

Attachment I to JPN-93-046

**PROPOSED TECHNICAL SPECIFICATION CHANGES
TORUS VENT SUBMERGENCE LEVELS AND INSPECTION INTERVALS**

(JPTS-90-014)

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

Docket No. 50-333

DPR-59

9307090061 930630
PDR ADDCK 05000333
P PDR

3.7 LIMITING CONDITIONS FOR OPERATION3.7 CONTAINMENT SYSTEMSApplicability:

Applies to the operating status of the primary and secondary containment systems.

Objective:

To assure the integrity of the primary and secondary containment systems.

Specification:A. Primary Containment

1. The level from the bottom of the torus and temperature of the water in the torus shall be maintained within the following limits whenever the reactor is critical or whenever the reactor coolant temperature is greater than 212°F and irradiated fuel is in the reactor vessel:

- a. Maximum level of 14.00 feet.
- b. Minimum level of 13.88 feet.

The torus water level may be outside the above limits for a maximum of four (4) hours as a result of required operability testing of HPCI, RCIC, RHR, CS, and the Drywell - Torus Vacuum Relief System.

- c. Maximum water temperature
 - (1) During normal power operation maximum water temperature shall be 95°F.

4.7 SURVEILLANCE REQUIREMENTS4.7 CONTAINMENT SYSTEMSApplicability:

Applies to the primary and secondary containment integrity.

Objective:

To verify the integrity of the primary, and secondary containment systems.

Specification:A. Primary Containment

1. The torus water level and temperature shall be monitored as specified in Table 4.2-8.

The accessible interior surfaces of the drywell and above the water line of the torus shall be inspected each operating cycle for evidence of deterioration.

Whenever there is indication of relief valve operation or testing which adds heat to the suppression pool, the pool temperature shall be continuously recorded until the heat addition is terminated. The operator will verify that average temperature is within applicable limits every 5 minutes. In lieu of continuous recording, the operator shall log the temperature every 5 minutes.

Whenever there is indication of relief valve operation with the temperature of the suppression pool reaching 160°F or more and the primary coolant system pressure greater than 200 psig, an external visual examination of the torus shall be conducted before resuming power operation.

3.7 BASES (cont'd)

Using the minimum or maximum torus water level (which are based on downcomer submergence levels where 13.88 feet above the bottom of the torus is 0.005 feet higher than the minimum submergence of 51.5 inches and 14.00 feet above the bottom of the torus is equivalent to the maximum submergence of 53 inches assumed in containment analyses) containment pressure during the design basis accident is approximately 15 psig which is below the design of 56 psig. The minimum downcomer submergence of 51.5 inches results in a minimum torus water volume of approximately 105,600 feet³. The majority of the Bodega tests (9) were run with a submerged length of 4 feet and with complete condensation. Thus, with respect to downcomer submergence, this specification is adequate. Additional JAFNPP specific analyses done in connection with the Mark I Containment-Suppression Chamber Integrity Program indicate the adequacy of the specified range of submergence to ensure that dynamic forces associated with pool swell do not result in overstress of the torus or associated structures. Level instrumentation is provided for operator use to maintain downcomer submergence within the specified range.

The maximum temperature at the end of blowdown tested during the Humboldt Bay (10) and Bodega Bay tests was 170°F, and this is conservatively taken to be the limit for complete condensation of the limit for complete condensation of the reactor coolant, although condensation would occur for temperatures above 170°F.

Using a 40°F rise (Section 5.2 FSAR) in the torus water temperature and a maximum initial temperature of 95°F, a temperature of 145°F is achieved, which is well below the 170°F temperature which is used for complete condensation.

For an initial maximum torus water temperature of 95°F and assuming the normal complement of containment cooling pumps (two LPCI pumps and two RHR service water pumps) containment pressure is not required to maintain adequate net positive suction head (HPSH) for the core spray LPCI and HPCI pumps.

