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

COMMONWEALTH EDISON COMPANY

AND

MIDAMERICAN ENERGY COMPANY

DOCKET NO. 50-254

QUAD CITIES NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 165
License No. DPR-29

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

   A. The application for amendment by Commonwealth Edison Company (the licensee) dated September 17, 1993, as supplemented by letter dated July 20, 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 3.B. of Facility Operating License No. DPR-29 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 165 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented no later than June 30, 1996.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert M. Pulsifer

Robert M. Pulsifer, Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 27, 1995

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

COMMONWEALTH EDISON COMPANY

AND

MIDAMERICAN ENERGY COMPANY

DOCKET NO. 50-265

QUAD CITIES NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 161
License No. DPR-30

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

   A. The application for amendment by Commonwealth Edison Company (the licensee) dated September 17, 1993, as supplemented by letter dated July 20, 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 3.B. of Facility Operating License No. DPR-30 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 161 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented no later than June 30, 1996.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert M. Pulsifer, Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 27, 1995

ATTACHMENT TO LICENSE AMENDMENT NOS. 165 AND 161

FACILITY OPERATING LICENSE NOS. DPR-29 AND DPR-30

DOCKET NOS. 50-254 AND 50-265

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number.

UNIT 1 REMOVE	UNIT 2 REMOVE	INSERT
3.7/4.7-1	3.7/4.7-1	3/4.7-1
3.7/4.7-2	3.7/4.7-2	3/4.7-2
3.7/4.7-3	3.7/4.7-3	3/4.7-3
3.7/4.7-4	3.7/4.7-4	3/4.7-4
3.7/4.7-5	3.7/4.7-5	3/4.7-5
3.7/4.7-6	3.7/4.7-6	3/4.7-6
3.7/4.7-7	3.7/4.7-6a	3/4.7-7
3.7/4.7-8	3.7/4.7-6b	3/4.7-8
3.7/4.7-9	3.7/4.7-6c	3/4.7-9
3.7/4.7-10	3.7/4.7-6d	3/4.7-10
3.7/4.7-11	3.7/4.7-7	3/4.7-11
3.7/4.7-11a	3.7/4.7-7a	3/4.7-12
3.7/4.7-11b	3.7/4.7-7b	3/4.7-13
3.7/4.7-11c	3.7/4.7-7c	3/4.7-14
3.7/4.7-11d	3.7/4.7-8	3/4.7-15
3.7/4.7-12	3.7/4.7-9	3/4.7-16
3.7/4.7-13	3.7/4.7-10	3/4.7-17
3.7/4.7-14	3.7/4.7-10a	3/4.7-18
3.7/4.7-15	3.7/4.7-11	3/4.7-19
3.7/4.7-16	3.7/4.7-11a	3/4.7-30
3.7/4.7-17	3.7/4.7-12	3/4.7-21
3.7/4.7-18	3.7/4.7-13	3/4.7-22
3.7/4.7-19	3.7/4/7-14	3/4.7-23
3.7/4.7-20	3.7/4.7-15	3/4.7-24
3.7/4.7-21	3.7/4/7-16	3/4.7-25
3.7/4.7-21a	3.7/4/7-17	3/4.7-26
3.7/4.7-22	3.7/4.7-18	B 3/4.7-1
3.7/4.7-23	3.7/4.7-19	B 3/4.7-2
3.7/4.7-24	3.7/4.7-20	B 3/4.7-3
3.7/4.7-25	3.7/4.7-20a	B 3/4.7-4
3.7/4.7-26	3.7/4.7-20b	B 3/4.7-5
3.7/4.7-27	3.7/4.7-21	B 3/4.7-6
3.7/4.7-28	3.7/4.7-21a	B 3/4.7-7
3.7/4.7-29	3.7/4.7-22	B 3/4.7-8
3.7/4.7-30	3.7/4.7-23	---
3.7/4.7-31	---	---
3.7/4.7-32	---	---
3.7/4.7-33	---	---
3.7/4.7-34	---	---
3.7/4.7-35	---	---
3.7/4.7-36	---	---

UNIT 1 REMOVE	UNIT 2 REMOVE	INSERT
3.7/4.7-37	---	---
3.7/4.7-38	---	---
3.7/4.7-39	---	---
3.7/4.7-40	---	---

3.7 - LIMITING CONDITIONS FOR OPERATION

A. PRIMARY CONTAINMENT INTEGRITY

PRIMARY CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2[a] and 3.

ACTION:

Without PRIMARY CONTAINMENT INTEGRITY, restore PRIMARY CONTAINMENT INTEGRITY within 1 hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

A. PRIMARY CONTAINMENT INTEGRITY

PRIMARY CONTAINMENT INTEGRITY shall be demonstrated:

1. After each closing of each penetration subject to Type B testing, except the primary containment air locks, if opened following Type A or B test, by leak rate testing the seals with gas at $\geq P_a$ (48 psig), and verifying that when the measured leakage rate for these seals is added to the leakage rates determined pursuant to Surveillance Requirement 4.7.B.4 for all other Type B and C penetrations, the combined leakage rate is $\leq 0.60\ L_a$.
2. At least once per 31 days by verifying that all primary containment penetrations[b] not capable of being closed by OPERABLE containment automatic isolation valves and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic valves secured in position, except for valves that are open under administrative control as permitted by Specification 3.7.D.
3. By verifying each primary containment air lock is in compliance with the requirements of Specification 3.7.C.
4. By verifying the suppression chamber is in compliance with the requirements of Specification 3.7.K.

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a See Special Test Exception 3.12.A.

b Except valves, blind flanges, and deactivated automatic valves which are located inside the containment, and are locked, sealed or otherwise secured in the closed position. These penetrations shall be verified closed during each COLD SHUTDOWN except such verification need not be performed when the primary containment has not been de-inerted since the last verification or more often than once per 92 days.

3.7 - LIMITING CONDITIONS FOR OPERATION

B. Primary Containment Leakage

Primary containment leakage rates shall be limited to:

1. An overall integrated leakage rate of $\leq L_a$ which is defined as 1.0 percent by weight of the containment air per 24 hours at P_a (48 psig).
2. A combined leakage rate of $\leq 0.60\ L_a$ for all primary containment penetrations, except[a] for main steam line isolation valves, subject to Type B and C tests when pressurized to P_a (48 psig).
3. ≤ 11.5 scfh for any one main steam line isolation valve when tested at P_t (25 psig)[a].

