakage rate shall be ≤ 10% of the bypass leakage rate limit. The drywell bypass leakage rate limit is given in the TSs bases as $A/\sqrt{K} = 1.68\ ft^2$.

The drywell bypass limit is based on a small reactor system break that 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 PNPP analysis that one containment spray loop is initiated. Passive containment heat sinks are also credited. This is an important assumption. Without containment spray and containment heat sinks, the allowable $A/\sqrt{K}$ would be an order of magnitude less.

The design basis leakage for PNPP corresponds to approximately 58,000 scfm. In contrast, the licensee stated in the January 16, 1996, submittal that the primary containment leakage rate limit for PNPP is approximately 3 scfm.

The PNPP TS 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 of 2.5 psig, which is slightly less than the 2.7 psig pressure required to bubble drywell air through the top row of vents (UFSAR, Section 3.8.3.3.1.e.2).

The January 16, 1996, submittal proposes to increase this test interval to one test in 10 years.

The table below provides some of the pertinent design information for the PNPP.

PERRY NUCLEAR POWER PLANT DRYWELL DESIGN PARAMETERS

DRYWELL DESIGN PRESSURE	30 psi
PRIMARY CONTAINMENT DESIGN PRESSURE	15 psi
DESIGN DRYWELL BYPASS LEAKAGE-SMALL BREAK LOCA WITH ONE CONTAINMENT SPRAY	1.68 ft^2 ($A/\sqrt{K}$) (approx. 58,0000 scfm at 2.5 psid)

3.4 Drywell Bypass Leakage Safety Evaluation

The staff's acceptance of the proposed 10-year test interval is based on the licensee's capability to ensure 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 approval to the licensee's commitment to assess the drywell leakage at least once per cycle to ensure that the drywell remains operable.

3.5 Overview

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 contain a sealing medium to limit leakage. The TSs specify leakage rate testing of the drywell air lock and specify the leakage rate criteria. The licensee proposes to modify the air lock requirements. An evaluation of the licensee's proposal for revising the drywell air lock TSs is provided in Sections 3.14, 3.15, 3.16, and 3.17 of this evaluation.

3.6 Operating Experience

The table below provides a summary of the drywell bypass leakage rate testing experience at PNPP. The operating experience has been good. The maximum value of bypass leakage was 4.2% of the design limit.

Six drywell bypass leakage rate tests have been performed at the PNPP in addition to the preoperational test.

RESULTS OF DRYWELL BYPASS LEAKAGE TESTS
PERRY NUCLEAR POWER PLANT

TEST DATE	LEAKRATE (scfm)	RATIO OF LEAKAGE RATE TO DESIGN LIMIT (%)	CALCULATED $A/\sqrt{K}$ (ft^2)
9/85	PASSED*	N/A	N/A
8/87	124	0.2	0.003
7/89	123	0.2	0.003
12/90	797	1.4	0.023
5/92	253	0.4	0.007
6/94**	2450	4.2	0.071
7/94**	111	0.2	0.003

*Pre-operational test; specific leakage rate not recorded.

**Although the June 1994 test passed, the licensee replaced boot seals on the safety/relief valve discharge lines and corrected a problem with a flow orifice and performed a successful July test. The reduction in the leakage rate is attributed by the licensee to the replaced seals.

In addition to reviewing the leakage history of the drywell tests at PNPP, the staff reviewed the drywell operating experience at the other three domestic BWR/6 facilities to determine if there were any operating issues which would indicate that extending the test interval may not be appropriate. None were identified.

The NRC staff has inspected the licensee's procedures for, and conduct of, a drywell bypass test. No violations or deviations were identified (NRC Inspection report 50-440/89-012).

The PNPP drywell was subject to several problems related to drywell bypass leakage.

As described in LER 89-005-01, all 144 drywell head holddown bolts were found detensioned at the end of an operating cycle when the head was removed for refueling. This was due to an inappropriate original installation torque value. The low preload allowed subsequent application of external loads (mainly thermal) and normal bolt relaxation to completely relax the initial bolt preloads. A drywell bypass leakage rate test had been successfully performed prior to startup.

During licensing, an issue was raised about the effect of concrete anchor expansion bolts (which pass through the drywell liner and attach to the drywell concrete) on drywell leakage integrity. The staff concluded that the purpose of the drywell liner was not drywell leakage integrity and that, therefore, the bolts did not detrimentally affect the drywell leakage integrity (licensee letter dated September 19, 1984, and NRC letter dated January 9, 1985).

The issue of boot seals has been mentioned above and is discussed further below.