Limiting suppression pool temperature to 130°F during RCIC, HPCI, or relief valve operation, when decay heat and stored energy are removed from the primary system by discharging reactor steam directly to the torus assures adequate margin for a potential blowdown any time during RCIC, HPCI, or relief valve operation.

Experimental data indicates that excessive steam condensing loads can be avoided if the peak temperature of the suppression pool is maintained below 160°F during any period of relief valve operation with sonic conditions at the discharge exit. Specifications have been placed on the envelope of reactor operating conditions so that the reactor can be depressurized in a timely manner to avoid the regime of potentially high torus loadings.

3.7 BASES (Cont'd)

In addition to the limits on temperature of the suppression pool water, operating procedures define the action to be taken in the event a relief valve inadvertently opens or sticks open. These procedures include: (1) use of all available means to close the valve, (2) initiate suppression pool cooling, (3) initiate reactor shutdown, and (4) if other relief valves are used to depressurize the reactor, their discharge shall be separated from that of the stuck-open relief valve to assure mixing and uniformity of energy insertion to the pool.

Because of the large volume and thermal capacity of the suppression pool, the volume and temperature normally changes very slowly and monitoring these parameters daily is sufficient to establish any temperature trends. By requiring the suppression pool temperature to be verified as within applicable limits every 5 minutes as well as continuously recorded (the operator can log temperature during verification if continuous recording is not available) during periods of significant heat addition, the temperature trends will be closely followed so that appropriate action can be taken. There are alarms at applicable limits to provide further assurance of appropriate action. The requirement for an external visual examination following any event where potentially high loadings could occur provides assurance that no significant damage was encountered. Particular attention should be focused on structural discontinuities in the vicinity of the relief valve discharge since these are expected to be the points of highest stress.

If a loss-of-coolant accident were to occur when the reactor water temperature is below 330°F, the containment pressure will not exceed the 56 psig design pressure, even if no condensation were to occur. The maximum allowable pool temperature, whenever the reactor is above 212°F, shall be governed by this

**SAFETY EVALUATION FOR
PROPOSED TECHNICAL SPECIFICATION CHANGES
TORUS VENT SUBMERGENCE LEVELS
AND INSPECTION INTERVALS (JPTS-90-014)**

I. DESCRIPTION OF THE PROPOSED CHANGES

The proposed changes to the James A. FitzPatrick Technical Specifications are addressed below.

Minor changes in format, such as type font, margins or hyphenation, are not described below. These types of changes are typographical in nature and do not affect the content of the Technical Specifications.

A. Torus Water Level LCO

Page 165, Specification 3.7.A.1

In the first sentence replace the word "volume" with the phrase "level from the bottom of the torus."

In subsection a., replace the sentence:

"Maximum vent submergence level of 53 inches"

with the sentence:

"Maximum level of 14.00 feet."

In subsection b., replace the sentence:

"Minimum vent submergence level of 51.5 inches"

with the sentence:

"Minimum level of 13.88 feet."

Page 188, Bases Section 3.7.A

Replace the first two sentences:

"Using the minimum or maximum downcomer submergence levels given in the specification, containment pressure during the design basis accident is approximately 45 psig which is below the design of 56 psig. The minimum downcomer submergence of 51.5 in. results in a minimum suppression chamber water volume of 105,600 ft³."

with the sentences:

"Using the minimum or maximum torus water level (which are based on downcomer submergence levels where 13.88 feet above the bottom of

SAFETY EVALUATION

the torus is 0.005 feet higher than the minimum submergence of 51.5 inches and 14.00 feet above the bottom of the torus is equivalent to the maximum submergence of 53 inches assumed in containment analyses), containment pressure during the design basis accident is approximately 45 psig which is below the design of 56 psig. The minimum downcomer submergence of 51.5 inches results in a minimum torus water volume of approximately 105,600 feet³."

B. Torus Inspection Interval

Page 165, Specification 4.7.A.1

In the second sentence replace the phrase "at each refueling stage" with the phrase "each operating cycle."