APPLICABILITY:

When PRIMARY CONTAINMENT INTEGRITY is required per Specification 3.7.A.

ACTION:

With the measured combined leakage rate for all primary containment penetrations subject to Type B and C tests $> 0.60\ L_a$, restore the combined leakage rate to $\leq 0.60\ L_a$, within 1 hour. Otherwise, be in HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

B. Primary Containment Leakage

The primary containment leakage rates shall be demonstrated at the following test schedule and shall be determined in conformance with the criteria, methods and provisions specified in Appendix J of 10CFR Part 50:

1. Three Type A overall integrated containment leakage rate tests shall be conducted at approximately equal intervals during shutdown at $\geq P_a$ (48 psig) during each 10-year service period. The third test of each set shall be conducted during the shutdown for the 10-year plant inservice inspection.
2. If the results of any periodic Type A test are $> 0.75\ L_a$, the test schedule for subsequent Type A tests shall be reviewed and approved by the Commission. If the results of two consecutive Type A tests are $> 0.75\ L_a$, a Type A test shall be performed at least every 18 months until the results of two consecutive Type A tests are $\leq 0.75\ L_a$, at which time the above test schedule may be resumed.
3. The accuracy of each Type A test shall be verified by a supplemental test which:
   a. Confirms the accuracy of the test by verifying that the difference between the supplemental data and the Type A test data is within $0.25\ L_a$.

a Exemption from Appendix J to 10CFR Part 50.

3.7 - LIMITING CONDITIONS FOR OPERATION

4.7 - SURVEILLANCE REQUIREMENTS

b. Has duration sufficient to establish accurately the change in leakage rate between the Type A test and the supplemental test.

c. Requires the quantity of gas to be bled from the containment during the supplemental test to be equivalent to at least 25% of the total measured leakage at $\geq P_a$ (48 psig).

4. Type B and C tests shall be conducted with gas at $\geq P_a$ (48 psig) at intervals no greater than 24 months except for tests involving:

   a. Air locks which shall be leak tested in accordance with Surveillance Requirement 4.7.C,

   b. Main steam line isolation valves[a] which shall be leak tested at $\geq P_t$ (25 psig)[a] at least once per 18 months, and

   c. Bolted double-gasketed seals which shall be leak tested at $\geq P_a$ (48 psig) following each closure of the seal and at least once every 18 months.

   The provisions of Specification 4.0.B are not applicable to the 24 month surveillance intervals.

a Exemption from Appendix J to 10CFR Part 50.

3.7 - LIMITING CONDITIONS FOR OPERATION

C. Primary Containment Air Locks

Each primary containment air lock shall be OPERABLE with:

1. Both doors closed except when the air lock is being used for normal transit entry and exit through the containment, then at least one air lock door shall be closed, and

2. An overall air lock leakage rate of $\leq 0.05\ L_a$ at P_a (48 psig).

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2[a] and 3.

ACTION:

1. With one primary containment air lock door inoperable:

   a. Maintain at least the OPERABLE air lock door closed[b] and either restore the inoperable air lock door to OPERABLE status within 24 hours or lock the OPERABLE air lock door closed.

   b. Operation may then continue until performance of the next required overall air lock leakage test provided that the OPERABLE air lock door is verified to be locked closed[b] at least once per 31 days.

4.7 - SURVEILLANCE REQUIREMENTS

C. Primary Containment Air Locks

Each primary containment air lock shall be demonstrated OPERABLE:

1. By conducting an overall air lock leakage test at $\geq P_a$ (48 psig) and by verifying that the overall air lock leakage rate is within its limit:

   a. Within 72 hours of air lock opening when PRIMARY CONTAINMENT INTEGRITY is required, except when the air lock is being used for multiple entries, then at least once per 72 hours.

   b. At least once per 6 months[c], and

   c. Prior to establishing PRIMARY CONTAINMENT INTEGRITY following air lock opening.

2. Concurrent with each overall air lock leakage test conducted prior to establishing PRIMARY CONTAINMENT INTEGRITY, by verifying that only one door in each air lock can be opened at a time.

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a See Special Test Exception 3.12.A.

b Except during entry through an OPERABLE door to repair an inoperable door or to facilitate the removal of personnel for a cumulative time not to exceed one hour per year.

c The provisions of Specification 4.0.B are not applicable.

3.7 - LIMITING CONDITIONS FOR OPERATION

c. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With the primary containment air lock interlock mechanism inoperable, restore the air lock interlock mechanism to OPERABLE status within 24 hours, or lock at least one air lock door closed and verify that the door is locked closed at least once per 31 days. Personnel entry and exit through the airlock is permitted provided one OPERABLE air lock door remains locked closed at all times and an individual is dedicated to assure that both air lock doors are not open simultaneously.

3. With the primary containment air lock inoperable, except as a result of an inoperable air lock door or interlock mechanism, maintain at least one air lock door closed; restore the inoperable air lock to OPERABLE status within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

3.7 - LIMITING CONDITIONS FOR OPERATION

D. Primary Containment Isolation Valves

Each primary containment isolation valve and reactor instrumentation excess flow check valve shall be OPERABLE[a].

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With one or more of the primary containment isolation valve(s)[b] inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and within 4 hours either:

   a. Restore the inoperable valve(s) to OPERABLE status, or

   b. Isolate each affected penetration by use of at least one deactivated automatic valve secured in the isolated position[a], or

   c. Isolate each affected penetration by use of at least one closed manual valve or blind flange[a].

   Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

D. Primary Containment Isolation Valves

1. Each power-operated or automatic primary containment isolation valve shall be demonstrated OPERABLE prior to returning the valve to service after maintenance, repair, or replacement work is performed on the valve or its associated actuator, control, or power circuit by performance of a cycling test and verification of isolation time.

2. Each power-operated or automatic primary containment isolation valve required to close on an isolation signal, except traversing in-core probe system explosive isolation valves, shall be demonstrated OPERABLE at least once per 18 months by verifying that on a containment isolation test signal each automatic isolation valve actuates to its isolation position.

3. The isolation time of each power-operated or automatic primary containment isolation valve shall be determined to be within its limit when tested pursuant to Specification 4.0.E.

4. Each reactor instrumentation line excess flow check valve which fulfills a primary containment isolation function shall be demonstrated OPERABLE at least once per 18 months by verifying that the valve checks flow.

