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

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-237

DRESDEN NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 146
License No. DPR-19

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

   A. The application for amendment by the Commonwealth Edison Company (the licensee) dated September 17, 1993, as supplemented by letter dated July 28, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

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

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

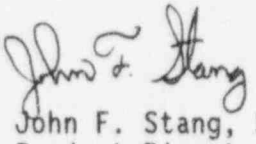
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-19 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 146 , 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



John F. Stang, Senior 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: December 27, 1995

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

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-249

DRESDEN NUCLEAR POWER STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 140
License No. DPR-25

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

   A. The application for amendment by the Commonwealth Edison Company (the licensee) dated September 17, 1993, as supplemented by letter dated July 28, 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-25 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 140 , 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

John F. Stang, Senior 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: December 27, 1995

ATTACHMENT TO LICENSE AMENDMENT NOS. 146 AND 140

FACILITY OPERATING LICENSE NOS. DPR-19 AND DPR-25

DOCKET NOS. 50-237 AND 50-249

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 2 REMOVE	UNIT 3 REMOVE	INSERT
3/4.5-1	3/4.5-1	3/4.5-1
3/4.5-2	3/4.5-2	3/4.5-2
3/4.5-3	3/4.5-3	3/4.5-3
3/4.5-4	3/4.5-4	3/4.5-4
3/4.5-4a	3/4.5-4a	3/4.5-5
3/4.5-5	3/4.5-5	3/4.5-6
3/4.5-6	3/4.5-6	3/4.5-7
3/4.5-7	3/4.5-7	3/4.5-8
3/4.5-7a	3/4.5-7a	3/4.5-9
3/4.5-8	3/4.5-8	---
3/4.5-9	3/4.5-9	---
3/4.5-10	3/4.5-10	---
3/4.5-11	3/4.5-11	---
3/4.5-12	3/4.5-12	---
3/4.5-12a	3/4.5-12a	---
3/4.5-13	3/4.5-13	---
3/4.5-14	3/4.5-14	---
3/4.5-15	3/4.5-15	---
3/4.5-16	3/4.5-16	---
3/4.5-17	3/4.5-17	---
3/4.5-18 thru 3/4.5-22	3/4.5-18 thru 3/4.5-21	---
3/4.5-23	3/4.5-22	---
3/4.5-24	3/4.5-23	---
3/4.5-25 thru 3/4.5-26	3/4.5-24	---
3/4.5-27	3/4.5-25 thru 3/4.5-27	---
3/4.5-28	3/4.5-28	---
3/4.5-29	3/4.5-29	---
B 3/4.5-30	B 3/4.5-30	B 3/4.5-1
B 3/4.5-31	B 3/4.5-31	B 3/4.5-2
B 3/4.5-32	B 3/4.5-32	B 3/4.5-3
B 3/4.5-33	B 3/4.5-33	---
B 3/4.5-34	B 3/4.5-34	---
B 3/4.5-35	B 3/4.5-35	---
B 3/4.5-36	B 3/4.5-36	---
B 3/4.5-37	B 3/4.5-37	---
B 3/4.5-38	B 3/4.5-38	---
B 3/4.5-39	B 3/4.5-39	---
B 3/4.5-40	B 3/4.5-40	---
B 3/4.5-41	B 3/4.5-41	---
B 3/4.5-42	B 3/4.5-42	---
B 3/4.5-43	B 3/4.5-43	---
B 3/4.5-44	B 3/4.5-44	---

3.5 - LIMITING CONDITIONS FOR OPERATION

A. Emergency Core Cooling System - Operating

The emergency core cooling systems (ECCS) shall be OPERABLE with:

1. The core spray (CS) system consisting of two subsystems with each subsystem comprised of:

   a. One OPERABLE CS pump, and

   b. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water through the spray sparger to the reactor vessel.

2. The low pressure coolant injection (LPCI) subsystem comprised of:

   a. Four OPERABLE LPCI pumps, and

   b. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water to the reactor vessel.

3. The high pressure cooling injection (HPCI) system consisting of:

   a. One OPERABLE HPCI pump, and

   b. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water to the reactor vessel.

4. The automatic depressurization system (ADS) with at least 5 OPERABLE ADS valves.

4.5 - SURVEILLANCE REQUIREMENTS

A. Emergency Core Cooling System - Operating

The ECCS shall be demonstrated OPERABLE by:

1. At least once per 31 days:

   a. For the CS system, the LPCI subsystem and the HPCI system:

      1) Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water.