C. Torus Water Temperature Surveillance

Page 165, Specification 4.7.A.1

In the third sentence replace the phrase "continually monitored and also observed and logged every 5 minutes" with "continuously recorded." After that sentence, add "The operator will verify that average temperature is within applicable limits every 5 minutes. In lieu of continuous recording, the operator shall log the temperature every 5 minutes."

Page 188a, Bases Section 3.7.A

In the second paragraph, replace the phrase "continually monitored and frequently logged" with the phrase "verified as within applicable limits every 5 minutes as well as continuously recorded (the operator can log temperature during verification if continuous recording is not available)."

In the second paragraph, add a new third sentence that states "There are alarms at applicable limits to provide further assurance of appropriate action."

D. Editorial Changes

Page 165, Specification 3.7.A.1

In Section b., replace the word "during" with the phrase "as a result of" and replace the phrase "Drywell - Torus Vacuum System" with the phrase "Drywell - Torus Vacuum Relief System."

Add Amendment numbers "16, 36." to the list of amendments.

Page 165, Specification 4.7.A.1

Separate the current paragraph into 4 paragraphs beginning with the first, second, third and fifth sentences.

Pages 188 and 188a, Bases Section 3.7.A

Replace the phrase "suppression chamber" with the word "torus" in each appropriate location (i.e., where it is not part of a title). Also, replace "ft." with "feet" in the first paragraph of page 188 and delete "heat exchangers" in the first paragraph of page 188a.

II. PURPOSE OF THE PROPOSED CHANGES

This application for an amendment to the James A. FitzPatrick Technical Specifications proposes four changes associated with the FitzPatrick torus (or suppression chamber) Limiting Condition for Operations (LCOs), Surveillance Requirements and associated Bases.

The first of these changes revises Technical Specification LCO 3.7.A to specify minimum and maximum torus water levels in terms of level above the bottom of the torus. The LCO currently specifies minimum and maximum water levels in terms of downcomer submergence. Because the torus water level instrumentation reads in feet of water level above torus bottom, the change will simplify compliance verification by eliminating the need to translate water level. The proposed change will not affect the actual water level limits.

The second and third changes revise Surveillance Requirement (SR) 4.7.A. The second change eliminates an unnecessary restriction on when periodic torus inspections can be performed. The SR currently requires periodic inspections "at each refueling outage." The proposed change will permit torus inspections during mid-cycle outages by changing it to read "each operating cycle." The third change clarifies the current requirement that the "pool temperature be continually monitored and also observed and logged every five minutes until the heat addition is terminated." The proposed change will clarify the responsibility of the operator to verify (observe) pool temperature and allow operator logging of temperature when the recorder is not available.