5. Each traversing in-core probe system explosive isolation valve shall be demonstrated OPERABLE:

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a Locked or sealed closed valves may be opened on an intermittent basis under administrative control.

b Except main steam isolation valves (MSIVs). Required actions for inoperable MSIVs are provided in Specification 3.6.M.

3.7 - LIMITING CONDITIONS FOR OPERATION

2. With one or more reactor instrumentation line excess flow check valves inoperable, operation may continue and the provisions of Specification 3.0.C are not applicable, provided that within 4 hours either:

    a. The inoperable valve is restored to OPERABLE status, or

    b. The instrument line is isolated and the associated instrument is declared inoperable.

    Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

a. At least once per 31 days by verifying the continuity of the explosive charge.

b. At least once per 18 months by removing at least one explosive squib from each explosive valve such that each explosive squib in each explosive valve will be tested at least once per 36 months, and initiating the removed explosive squib(s). The replacement charge for the exploded squib(s) shall be from the same manufactured batch as the one fired or from another batch which has been certified by having at least one of that batch successfully fired. No squib shall remain in use beyond the expiration of its shelf-life or operating life, as applicable.

3.7 - LIMITING CONDITIONS FOR OPERATION

E. Suppression Chamber - Drywell Vacuum Breakers

Nine suppression chamber - drywell vacuum breakers shall be OPERABLE and twelve suppression chamber - drywell vacuum breakers shall be closed.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With one or more of the required suppression chamber - drywell vacuum breakers inoperable for opening but known to be closed, restore at least nine vacuum breakers to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one suppression chamber - drywell vacuum breaker open, restore the open vacuum breaker to the closed position within 4 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one position indicator of any OPERABLE suppression chamber - drywell vacuum breaker inoperable, verify the vacuum breaker(s) with the inoperable position indicator to be closed by conducting a test which demonstrates that the ΔP is

4.7 - SURVEILLANCE REQUIREMENTS

E. Suppression Chamber - Drywell Vacuum Breakers

Each suppression chamber - drywell vacuum breaker shall be:

1. Verified closed at least once per 7 days.

2. Demonstrated OPERABLE:

   a. At least once per 31 days and within 12 hours after any discharge of steam to the suppression chamber from one or more main steam relief valve(s), by cycling each vacuum breaker through at least one complete cycle of full travel.

   b. At least once per 31 days by verifying both position indicator(s) OPERABLE by observing expected valve movement during the cycling test.

   c. At least once per 18 months by:

      1) Verifying the force required to open the vacuum breaker, from the closed position, to be ≤0.5 psid, and

      2) Verifying both position indicators OPERABLE by performance of a CHANNEL CALIBRATION.

      3) Verifying that each valve's position indicator is capable of detecting disk displacement of ≥0.0625 inches.

3.7 - LIMITING CONDITIONS FOR OPERATION

maintained at greater than or equal to 0.5 psi for one hour without makeup within 24 hours and at least once per 15 days thereafter. Otherwise be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

3.7 - LIMITING CONDITIONS FOR OPERATION

F. Reactor Building - Suppression Chamber Vacuum Breakers

All reactor building - suppression chamber vacuum breakers shall be OPERABLE and closed.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With one reactor building - suppression chamber vacuum breaker line inoperable for opening with both valves known to be closed, restore the inoperable vacuum breaker line to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one reactor building - suppression chamber vacuum breaker line otherwise inoperable, verify at least one vacuum breaker in the line to be closed within 2 hours and restore the open vacuum breaker to the closed position within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With the position indicator of the air operated reactor building - suppression chamber vacuum breaker inoperable, restore the inoperable position indicator to OPERABLE status within 14 days or verify the vacuum breaker to be closed at least once per 24 hours by an

4.7 - SURVEILLANCE REQUIREMENTS

F. Reactor Building - Suppression Chamber Vacuum Breakers

Each reactor building - suppression chamber vacuum breaker shall be:

1. Verified closed at least once per 7 days.

2. Demonstrated OPERABLE:

   a. At least once per 92 days when tested pursuant to Specification 4.0.E by:

      1) Cycling the vacuum breaker through at least one test cycle.

      2) Verifying the air operated vacuum breaker position indicator OPERABLE by observing expected valve movement during the cycling test.

   b. At least once per 18 months by:

      1) Demonstrating that the force required to open each vacuum breaker does not exceed the equivalent of 0.5 psid.

      2) Verifying the air operated vacuum breaker position indicator OPERABLE by performance of a CHANNEL CALIBRATION.

3.7 - LIMITING CONDITIONS FOR OPERATION

alternate means. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

3.7 - LIMITING CONDITIONS FOR OPERATION

G. Drywell Internal Pressure

The drywell internal pressure shall not exceed +1.5 psig[a].

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With the drywell internal pressure <1.0 psig during the applicable time period for OPERATIONAL MODE 1, restore the internal pressure to above the low pressure limit within 24 hours or reduce THERMAL POWER to <15% RATED THERMAL POWER within the next 8 hours.

2. With the drywell internal pressure otherwise outside of the specified limits, restore the internal pressure to within the limits within 1 hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

G. Drywell Internal Pressure

The drywell internal pressure shall be determined to be within the limits at least once per 12 hours.

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a In OPERATIONAL MODE 1, during the time period beginning within 24 hours after THERMAL POWER is >15% of RATED THERMAL POWER following startup, and ending within 24 hours prior to reducing THERMAL POWER to <15% of RATED THERMAL POWER preliminary to a scheduled reactor shutdown, the drywell internal pressure shall also be maintained ≥1.0 psig (except for up to 4 hours for required surveillance which reduces the differential pressure.)

3.7 - LIMITING CONDITIONS FOR OPERATION

H. Drywell - Suppression Chamber Differential Pressure

Differential pressure between the drywell and the suppression chamber shall be ≥1.0 psid[a].

APPLICABILITY:

OPERATIONAL MODE 1, during the time period:

1. Beginning within 24 hours after THERMAL POWER is >15% of RATED THERMAL POWER following startup, and

2. Ending within 24 hours prior to reducing THERMAL POWER to <15% of RATED THERMAL POWER preliminary to a scheduled reactor shutdown.

ACTION:

1. With the drywell - suppression chamber differential pressure less than the above limit, restore the required differential pressure within 24 hours or reduce THERMAL POWER to <15% RATED THERMAL POWER within the next 8 hours.

2. With the drywell - suppression chamber differential pressure instrumentation CHANNEL inoperable, restore the inoperable CHANNEL to OPERABLE status within 30 days or reduce THERMAL POWER to <15% RATED THERMAL POWER within the next 8 hours.