3.7 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 licensee's January 16, 1996, submittal states that the results showed that the structure was not stressed as much as predicted and responded in the elastic range. No signs of distress or damage to either the concrete or liner were detected. NRC Inspection Report 50-440/85-061 verified that "test results and data readouts revealed all structural movements, cracking, and air losses were within acceptable limits."

During the drywell bypass leakage rate test, the drywell is pressurized to 2.5 psig. Thus, the staff expects no significant challenge to the integrity of the drywell structure. This is verified by a statement in the January 16, 1996, submittal that "[v]isual inspections of the accessible drywell surfaces have been regularly performed and have not revealed abnormal cracking or other abnormalities."

The PNPP TS 3.6.5.1.2 requires that the exposed accessible interior and exterior surfaces of the drywell be inspected prior to the performance of each 10 CFR Part 50, Appendix J, Type A test. The licensee is currently required to comply with 10 CFR Part 50, Appendix J, Option A, which requires a Type A (integrated leak rate) test three times, approximately equally spaced, within a 10-year period. The licensee has stated in the December 6, 1996, response to staff questions that:

> this periodicity...will be maintained...even if the Type A Containment test interval is extended due to the adoption of a performance-based 10 CFR 50 Appendix J Option B program.

Option B permits Type A testing on a 10-year interval.

The PNPP drywell design includes flexible material boots around the safety/relief valve discharge lines where those piping lines penetrate the drywell. There are 19 safety/relief valve lines and, consequently, 19 boot seals. The purpose of the boots is to prevent bypass leakage during a LOCA. During preoperational structural integrity testing of the drywell, those boots experienced numerous failures due to material and design deficiencies. The boot seals were redesigned using a more flexible material. During the fourth refueling outage, as a result of performing the drywell bypass leakage rate test, the licensee noticed an increased leakage rate (see the table above of past test results). The value was still well within the limit specified in the TSs bases. However, the licensee replaced the boot seals and performed the bypass leakage rate test again. There was a large reduction in leakage, which was attributable to the seal replacement.

The preoperational problems caused the licensee, at the NRC staff's request, to include the seals in the PNPP equipment qualification program for active mechanical equipment (licensee letter to the NRC dated December 18, 1985).

In the January 16, 1996, submittal, the licensee stated that calculations performed at the time of the original boot seal installation determined that even if all 19 boot seals were to fail catastrophically, so that no material remains, the resultant $A/\sqrt{K}$ would be 1.36 ft^2. This is less than the design value of 1.68 ft^2. The assumption that all material would disappear is conservative and unrealistic. If the maximum measured leakage, as given in the table of results from bypass leakage rate tests, is added to the value of leakage due to catastrophic failure of the boot seals, the design drywell bypass leakage rate value is still not exceeded. In addition, PNPP has safety-related containment sprays capable of condensing suppression pool bypass from the boot seals if that were to occur. The use of these sprays for that purpose is included in the PNPP emergency operating procedures.

The licensee's December 6, 1996, letter to the staff listed some options the licensee is considering as a long-term resolution of this issue.

The licensee may, at some time, modify the drywell structure or some pressure retaining component of the drywell. The bases to SR 3.0.1 state that:

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

This is reflected in plant procedures as discussed in the licensee's December 6, 1996, response to staff questions. The staff considers this to be sufficient to ensure that the drywell remains capable of performing its safety function following maintenance.

3.8 Piping Penetrations

Lines which penetrate the drywell contain drywell isolation valves. These valves prevent leakage from the drywell into the primary containment. The isolation valves on those lines that 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 table of drywell isolation valves for the PNPP is given in the December 6, 1996, 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 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 containment/drywell purge valves and the drywell vacuum relief valves are large diameter valves. In addition to automatic closure and position indication in the control room, TSs require verification that these valves are sealed closed on a regular surveillance frequency. Should a vacuum relief subsystem or drywell purge valve not be closed, the TSs provide only 4 hours to restore it to a closed position or begin a plant shutdown. The drywell air purge supply and exhaust valves are also water sealed in MODES 1, 2, and 3.

The design and TSs are sufficient to ensure that the drywell bypass leakage limit is not exceeded.

3.9 Air Locks and Equipment Hatch

The TSs require the drywell air lock to be leakage rate tested every refueling outage. The test interval is currently 18 months. The licensee has proposed to change this interval to 24 months to accommodate longer operating cycles (see Section 3.17 of this Safety Evaluation). Because of high radiation and temperature conditions in the drywell during plant operation, use of the drywell air lock is limited. This gives more confidence in the ability of the air lock doors to remain leak tight during operation.

In the December 6, 1996, response to a staff question, the licensee stated that the PNPP drywell equipment hatch is leak tested under administrative controls following each opening.

3.10 Electrical Penetrations

The drywell electrical penetrations are described in the FSAR, Section 3.8.3.1, and in Figure 3.8-7.