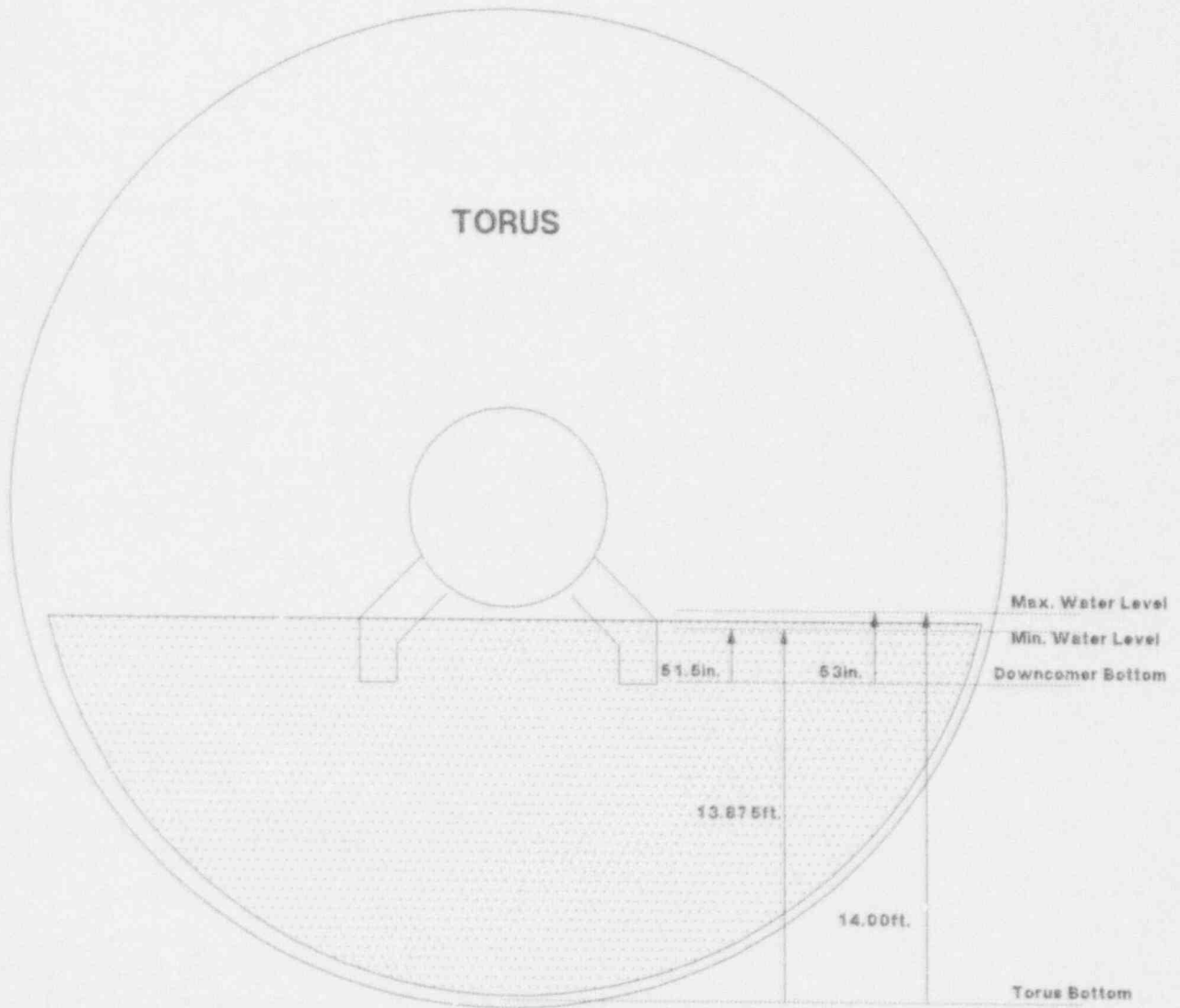
The fourth change includes those revisions proposed to correct editorial errors and clarify terminology.

A. Torus Water Level

The proposed changes revise the reference point used in Specification 3.7.A.1 for determining the water level in the torus. The current specification provides limits on the maximum and minimum torus water levels by referring to the submergence level of the downcomer vents. Downcomer submergence was used in FitzPatrick plant specific calculations to establish the torus water level requirements (References 1, 2, and 3). The proposed change to the LCO measures water level relative to the bottom of the torus. Referring to the maximum and minimum water levels above the bottom of the torus makes the LCO consistent with the instrumentation used to monitor water level. The changes also revise the units of measurement to "feet" for consistency with control room instruments. Figure 1 illustrates the water level measurement.

Figure 1

Illustration of Water Level Measurement Reference Points



NOTE: Not To Scale
Max. to Min. Waterlevel = 0.125 ft. = 1.5 in.

SAFETY EVALUATION

Specification 3.7.A.1 requires the volume of water in the torus to be maintained by reference to water level. There is no guidance to the operator on maintaining water volume. The proposed change replaces the word "volume" with the word "level" for consistency with the level requirements in the LCO.

For consistency with the proposed changes discussed above, a change has been proposed to the Bases. Bases 3.7.A has been clarified by adding a statement on how the water level measurement from the bottom of the torus relates to downcomer submergence. Additionally, a reference to water volume has been qualified by the addition of the word "approximately." Both Table 5.2-1 of the updated Final Safety Analysis Report (FSAR) and the torus water level calculations (Reference 1) indicate that the water volume of 105,600 ft³ is an approximation.