4.7 - SURVEILLANCE REQUIREMENTS

H. Drywell - Suppression Chamber Differential Pressure

1. The drywell - suppression chamber differential pressure shall be demonstrated to be within limits by verifying the differential pressure at least once per 12 hours.

2. At least one drywell - suppression chamber differential pressure instrumentation CHANNEL, and at least one drywell pressure and one suppression chamber pressure instrumentation CHANNEL shall be demonstrated OPERABLE by performance of a:

   a. CHANNEL CHECK at least once per 24 hours,

   b. CHANNEL CALIBRATION at least once per 18 months.

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a Except for up to 4 hours for required surveillance which reduces the differential pressure.

3.7 - LIMITING CONDITIONS FOR OPERATION

3. With the drywell and/or suppression chamber pressure instrumentation CHANNEL(s) inoperable, restore the inoperable CHANNEL(s) to OPERABLE status within 30 days or reduce THERMAL POWER to <15% RATED THERMAL POWER within the next 8 hours.

4. With the drywell - suppression chamber differential pressure instrumentation CHANNEL inoperable and with insufficient drywell and suppression chamber pressure instrumentation CHANNEL(s) OPERABLE to determine drywell - suppression chamber differential pressure, restore either the drywell - suppression chamber differential pressure instrumentation CHANNEL or sufficient drywell and suppression chamber pressure instrumentation CHANNEL(s) to determine drywell - suppression chamber differential pressure to OPERABLE status within 8 hours or reduce THERMAL POWER to <15% RATED THERMAL POWER within the next 8 hours.

4.7 - SURVEILLANCE REQUIREMENTS

3.7 - LIMITING CONDITIONS FOR OPERATION

I. Primary Containment Nitrogen System

The primary containment nitrogen system shall be OPERABLE with:

1. An OPERABLE inerting flow path, and
2. An OPERABLE make-up flow path.

APPLICABILITY:

OPERATIONAL MODE(s) 1 and 2.

ACTION:

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4.7 - SURVEILLANCE REQUIREMENTS

I. Primary Containment Nitrogen System

The primary containment nitrogen system shall be demonstrated to be OPERABLE at least once per 31 days by verifying that:

1. The liquid nitrogen storage tank level is ≥70 inches, and
2. Each valve, manual, power operated or automatic, in the flow path not locked, sealed, or otherwise secured in position, is in its correct position.

3.7 - LIMITING CONDITIONS FOR OPERATION

J. Primary Containment Oxygen Concentration

The suppression chamber and drywell atmosphere oxygen concentration shall be <4% by volume.

APPLICABILITY:

OPERATIONAL MODE 1, during the time period:

1. Beginning within 24 hours after THERMAL POWER is >15% of RATED THERMAL POWER following startup, and

2. Ending within 24 hours prior to reducing THERMAL POWER to <15% of RATED THERMAL POWER preliminary to a scheduled reactor shutdown.

ACTION:

With the drywell and/or suppression chamber oxygen concentration exceeding the limit, restore the oxygen concentration to within the limit within 24 hours or reduce THERMAL POWER to <15% RATED THERMAL POWER within the next 8 hours.

4.7 - SURVEILLANCE REQUIREMENTS

J. Primary Containment Oxygen Concentration

The suppression chamber and drywell oxygen concentration shall be verified to be within the limit within 24 hours after THERMAL POWER is >15% of RATED THERMAL POWER and at least once per 7 days thereafter.

3.7 - LIMITING CONDITIONS FOR OPERATION

K. Suppression Chamber

The suppression chamber shall be OPERABLE with:

1. The suppression pool water level between 14' 1" and 14' 5",

2. A suppression pool maximum average water temperature of ≤95°F during OPERATIONAL MODE(s) 1 or 2, except that the maximum average temperature may be permitted to increase to:

    a. ≤105°F during testing which adds heat to the suppression pool.

    b. ≤110°F with THERMAL POWER ≤1% of RATED THERMAL POWER.

    c. ≤120°F with the main steam line isolation valves closed following a scram.

3. A total leakage between the suppression chamber and drywell of less than the equivalent leakage through a 1 inch diameter orifice at a differential pressure of 1.0 psid.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With the suppression pool water level outside the above limits, restore the water level to within the limits

4.7 - SURVEILLANCE REQUIREMENTS

K. Suppression Chamber

The suppression chamber shall be demonstrated OPERABLE:

1. By verifying the suppression pool water level to be within the limits at least once per 24 hours.

2. At least once per 24 hours by verifying the suppression pool average water temperature to be ≤95°F, except:

    a. At least once per 5 minutes during testing which adds heat to the suppression pool, by verifying the suppression pool average water temperature to be ≤105°F.

    b. At least once per hour when suppression pool average water temperature is ≥95°F, by verifying:

        1) Suppression pool average water temperature to be ≤110°F, and

        2) THERMAL POWER to be ≤1% of RATED THERMAL POWER after suppression pool average water temperature has exceeded 95°F for more than 24 hours.

    c. At least once per 30 minutes with the main steam line isolation valves closed following a scram and suppression pool average water temperature >95°F, by verifying suppression pool average water temperature to be ≤120°F.

3.7 - LIMITING CONDITIONS FOR OPERATION

within 1 hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. In OPERATIONAL MODE(s) 1 or 2 with the suppression pool average water temperature >95°F, except as permitted above, restore the average temperature to ≤95°F within 24 hours or reduce THERMAL POWER to ≤1% RATED THERMAL POWER within the next 12 hours.

3. With the suppression pool average water temperature >105°F during testing which adds heat to the suppression pool, except as permitted above, stop all testing which adds heat to the suppression pool and restore the average temperature to ≤95°F within 24 hours or reduce THERMAL POWER to ≤1% RATED THERMAL POWER within the next 12 hours.

4. With the suppression pool average water temperature >110°F, immediately place the reactor mode switch in the Shutdown position and operate at least one residual heat removal loop in the suppression pool cooling mode.

5. With the suppression pool average water temperature >120°F, depressurize the reactor pressure vessel to <150 psig (reactor steam dome pressure) within 12 hours.

4.7 - SURVEILLANCE REQUIREMENTS

3. By an external visual examination of the suppression chamber after main steam relief valve operation with the suppression pool average water temperature ≥160°F and reactor coolant system pressure >150 psig.

4. At least once per 18 months by a visual inspection of the accessible interior and exterior of the suppression chamber.