      2) 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[a] position.

   b. For the HPCI system, verifying that the HPCI pump flow controller is in the correct position.

2. Verifying that, when tested pursuant to Specification 4.0.E:

   a. The CS pump in each subsystem develop a flow of at least 4500 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥90 psig.

---

a Except that an automatic valve capable of automatic return to its ECCS position when an ECCS signal is present may be in position for another mode of operation.

3.5 - LIMITING CONDITIONS FOR OPERATION

APPLICABILITY:

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

ACTION:

1. For the core spray system:

   a. With one CS subsystem inoperable, provided that the LPCI subsystem is OPERABLE, restore the inoperable CS 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.

   b. With both CS subsystems inoperable, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. For the LPCI subsystem:

   a. LEFT INTENTIONALLY BLANK

4.5 - SURVEILLANCE REQUIREMENTS

   b. Three LPCI pumps together develop a flow of at least 14,500 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥20 psig.

   c. The HPCI pump develops a flow of at least 5000 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥1150 psig when steam is being supplied to the turbine between 920 and 1005 psig[c].

3. At least once per 18 months:

   a. For the CS system, the LPCI subsystem, and the HPCI system, performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence and verifying that each automatic valve in the flow path actuates to its correct position. Actual injection of coolant into the reactor vessel may be excluded from this test.

   b. For the HPCI system, verifying that:

      1) The system develops a flow of ≥5000 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥300 psig, when steam is being supplied to the turbine between 200 and 350 psig[c].

---

b The HPCI system and ADS are not required to be OPERABLE when reactor steam dome pressure is ≤150 psig.

c The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS
b. LEFT INTENTIONALLY BLANK	2) The pump suction is automatically transferred from the condensate storage tank to the suppression chamber on a condensate storage tank water level - low signal and on a suppression chamber water level - high signal.
c. LEFT INTENTIONALLY BLANK	c. Performing a CHANNEL CALIBRATION of the CS and LPCI system discharge line "keep filled" alarm instrumentation.
	d. Performing a CHANNEL CALIBRATION of the CS header ΔP instrumentation and verifying the setpoint to be ≤ 0.5 psid.
3. With the HPCI system inoperable, provided both CS subsystems, the LPCI subsystem, the ADS and the Isolation Condenser (IC) system are OPERABLE, restore the HPCI system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 150 psig within the following 24 hours.	4. At least once per 18 months for the ADS:
4. For the ADS:	a. Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence, but excluding actual valve actuation.
a. With one of the above required ADS valves inoperable, provided the HPCI system, both CS subsystems and the LPCI subsystem are OPERABLE, restore the inoperable ADS valve to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 150 psig within the following 24 hours.	b. Manually opening each ADS valve when the reactor steam dome pressure is ≥ 150 psig[c] and observing that either:
	1) The turbine control valve or turbine bypass valve position responds accordingly, or
	2) There is a corresponding change in the measured steam flow.

c The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS
b. With two or more of the above required ADS valves inoperable, be in at least HOT SHUTDOWN within 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.	
5. With an ECCS discharge line "keep filled" pressure alarm instrumentation CHANNEL inoperable, perform Surveillance Requirement 4.5.A.1.a.1) for CS and LPCI at least once per 24 hours.	
6. With a CS subsystem header ΔP instrumentation CHANNEL inoperable, restore the inoperable CHANNEL to OPERABLE status within 72 hours or determine the CS header ΔP locally at least once per 12 hours; otherwise, declare the associated CS subsystem inoperable.	
7. In the event an ECCS system is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.B within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.	

3.5 - LIMITING CONDITIONS FOR OPERATION

B. Emergency Core Cooling System - Shutdown

At least two of the following four subsystems/loops shall be OPERABLE:

1. One or both core spray (CS) subsystems with:

   a. An OPERABLE flow path capable of taking suction from at least one of the following water sources and transferring the water through the spray sparger to the reactor vessel:

      1) From the suppression chamber, or

      2) When the suppression chamber water level is less than the limit or is drained, from the condensate storage tank containing at least 140,000 available gallons of water.