B. Torus Inspection Interval

The current drywell and torus surveillance requirement states that an inspection will be performed during each refueling outage. The proposed revision provides the flexibility of performing these inspections during any outage of an operating cycle. This will not change the inspection interval requirement of 18 months but will allow inspections to be scheduled during outages to allow proper utilization of plant resources.

C. Torus Water Temperature Surveillance

The current torus pool surveillance requirement, Specification 4.7.A.1, requires that the "pool temperature shall be continuously monitored and also observed and logged every five minutes until the heat addition is terminated" during relief valve testing and when there are indications of heat being added to the suppression pool. The current surveillance requirement could be interpreted as a requirement for the operator to continuously monitor the temperature and physically log the temperature every 5 minutes. The proposed change will clarify the surveillance requirement. Water temperature in the suppression pool is continuously recorded automatically by instrumentation. The operator will be required to verify (observe) every 5 minutes that applicable limits are met. The proposed change will also allow the operator to log the temperature every 5 minutes if the recorder is unavailable.

D. Editorial Changes

The proposed addition of the word "relief" corrects the system name to "Drywell - Torus Vacuum Relief System."

The proposed change from the word "during" to the phrase "as a result of" clarifies that it is system testing which causes the water level/temperature change.

The proposed addition of amendment numbers corrects an error introduced in Amendment 168 (Reference 4) which inadvertently removed amendment numbers 16 and 36.

The separation of one paragraph into four clarifies that there are four separate surveillance requirements.

SAFETY EVALUATION

The change from "suppression chamber" to "torus" is to make the Technical Specifications consistent with plant terminology.

Delete "water cooling heat exchangers" and replace it with "cooling" to clarify the Technical Specifications since the RHR System in its "suppression pool cooling" mode is manually initiated and there are no dedicated suppression pool water cooling heat exchangers.

III. SAFETY IMPLICATIONS OF THE PROPOSED CHANGES

A. Torus Water Level LCO

The proposed change to the frame of reference for determining torus water level in Specifications 3.7.A.1.a and b does not alter the allowable maximum or minimum water levels. The proposed water levels are equivalent, with a small and conservative adjustment to reflect instrument accuracy, to levels assumed in the calculations that were used to establish the torus water level requirements (References 1 and 3). Changing the Specification from vent submergence levels measured relative to the submergence of the vent to measurements relative to the bottom of the suppression chamber makes the Specification consistent with the instrument readout. This is good human engineering practice. This change improves safety by eliminating the need for the operator to convert the instrument readout to verify compliance with the Specification. To account for instrument accuracy, the range in which the water level is maintained is conservatively decreased by 0.005 feet.

The proposed change of the word "volume" to "level from the bottom of the torus" corrects an error in the LCO while making no change to the plant configuration. The operator is maintaining level. Volume cannot be measured although there is a direct correlation between volume and level identified in the analyses used to define the maximum and minimum water levels (References 1 and 3).

The proposed change to Bases 3.7.A clarifies the relationship between the downcomer vent and the bottom of the torus as water level reference points to reflect the change to the LCO. There is no safety significance to the proposed change identifying the volume of water associated with minimum level as an approximate number. The volume calculated for the minimum water level (Reference 1) is several hundred gallons greater (more conservative) than the value in the Bases. The use of an approximate value is consistent with the updated FSAR. (Table 5.2-1 uses the word "approximately" when identifying the volume as 105,600 ft³.)

B. Torus Inspection Interval

The proposed change in Specification 4.7.A.1 to allow torus inspection during any outage will provide the potential for reductions in radiological exposure to personnel with no reductions in safety. Scheduling surveillance during outages that have few activities scheduled for the torus area will limit interferences and decrease the time

SAFETY EVALUATION

that inspection personnel are in the radiation area. This will reduce dose. The inspection interval remains 18 months (i.e., the standard length of an operating cycle) so there are no safety implications due to this change.