5. At least once per 18 months by conducting a drywell to suppression chamber bypass leak test at an initial differential pressure of 1.0 psid and verifying that the measured leakage is within the specified limit. If any drywell to suppression chamber bypass leak test fails to meet the specified limit, the test schedule for subsequent tests shall be reviewed and approved by the Commission. If two consecutive tests fail to meet the specified limit, a test shall be performed at least every 9 months until two consecutive tests meet the specified limit, at which time the 18 month test schedule may be resumed.

3.7 - LIMITING CONDITIONS FOR OPERATION

L. Suppression Chamber and Drywell Spray

The suppression chamber and drywell spray functions of the residual heat removal (RHR) system shall be OPERABLE with two independent subsystems, each subsystem consisting of:

1. One OPERABLE RHR pump, and

2. An OPERABLE flow path capable of recirculating water from the suppression pool through a heat exchanger and the suppression chamber and drywell spray nozzles.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With one suppression chamber/drywell spray subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With both suppression chamber/drywell spray subsystems inoperable, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN[a] within the next 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

L. Suppression Chamber and Drywell Spray

The suppression chamber and drywell spray functions of the RHR system shall be demonstrated OPERABLE:

1. At least once per 31 days by verifying that each valve, manual, power operated or automatic, in the flow path that is not locked, sealed or otherwise secured in position, is in its correct position.

2. By performance of an air or smoke flow test of the drywell spray nozzles at least once per 5 years and verifying that each spray nozzle is unobstructed.

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a Whenever the two required RHR SDC mode subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

3.7 - LIMITING CONDITIONS FOR OPERATION

M. Suppression Pool Cooling

The suppression pool cooling function of the residual heat removal (RHR) system shall be OPERABLE with two independent subsystems, each subsystem consisting of:

1. One OPERABLE RHR pump, and
2. An OPERABLE flow path capable of recirculating water from the suppression pool through a heat exchanger.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With one suppression pool cooling subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
2. With both suppression pool cooling subsystems inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN[a] within the next 24 hours.

4.7 - SURVEILLANCE REQUIREMENTS

M. Suppression Pool Cooling

The suppression pool cooling function of the RHR system shall be demonstrated OPERABLE:

1. At least once per 31 days by verifying that each valve, manual, power operated or automatic, in the flow path that is not locked, sealed or otherwise secured in position, is in its correct position.
2. By verifying that each of the required RHR pumps develops the required recirculation flow through the heat exchanger and the suppression pool when tested pursuant to Specification 4.0.E.

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a Whenever the two required RHR SDC mode subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

3.7 - LIMITING CONDITIONS FOR OPERATION

N. SECONDARY CONTAINMENT INTEGRITY

SECONDARY CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2, 3 and *.

ACTION:

1. Without SECONDARY CONTAINMENT INTEGRITY in OPERATIONAL MODES(s) 1, 2 or 3, restore SECONDARY CONTAINMENT INTEGRITY within 4 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
2. Without SECONDARY CONTAINMENT INTEGRITY in OPERATIONAL MODE *, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATION(s), and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.C are not applicable.

4.7 - SURVEILLANCE REQUIREMENTS

N. SECONDARY CONTAINMENT INTEGRITY

SECONDARY CONTAINMENT INTEGRITY shall be demonstrated by:

1. Verifying at least once per 24 hours that the pressure within the secondary containment is ≥0.25 inches of vacuum water gauge.
2. Verifying at least once per 31 days that:
   a. At least one door in each secondary containment air lock is closed.
   b. All secondary containment penetrations not capable of being closed by OPERABLE secondary containment automatic isolation dampers and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic dampers secured in position.
3. At least once per 18 months by operating one standby gas treatment subsystem at a flow rate ≤4000 cfm for one hour and maintaining ≥0.25 inches of vacuum water gauge in the secondary containment.

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* When handling irradiated fuel in the secondary containment, during CORE ALTERATION(s), and operations with a potential for draining the reactor vessel.

3.7 - LIMITING CONDITIONS FOR OPERATION

O. Secondary Containment Automatic Isolation Dampers

Each secondary containment ventilation system automatic isolation damper shall be OPERABLE.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2, 3 and *.

ACTION:

With one or more of the secondary containment ventilation system automatic isolation dampers inoperable, maintain at least one isolation damper OPERABLE in each affected penetration that is open and within 8 hours either:

1. Restore the inoperable damper(s) to OPERABLE status, or

2. Isolate each affected penetration by use of at least one deactivated automatic damper secured in the isolation position, or

3. Isolate each affected penetration by use of at least one closed manual valve or blind flange.

Otherwise, in OPERATIONAL MODE(s) 1, 2 or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

Otherwise, in OPERATIONAL MODE *, suspend handling of irradiated fuel in the secondary containment, CORE

4.7 - SURVEILLANCE REQUIREMENTS

O. Secondary Containment Automatic Isolation Dampers

Each secondary containment ventilation system automatic isolation damper shall be demonstrated OPERABLE:

1. Prior to returning the damper to service after maintenance, repair, or replacement work is performed on the valve or its associated actuator, control, or power circuit by performance of a cycling test.

2. At least once per 18 months by verifying that on an isolation test signal each automatic isolation damper actuates to its isolation position.

* When handling irradiated fuel in the secondary containment, during CORE ALTERATION(s), and operations with a potential for draining the reactor vessel.

3.7 - LIMITING CONDITIONS FOR OPERATION

4.7 - SURVEILLANCE REQUIREMENTS

ALTERATION(s), and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.C are not applicable.

3.7 - LIMITING CONDITIONS FOR OPERATION

P. Standby Gas Treatment System

Two independent standby gas treatment subsystems shall be OPERABLE, each with an OPERABLE diesel generator power source.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2, 3 and *.

ACTION:

1. With one standby gas treatment subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days, or:

   a. In OPERATIONAL MODE(s) 1,2 or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

   b. In OPERATIONAL MODE *, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATION(s), and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.C are not applicable.

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4.7 - SURVEILLANCE REQUIREMENTS

P. Standby Gas Treatment System

Each standby gas treatment subsystem shall be demonstrated OPERABLE:

1. At least once per 31 days by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the subsystem operates for at least 10 hours with the heaters operating.

2. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the subsystem by:

   a. Verifying that the subsystem satisfies the in-place penetration and bypass leakage testing acceptance criteria of <1% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 4000 cfm ±10%.

   b. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of ASTM-D-3803-89, for a methyl iodide penetration of <10%, when tested at 30°C and 70% relative humidity; and

* When handling irradiated fuel in the secondary containment, during CORE ALTERATION(s), and operations with a potential for draining the reactor vessel.