As part of the rulemaking revising 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.

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

3.11 Monitoring Leakage

The staff requested that the licensee consider a method of monitoring the drywell for significant leakage during operation. The licensee responded by proposing methods which provide a reasonable assurance that the TSs value of drywell bypass leakage will not be exceeded.

By letter dated December 6, 1996, the licensee made the following commitment:

> At least once per operating cycle, a qualitative assessment of drywell bypass leak tightness will be performed, unless the Technical Specification Drywell Bypass Leak Rate Test is performed in its place. At a minimum, this assessment will be performed during refueling outages, following completion of work on the drywell structure and penetrations. The assessment will involve verifying that a differential pressure can be established between the drywell and the containment. Although the assessment is not as comprehensive as the Technical Specification Drywell Bypass Leakage Rate Test, it will provide reasonable assurance of the ability of the drywell to perform its design basis function.

By letter dated August 15, 1997, the licensee informed the staff that a change to the USAR had been made to place their commitment concerning a qualitative assessment into the USAR. The licensee's December 6, 1996, letter to the NRC staff states that the current method for performing this assessment is by pressurizing the drywell using the Combustible Gas Control System compressors. While this method may not be capable of providing an accurate leakage rate measurement, it should be able to detect leakage of a magnitude that could affect the operability of the drywell with respect to bypass leakage.

3.12 Risk Considerations

Drywell performance plays a significant role in the risk analysis of the 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, also a BWR/6 design with a Mark III containment, given in NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants." NUREG/CR-4551, Vol. 6, Rev. 1, Part 1, "Evaluation of Severe Accident Risks: Grand Gulf Unit 1, Main Report," provides some insight. Although the numbers are developed in these reports for the Grand Gulf Nuclear Station, the relative magnitude of the quantities should be similar for PNPP.

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 TS value is taken to be zero. The mean probability of coincident early drywell failure and containment failure is 0.23. Therefore, there are some accidents that result in early drywell failure that do not result in early containment failure. However, for simplicity and conservatism, 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 based on previous operating experience, the controls on penetrations discussed above, and a 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.

3.13 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 finds this extension in the test interval to be acceptable. As discussed above, this is partly because of the demonstrated margin available due to the large amount of bypass leakage necessary to exceed the containment design pressure, but also because of 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.

3.14 Leakage Rate Surveillances for the Drywell Air Lock Door Seals (SR 3.6.5.2.1) and Barrel (SR 3.6.5.2.4) Are Relocated to the Drywell SRs; Corresponding Notes Are Also Eliminated

The licensee proposes to move the air lock leakage rate SR to the drywell LCO since excess air lock leakage will require actions for drywell inoperability. While this is different in format from the Improved Standard Technical Specifications (NUREG-1434, Rev. 1), it is essentially an editorial change and the staff finds it acceptable.

3.15 Delete the Requirement for the Drywell Air Lock Seal (SR 3.6.5.2.1) and Barrel (SR 3.6.5.2.4) Tests to Satisfy Leakage Rate Limits Specified in the TSs

The licensee states 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. This is not, however, the only purpose of this leakage requirement.

The drywell air lock leakage rate limit is intended as an indication of degradation. As such, however, it is not necessary as a TS value and the staff agrees that it may be removed from the TSs.

The TS value of allowable drywell air lock barrel leakage for PNPP is less than 2.5 scfh. This is insignificant compared to the drywell leakage rate limit of approximately 58,000 scfm, or 3.48E6 scfh. The drywell air lock leakage rate limit for drywell air lock door seals is also 2.5 scfh.

3.16 Delete Note Accompanying SR 3.6.5.2.4

This note states:

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

The licensee did not provide a rationale for deleting this note. However, other licensees of BWR/6 reactors have 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.

The staff finds this interpretation plausible and finds the licensee's deletion acceptable.

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

The staff finds this change acceptable. The change in the frequency of air lock leakage rate testing would be more consistent with the guidance in Regulatory Guide 1.163, concerning performance-based containment leakage rate testing for primary containment air locks, which allows a 30-month test interval. The increase in the test interval for the air lock interlock test is also acceptable.

A staff review of air lock interlock operating experience did not find any indication that extending the test interval from 18 to 24 months would be detrimental.

3.18 EXECUTIVE SUMMARY

The staff finds 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, and the licensee's commitment placed into the USAR to assess the drywell bypass leakage at least once every operating cycle following completion of work on the drywell structure and penetrations.

The changes to the air lock TSs will add flexibility without decreasing safety.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding (61 FR 3951). Accordingly, this 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 this amendment.

6.0 CONCLUSION

The staff 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: R. Lobel

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