C. Torus Water Temperature Surveillance

The proposed change to Specification 4.7.A.1 for monitoring water temperature clarifies the intent of the requirement and eliminates the potential for misinterpretation. There is no effect on plant safety and no change to current plant requirements or procedures. The Specification is not intended to have the operator continuously observe torus water temperature. Torus water temperature is continuously monitored and recorded by instrumentation. There are alarms when the suppression pool reaches the limiting temperatures, 95°F and 110°F, providing assurance that the operator is warned before any actions are required. The change requires the operator to verify the water temperature every 5 minutes. The 5 minute frequency for operator verification of water temperature provides adequate time for the operator to determine if any action is required based on the temperature, its rate of increase and the time required for other action. The operator shall log temperature every 5 minutes when the recorder is not available. The proposed change provides a positive safety benefit by adding a requirement for the operator to verify pool temperature during periods of heat addition on a specified time interval. This interval and the verification requirement are consistent with the requirements of the improved Standard Technical Specifications (Reference 5).

D. Editorial Changes

The remainder of the proposed changes are editorial in nature and have no safety implications.

IV. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Operation of the FitzPatrick plant in accordance with the proposed Amendment would not involve a significant hazards consideration as defined in 10 CFR 50.92, since it would not:

1. involve a significant increase in the probability or consequences of an accident previously evaluated.

There are proposed changes in four areas. The first revises LCO 3.7.A and its associated Bases to specify minimum and maximum torus water levels based on height from the torus bottom rather than downcomer submergence and corrects the LCO to identify that level is the parameter being monitored. It also corrects the Bases to indicate that the volume for the minimum water level is an approximate value. These changes make the LCO consistent with instrumentation scales without changing allowable water level, clarify the LCO by identifying level and not volume as the parameter monitored and make the Bases consistent with the LCO and the updated FSAR. The second and third changes revise SR 4.7.A. The second change eliminates a restriction that limits periodic torus inspections to

SAFETY EVALUATION

refueling outages. The proposed change will allow inspections to be scheduled during non-refueling outages. This is expected to minimize interferences which can limit inspection work hours and reduce personnel radiation exposure. The third change clarifies the surveillance requirement for pool temperature monitoring. The proposed change will eliminate any implication that the operator is to continuously monitor temperature during periods of heat addition. The proposed change requires the operator to verify temperature every five minutes. If there is a failure of the recorder, the operator shall log temperature every 5 minutes. This interval and the verification requirement are consistent with the requirements of the improved Standard Technical Specifications. There are existing instrumentation and alarms to keep the operator aware of excessive temperature and to record temperature. The last change makes editorial corrections and clarifies terminology. None of the proposed changes make hardware or equipment modifications. A procedural change will be required to allow torus surveillance to be performed during non-refueling outages. These changes will not alter the probability or consequences of any previously evaluated accidents as documented in the FitzPatrick FSAR or the NRC staff SER.

2. create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed changes involve clarifications and improvements to the Technical Specifications. There are no hardware modifications or equipment changes. There is a change to allow the torus surveillance procedure to be revised so that surveillances can be implemented during non-refueling outages. The revision to torus inspection requirements does not alter the surveillance requirements other than to add additional scheduling flexibility. Revising the reference point for specifying torus water level will not alter the allowable torus water levels, initiate an accident or otherwise affect postulated events. The surveillance clarification reflects current plant practice that the operator is not required to continuously monitor or log torus water temperature and is consistent with the improved Standard Technical Specifications.

3. involve a significant reduction in a margin of safety.

The proposed changes involve no hardware modifications or equipment changes. The revision to torus water level limits does not alter the water levels, just the measurement reference point to simplify compliance verification. This provides a positive safety benefit by avoiding the need for the operator to translate water level. The change to the torus inspection interval provides added flexibility in scheduling inspections. There is no reduction in safety since the length of the surveillance interval remains the same. The change to the surveillance of the water temperature monitoring requirement clarifies the wording of the surveillance requirement and removes the possibility of an unintended interpretation creating confusion in responsibilities.