3.7 - LIMITING CONDITIONS FOR OPERATION

3. THIS ITEM INTENTIONALLY LEFT BLANK

4.7 - SURVEILLANCE REQUIREMENTS

c. Verifying a subsystem flow rate of 4000 cfm ±10% during system operation when tested in accordance with ANSI N510-1980.

3. After every # hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of ASTM-D-3803-89, for a methyl iodide penetration of <10%, when tested at 30°C and 70% relative humidity.

4. At least once per 18 months by:

   a. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is <6 inches water gauge while operating the filter train at a flow rate of 4000 cfm ±10%.

   b. Verifying that the filter train starts and isolation dampers open on each of the following test signals:

      1) Manual initiation from the control room, and

      2) Simulated automatic initiation signal.

   c. Verifying that the heaters dissipate 30 ±3 kw when tested in accordance with ANSI N510-1980. This reading shall include the appropriate correction for variations from 480 volts at the bus.

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3.7 - LIMITING CONDITIONS FOR OPERATION

4. With both standby gas treatment subsystems otherwise inoperable in OPERATIONAL MODE(s) 1,2 or 3, restore at least one subsystem to OPERABLE status within one hour, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

5. With both standby gas treatment subsystems inoperable in OPERATIONAL MODE *, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATION(s), and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.C are not applicable.

4.7 - SURVEILLANCE REQUIREMENTS

5. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter bank satisfies the in-place penetration and leakage testing acceptance criteria of <1% in accordance with ANSI N510-1980 while operating the system at a flow rate of 4000 cfm ±10%.

6. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorber bank satisfies the in-place penetration and leakage testing acceptance criteria of <1% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the system at a flow rate of 4000 cfm ±10%.

* When handling irradiated fuel in the secondary containment, during CORE ALTERATION(s), and operations with a potential for draining the reactor vessel.

3/4.7.A PRIMARY CONTAINMENT INTEGRITY

PRIMARY CONTAINMENT INTEGRITY ensures that the release of radioactive materials from the containment atmosphere will be restricted to those leakage paths and associated leak rates assumed in the accident analyses. This restriction, in conjunction with the leakage rate limitation, will limit the site boundary radiation doses to within the limits of 10CFR Part 100 during accident conditions.

3/4.7.B Primary Containment Leakage

The limitations on primary containment leakage rates ensure that the total containment leakage volume will not exceed the value assumed in the accident analyses at the peak accident pressure of 48 psig, P_a. As an added conservatism, the measured overall integrated leakage rate, L_a, is further limited to $\leq 0.75\ L_a$ during performance of the periodic tests to account for possible degradation of the containment leakage barriers between leakage tests. Periodic testing of the containment boundary is required to verify the allowable leakage rates are met. Generally, these tests are conducted while shutdown and the leakage rates must be verified as acceptable prior to establishing containment integrity. Type B and C tests may, however, be conducted at power and be found to exceed the limit while in the applicable OPERATIONAL MODE(s). A short time frame, consistent with the allowed outage time for PRIMARY CONTAINMENT INTEGRITY, is provided to restore the leakage to within its limits. If the leakage is tested individually for each valve in a penetration, closing and locking the other containment isolation valve with an acceptable leakage rate restores PRIMARY CONTAINMENT INTEGRITY. Locking the valve with an acceptable leakage rate is required to assure that the leakage rate is not exceeded due to a single failure that could cause the valve to be re-opened.

The main steam line isolation valves are tested at lower pressures, per an approved exemption, but the leakage rate is included in the Type B and C test totals. The surveillance testing for measuring leakage rates is consistent with the requirements of Appendix J of 10CFR Part 50 with the exception of approved exemptions. (Ref: Exemption Request Approval, Mr. D. B. Vassallo (NRC) to Mr. D. L. Farrar (CECo) dated June 12, 1984.)

3/4.7.C Primary Containment Air Locks

The limitations on closure and leakage for the primary containment air locks are required to meet the restrictions on PRIMARY CONTAINMENT INTEGRITY and the primary containment leakage rate given in Specifications 3.7.A. and 3.7.B. The specification makes allowances for the fact that there may be long periods of time when the air locks will be in a closed and secured position during reactor operation.

3/4.7.D Primary Containment Isolation Valves

The OPERABILITY of the primary containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment. Containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA.

The containment is also penetrated by a large number of small diameter instrument lines which contact the primary coolant system. A program for periodic testing and examination of the flow check valves in these lines is performed by blowing down the instrument line during a vessel hydro and observing conditions which verify that the flow check valve is operable, e.g., a distinctive 'click' when the poppet valve seats, or an instrumentation high flow that quickly reduces to a slight trickle.

3/4.7.E Suppression Chamber - Drywell Vacuum Breakers

The function of the suppression chamber to drywell vacuum breakers is to relieve vacuum in the drywell. These internal vacuum breakers allow air and steam flow from the suppression chamber to the drywell when the drywell is at a negative pressure with respect to the suppression chamber. Each vacuum breaker is a self-actuating valve, similar to a check valve.

The safety analysis assumes that the internal vacuum breakers are closed initially and are fully open at a differential pressure of 0.5 psid. Additionally, three of these internal vacuum breakers are assumed to fail in a closed position. The results of the analyses show that the design pressure is not exceeded even under the worst case accident scenario.

The vacuum breakers between the suppression chamber and the drywell must not be inoperable in the open position since this would allow bypassing of the suppression pool in case of an accident. There is a sufficient number of valves so that operation may continue for a limited time with up to three vacuum breakers inoperable in the closed position.

Each suppression chamber to drywell vacuum breaker is fitted with a redundant pair of position switches which provide signals of disk position to panel mounted indicators and annunciate an alarm in the control room if the disk is open more than allowable. The alarm systems meet the intent of IEEE-279 standards.

3/4.7.F Reactor Building -Suppression Chamber Vacuum Breakers

The function of the reactor building to suppression chamber vacuum breakers is to relieve vacuum when the suppression chamber atmosphere depressurizes below reactor building pressure. If the drywell depressurizes below reactor building pressure, the negative differential pressure is mitigated by flow through the reactor building to suppression chamber vacuum breakers and through the suppression chamber to drywell vacuum breakers. The reactor building to suppression chamber vacuum breakers include both an air operated valve and a check valve in each line. However, position indication is only provided on the air operated valve. These lines and valves are sized on the basis of the air flow from the secondary containment that is required to mitigate the depressurization transient and limit the maximum negative drywell pressure to within design limits. The maximum depressurization rate is a function of the drywell spray flow rate and temperature and the assumed initial conditions of the drywell atmosphere. The safety analyses assume the external vacuum breakers to be closed initially and to be fully open at 1.0 psid. Both vacuum breakers are periodically demonstrated to open at the required pressure differential. For the air operated vacuum breaker, this demonstration is essentially a CHANNEL CALIBRATION of the logic system. Additionally, of the two reactor building to suppression chamber vacuum breaker lines, one is assumed to fail in a closed position to satisfy the single active failure criterion.

3/4.7.G Drywell Internal Pressure

The limitations on drywell internal pressure ensure that the containment peak pressure does not exceed the design pressure during the Design Basis Accident (DBA). The upper limit for initial positive containment pressure will limit the total post accident design basis pressure to approximately 48 psig which is less than the design pressure and is consistent with the safety analysis. The maximum pressure, and the minimum pressure above 15% RATED THERMAL POWER, is also based on assumptions for post-accident hydrodynamic loading analysis. A short period is allowed to conduct testing, e.g. HPCI, vacuum breaker and relief valve testing, which temporarily reduces the drywell pressure below this minimum.

3/4.7.H Drywell-Suppression Chamber Differential Pressure

The toroidal-shaped suppression chamber, which contains the suppression pool is connected to the drywell by eight main vent pipes. The main vent pipes exhaust into a vent header, from which downcomer pipes extend into the suppression pool. During a loss-of-coolant accident (LOCA), the increasing drywell pressure will force the water leg in the downcomer pipes into the suppression pool at substantial velocities as the blowdown phase of the event begins. The length of the water leg has a significant effect on the resultant primary containment pressures and loads.

The purpose of maintaining the drywell at a slightly higher pressure with respect to the suppression chamber is to minimize the drywell pressure increase necessary to clear the downcomer pipes to commence condensation of steam in the suppression pool and to minimize the mass of the accelerated water leg. This reduces the hydrodynamic loads on the torus during the LOCA blowdown. Initial drywell-to-suppression-chamber differential pressure affects both the dynamic pool loads on the suppression chamber and the peak drywell pressure during downcomer pipe clearing during a Design Basis Accident. Drywell-to-suppression-chamber differential pressure must be maintained within the specified limits so that the safety analysis remains valid. However, a short period is allowed to conduct testing, e.g. HPCI, vacuum breaker and relief valve testing, which temporarily increases the suppression chamber pressure and reduces the differential pressure. Only one direct suppression chamber to drywell differential pressure instrumentation CHANNEL is provided. However, any pair of the redundant drywell and suppression chamber pressure instrumentation CHANNEL(s) are sufficient to determine the differential pressure.

3/4.7.I Primary Containment Nitrogen System

The nitrogen system functions to maintain oxygen concentrations within the primary containment at or below the explosive levels. To ensure that a combustible gas mixture does not occur, oxygen concentration is kept below 4.0 volume percent. The system operates in conjunction with emergency operating procedures that are used to reduce primary containment pressure periodically during system operation. This combination results in a feed-and-bleed approach to maintaining hydrogen and/or oxygen concentrations below combustible levels. Sufficient liquid nitrogen is maintained to provide approximately a seven day supply to allow for establishing an additional nitrogen supply following a LOCA.

3/4.7.J Primary Containment Oxygen Concentration

All nuclear reactors must be designed to withstand events that generate hydrogen either due to the zirconium metal-water reaction in the core or due to radiolysis. The primary method to control hydrogen is to inert the primary containment. With the primary containment inerted, that is, oxygen concentration less than 4.0 volume percent, a combustible mixture cannot be present in the primary containment for any hydrogen concentration. The Design Basis Accident (DBA) loss-of-coolant accident (LOCA) analysis assumes that the primary containment is inerted when the DBA occurs. Thus, the hydrogen assumed to be released to the primary containment as a result of a metal-water reaction in the reactor core will not produce combustible gas mixtures in the primary containment.

The primary containment oxygen concentration must be within the specified limit when primary containment is inerted, except as allowed by the relaxations during startup and shutdown. The primary containment must be inert in OPERATIONAL MODE 1, since this is the condition with the highest probability of an event that could produce hydrogen. Inerting the primary containment is an operational problem because it prevents containment access without an appropriate breathing apparatus. Therefore, the primary containment is inerted as late as possible in the plant startup and de-inerted as soon as possible in the plant shutdown. As long as reactor power is below 15% of RATED THERMAL POWER, the potential for an event that generates significant hydrogen is low and the primary containment does not need to be inert. Furthermore, the probability of an event that generates hydrogen occurring within the first 24 hours of a reactor startup or within the last 24 hours before a shutdown is low enough that these windows, when the primary containment is not inerted, are also justified. The 24 hour time frame is a reasonable amount of time to allow plant personnel to perform inerting or de-inerting.

BASES

3/4.7.K Suppression Chamber

The specifications of this section ensure that the primary containment pressure will not exceed the design pressure during primary system blowdown from full operating pressure.

The suppression chamber water provides the heat sink for the reactor coolant system energy release following a postulated rupture of the system. The suppression chamber water volume must absorb the associated decay and structural sensible heat released during reactor coolant system blowdown from ~1000 psig. Since all of the gases in the drywell are purged into the suppression chamber air space during a loss of coolant accident, the pressure of the liquid and gas must not exceed the suppression chamber maximum pressure. The design volume of the suppression chamber, water and air, was obtained by considering that the total volume of reactor coolant is discharged to the suppression chamber and that the drywell volume is purged to the suppression chamber.

An allowable bypass area between the primary containment and the drywell and suppression chamber is identified based on analysis considering primary system break area, suppression chamber effectiveness, and containment design pressure. Analyses show that the maximum allowable bypass area is equivalent to all vacuum breakers open the equivalent of 1/16 inch at all points along the seal surface of the disk.

Using the minimum or maximum water levels given in this specification (as measured from the bottom of the suppression chamber), primary containment maximum pressure following a design basis accident is approximately 48 psig, which is below the design pressure. The maximum water level results in a downcomer submergence of 4 feet and the minimum level results in a submergence approximately 4 inches less. If it becomes necessary to make the suppression chamber inoperable, it is done in accordance with the requirements in Specification 3.5.C.