SAFETY EVALUATION

V. IMPLEMENTATION OF THE PROPOSED CHANGES

Implementation of the proposed changes will not alter the ALARA or Fire Protection Programs at the FitzPatrick plant, nor will the changes affect the environment. Revising the suppression chamber and drywell surveillance requirements is consistent with the ALARA concept by providing flexibility in scheduling inspections to minimize personnel exposures.

VI. CONCLUSION

The changes, as proposed, do not constitute an unreviewed safety question as defined in 10 CFR 50.59. That is, they:

1. will not change the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report;
2. will not increase the possibility of an accident or malfunction of a type different from any previously evaluated in the Safety Analysis Report;
3. will not reduce the margin of safety as defined in the basis for any technical specification; and

Because there is no unreviewed safety question, the changes involve no significant hazards as defined in 10 CFR 50.92.

VII. REFERENCES

1. James A. FitzPatrick Document No. 22A5747, "Containment Data," Revision 2, dated 1981.
2. James A. FitzPatrick Updated Final Safety Analysis Report, Sections 5.2.3.1 and 14.6.1.3, through Revision 5, dated January 1992.
3. General Electric Report NEDO-21888, "Mark I Containment Program Load Definition Report," Revision 2, dated November 1981.
4. NRC letter, D.E. LaBarge to J.C. Brons, dated February 13, 1991 (JAF-91-071). Transmits Amendment 168 to the Technical Specifications.
5. NRC NUREG-1433 "Standard Technical Specifications General Electric Boiling Water Reactors (BWR/4)," Revision 0, dated September 1992.
6. James A. FitzPatrick Nuclear Power Plant Safety Evaluation Report (SER), dated November 20, 1972, and supplements.

Attachment III to JPN-93-046

PROPOSED TECHNICAL SPECIFICATION CHANGES
TORUS VENT SUBMERGENCE LEVELS AND INSPECTION INTERVALS
MARKUP OF TECHNICAL SPECIFICATION PAGES

(JPTS-90-014)

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

Docket No. 50-333

DPR-59

3.7 LIMITING CONDITIONS FOR OPERATION

3.7 CONTAINMENT SYSTEMS

Applicability:

Applies to the operating status of the primary and secondary containment systems.

Objective:

To assure the integrity of the primary and secondary containment systems.

Specification:

A. Primary Containment

level from the bottom of the torus

1. The volume and temperature of the water in the torus shall be maintained within the following limits whenever the reactor is critical or whenever the reactor coolant temperature is greater than 212°F and irradiated fuel is in the reactor vessel:

- a. Maximum vent submergence level of 50 inches.
- b. Minimum vent submergence level of 51.5 inches.

14.00 feet

3.88 feet

The torus water level may be outside the above limits for a maximum of four (4) hours during as a result of required operability testing of HPCI, RCIC, RHR, CS, and the Drywell-Torus Vacuum System.

- c. Maximum water temperature *Relief*
- (1) During normal power operation maximum water temperature shall be 95°F.

4.7 SURVEILLANCE REQUIREMENTS

4.7 CONTAINMENT SYSTEMS

Applicability:

Applies to the primary and secondary containment integrity.

Objective:

To verify the integrity of the primary, and secondary containment systems.

Specification:

A. Primary Containment

each operating cycle

1. The torus water level and temperature shall be monitored as specified in Table 4.2-8. The accessible interior surfaces of the drywell and above the water line of the torus shall be inspected ~~at each refueling outage~~ for evidence of deterioration. Whenever there is indication of relief valve operation or testing which adds heat to the suppression pool, the pool temperature shall be ~~continually monitored and also observed and logged every 5 minutes until the heat addition is terminated~~. Whenever there is indication of relief valve operation with the temperature of the suppression pool reaching 160°F or more and the primary coolant system pressure greater than 200 psig, an external visual examination of the torus shall be conducted before resuming power operation.

continuously recorded

The operator will verify that average temperature is within applicable limits every 5 minutes. In lieu of continuous recording, the operator shall log the temperature every 5 minutes.