Because of the large volume and thermal capacity of the suppression pool, the level and temperature normally change very slowly and monitoring these parameters daily is sufficient to establish any trend. By requiring the suppression pool temperature to be more frequently monitored 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.

Under full power operating conditions, blowdown from an initial suppression chamber water temperature of 95°F results in a water temperature of approximately 145°F immediately following blowdown which is low enough to provide complete condensation via T-quencher devices. At this temperature and atmospheric pressure, the available net positive suction head exceeds that required by the emergency core cooling system pumps, thus there is no dependency on containment overpressure during the accident injection phase.

BASES

Experimental data indicates that excessive steam condensing loads can be avoided if the peak temperature of the suppression pool is maintained sufficiently low during any period of safety relief valve operation for T-quencher devices. 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 safety or relief valve inadvertently opens or sticks open. As a minimum this action shall include: (1) use of all available means to close the valve, (2) initiate suppression pool water cooling, (3) initiate reactor shutdown, and (4) if other safety or relief valves are used to depressurize the reactor, their discharge shall be separated from that of the stuck-open safety or relief valve to assure mixing and uniformity of energy insertion to the pool.

In conjunction with the Mark I Containment Short Term Program, a plant unique analysis was performed which demonstrated a factor of safety of at least two for the weakest element in the suppression chamber support system and attached piping. The maintenance of a drywell-suppression chamber differential pressure and a suppression chamber water level corresponding to a downcomer submergence range of 3.67 to 4.00 feet will assure the integrity of the suppression chamber when subjected to post-LOCA suppression pool hydrodynamic forces.

3/4.7.L Suppression Chamber and Drywell Spray

Following a Design Basis Accident (DBA), the suppression chamber spray function of the containment cooling mode of the residual heat removal (RHR) system removes heat from the suppression chamber air space and condenses steam. The suppression chamber is designed to absorb the sudden input of heat from the primary system from a DBA or a rapid depressurization of the reactor pressure vessel through safety or relief valves. There is one 100% capacity containment spray header inside the suppression chamber. Periodic operation of the suppression chamber and drywell sprays may also be used following a DBA to assist the natural convection and diffusion mixing of hydrogen and oxygen when other ECCS requirements are met and oxygen concentration exceeds 4%. Since the spray system is a function of the RHR system, the loops will not be aligned for the spray function during normal operation, but all components required to operate for proper alignment must be OPERABLE.

3/4.7.M Suppression Pool Cooling

Following an accident, the suppression pool cooling function of the RHR system removes heat that the suppression pool absorbs from the primary system and, in the long term, continues to absorb residual heat generated by fuel in the reactor core. Each of the suppression pool cooling loops consists of a pump and heat exchanger. Following a loss of coolant accident (LOCA), the plant operators can realign the valves in these two loops to draw water from the suppression pool, pump it through the shell side of the exchangers, and discharge it back to the suppression pool via the full flow test lines. At the same time, residual heat removal service water (RHRSW) is pumped through the tube side of the exchangers to exchange heat to the external heat sink.

3/4.7.N SECONDARY CONTAINMENT INTEGRITY

The function of the secondary containment is to isolate and contain fission products that escape from primary containment following a Design Basis Accident (DBA), to confine the postulated release of radioactive material within the requirements of 10CFR Part 100, and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside of primary containment. The reactor building and associated structures provide secondary containment during normal operation when the drywell is sealed and in service. At other times the drywell may be open and, when required, secondary containment integrity is specified. There are two principal accidents for which credit is taken for secondary containment OPERABILITY. These are a LOCA and fuel-handling accident inside secondary containment. The secondary containment performs no active function in response to each of these limiting events; however, its leak tightness is required to limit offsite radiation doses to below those required by 10CFR Part 100. Maintaining secondary containment OPERABLE ensures that the release of radioactive materials from the primary containment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the secondary containment structure will be treated prior to discharge to the environment. Establishing and maintaining a vacuum in the reactor building with the standby gas treatment system during testing, along with the surveillance of the doors, hatches, dampers and valves, is adequate to ensure that there are no violations of the integrity of the secondary containment. This surveillance is normally conducted during periods of calm winds (<5 mph), but may be conducted under higher wind conditions with appropriate application of correction factors.

3/4.7.O Secondary Containment Automatic Isolation Dampers

The function of the secondary containment ventilation system automatic isolation dampers, in combination with other accident-mitigation systems, is to limit fission-product release during and following postulated Design Basis Accidents (DBA) such that offsite radiation exposures are maintained within the requirements of 10CFR Part 100. Secondary containment isolation ensures that fission products that escape from primary containment following a DBA, or which are released during certain operations when primary containment is not required, or take place outside primary containment, are maintained within applicable limits. The OPERABILITY requirements for the secondary containment ventilation system isolation dampers help ensure that adequate secondary containment leak tightness is maintained during and after an accident by minimizing potential paths to the environment.

3/4.7.P Standby Gas Treatment System

The standby gas treatment system (SBGT) is required to ensure that radioactive materials that leak from the primary containment into the secondary containment following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment. This system reduces the potential releases of radioactive material, principally iodine, to within values specified in 10CFR Part 100.

The standby gas treatment system is designed to filter and exhaust the reactor building atmosphere to the main chimney during secondary containment isolation conditions, with a minimum release of radioactive materials from the reactor building to the environment. One standby gas treatment fan is designed to automatically start upon secondary containment isolation and to maintain the reactor building pressure to approximately a negative ¼ inch water gauge pressure; all leakage should be in-leakage. Should the fan fail to start, the redundant alternate fan and filter subsystem is designed to start automatically.

The OPERABILITY of the standby gas treatment system reduces the potential release of radioactive material, principally iodine, following a design basis accident. The reduction in containment iodine inventory reduces the resulting site boundary radiation doses associated with containment leakage. The operation of this system and resultant iodine removal capacity are consistent with the assumptions used in the LOCA analyses. Periodic operation of the system with the heaters is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters.

Since the standby gas treatment subsystems are shared by both units, one subsystem is powered by the unit diesel generator power source of each unit. This unique arrangement requires that special allowed out-of-service times be provided for the combinations of subsystem and diesel generator power source inoperability that may occur. For example, if conducting the alternate offsite power source cross-tie surveillance were to require the inoperability of both unit diesel generator power sources, neither of the standby gas treatment subsystems would have an OPERABLE diesel generator power source and the appropriate ACTION would have to be entered.