3.7 BASES (cont'd)

Using the minimum or maximum downcomer submergence levels given in the specification, containment pressure during the design basis accident is approximately 45 psig which is below the design of 56 psig. The minimum downcomer submergence of 51.5 inches results in a minimum suppression chamber water volume of 105,600 ft³. The majority of the Bodega tests (9) were run with a submerged length of 4 feet and with complete condensation. Thus, with respect to downcomer submergence, this specification is adequate. Additional JAFNPP specific analyses done in connection with the Mark I Containment-Suppression Chamber Integrity Program indicate the adequacy of the specified range of submergence to ensure that dynamic forces associated with pool swell do not result in overstress of the suppression chamber or associated structures. Level instrumentation is provided for operator use to maintain downcomer submergence within the specified range.

The maximum temperature at the end of blowdown tested during the Humboldt Bay (10) and Bodega Bay tests was 170°F, and this is conservatively taken to be the limit for complete condensation of the limit for complete condensation of the reactor coolant, although condensation would occur for temperatures above 170°F.

torus water level (which are based on downcomer submergence levels where 13.88 feet above the bottom of the torus is 0.005 feet higher than the minimum submergence of 51.5 inches and 14.00 feet above the bottom of the torus is equivalent to the maximum submergence of 53 inches assumed in containment analyses)

Using a 40°F rise (Section 5.2 FSAR) in the suppression chamber water temperature and a maximum initial temperature of 95°F, a temperature of 145°F is achieved, which is well below the 170°F temperature which is used for complete condensation.

For an initial maximum suppression chamber water temperature of 95°F and assuming the normal complement of containment cooling pumps (two LPCI pumps and two RHR service water pumps) containment pressure is not required to maintain adequate net positive suction head (HPSH) for the core spray LPCI and HPCI pumps.

Limiting suppression pool temperature to 130°F during RCIC, HPCI, or relief valve operation, when decay heat and stored energy are removed from the primary system by discharging reactor steam directly to the suppression chamber assures adequate margin for a potential blowdown any time during RCIC, HPCI, or relief valve operation.

Experimental data indicates that excessive steam condensing loads can be avoided if the peak temperature of the suppression pool is maintained below 160°F during any period of relief valve operation with sonic conditions at the discharge exit. Specifications have been placed on the envelope of reactor operating conditions so that the reactor can be depressurized in a timely manner to avoid the regime of potentially high suppression chamber loadings.

In addition to the limits on temperature of the suppression chamber pool water, operating procedures define the action to be taken in the event a relief valve inadvertently opens or sticks open. These procedures include: (1) use of all available means to close the valve, (2) initiate suppression pool ~~valve~~ cooling heat exchangers, (3) initiate reactor shutdown, and (4) if other relief valves are used to depressurize the reactor, their discharge shall be separated from that of the stuck-open relief valve to assure mixing and uniformity of energy insertion to the pool.

because of the large volume and thermal capacity of the suppression pool, the volume and temperature normally changes very slowly and monitoring these parameters daily is sufficient to establish any temperature trends. By requiring the suppression pool temperature to be ~~continually monitored and frequently logged~~ during periods of significant heat addition, the temperature trends will be closely followed so that appropriate action can be taken. The requirement for an external visual examination following any event where potentially high loadings could occur provides assurance that no significant damage was encountered. Particular attention should be focused on structural discontinuities in the vicinity of the relief valve discharge since these are expected to be the points of highest stress.

If a loss-of-coolant accident were to occur when the reactor water temperature is below 330°F, the containment pressure will not exceed the 56 psig design pressure, even if no condensation were to occur. The maximum allowable pool temperature, whenever the reactor is above 212°F, shall be governed by this

verified as within applicable limits every 5 minutes as well as continuously recorded (the operator can log temperature during verification if continuous recording is not available).

There are alarms at applicable limits to provide further assurance of appropriate action.