2. One or both low pressure coolant injection (LPCI) subsystem loops with a subsystem loop comprised of:

   a. At least one OPERABLE LPCI pump, and

   b. An OPERABLE flow path capable of taking suction from at least one of the following water sources and transferring the water to the reactor vessel:

      1) From the suppression chamber, or

4.5 - SURVEILLANCE REQUIREMENTS

B. Emergency Core Cooling System - Shutdown

The required ECCS shall be demonstrated OPERABLE per Surveillance Requirement 4.5.A, except:

1. The LPCI subsystems cross-tie valves may be closed.

2. Each LPCI pump develops the required flow when tested pursuant to Specification 4.0.E.

3.5 - LIMITING CONDITIONS FOR OPERATION

4.5 - SURVEILLANCE REQUIREMENTS

2) When the suppression chamber water level is less than the limit or is drained, from the condensate storage tank containing at least 140,000 available gallons of water.

APPLICABILITY:

OPERATIONAL MODE(s) 4 and 5[a].

ACTION:

1. With one of the above required subsystems/loops inoperable, restore at least two subsystems/loops to OPERABLE status within 4 hours or suspend all operations with a potential for draining the reactor vessel.

2. With both of the above required subsystems/loops inoperable, suspend CORE ALTERATION(s) and all operations with a potential for draining the reactor vessel. Restore at least one subsystem/loop to OPERABLE status within 4 hours or establish SECONDARY CONTAINMENT INTEGRITY within the next 8 hours.

---

a The ECCS is not required to be OPERABLE provided that the reactor vessel head is removed, the cavity is flooded, the spent fuel pool gates are removed, and water level is maintained within the limits of Specification 3.10.G and 3.10.H.

3.5 - LIMITING CONDITIONS FOR OPERATION

C. Suppression Chamber

The suppression chamber shall be OPERABLE:

1. In OPERATIONAL MODE(s) 1, 2, and 3 with a contained water volume equivalent to a water level of ≥14' 6.5" above the bottom of the suppression chamber.

2. In OPERATIONAL MODE(s) 4 and 5[a] with a contained volume equivalent to a water level of ≥8' above the bottom of the suppression chamber, except that the suppression chamber level may be less than the limit provided that:

   a. No operations are performed that have a potential for draining the reactor vessel,

   b. The reactor mode switch is locked in the Shutdown or Refuel position,

   c. The condensate storage tank contains ≥140,000 available gallons of water, and

   d. The ECCS systems are OPERABLE per Specification 3.5.B.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2, 3, 4 and 5[a].

4.5 - SURVEILLANCE REQUIREMENTS

C. Suppression Chamber

The suppression chamber shall be determined OPERABLE by verifying:

1. For OPERATIONAL MODE(s) 1, 2 and 3, at least once per 24 hours, the water level to be ≥14' 6.5".

2. For OPERATIONAL MODE(s) 4 or 5[a], at least once per 12 hours:

   a. The water level to be ≥8', or

   b. Verify the alternate conditions of Specification 3.5.C.2, or the conditions of footnote (a), to be satisfied.

---

a The suppression chamber is not required to be OPERABLE provided that the reactor vessel head is removed, the cavity is flooded or being flooded from the suppression pool, the spent fuel pool gates are removed when the cavity is flooded, and the water level is maintained within the limits of Specification 3.10.G and 3.10.H.

3.5 - LIMITING CONDITIONS FOR OPERATION

4.5 - SURVEILLANCE REQUIREMENTS

ACTION:

1. In OPERATIONAL MODE(s) 1, 2, or 3 with the suppression chamber water level less than the above limit, restore the water level to within the limit 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) 4 or 5[a] with the suppression chamber water level less than the above limit or drained and the above required conditions not satisfied, suspend CORE ALTERATION(s) and all operations that have a potential for draining the reactor vessel and lock the reactor mode switch in the Shutdown position. Establish SECONDARY CONTAINMENT INTEGRITY within 8 hours.

---

a The suppression chamber is not required to be OPERABLE provided that the reactor vessel head is removed, the cavity is flooded or being flooded from the suppression pool, the spent fuel pool gates are removed when the cavity is flooded, and the water level is maintained within the limits of Specification 3.10.G and 3.10.H.

3.5 - LIMITING CONDITIONS FOR OPERATION

D. Isolation Condenser

The isolation condenser (IC) system shall be OPERABLE.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3 with reactor steam dome pressure >150 psig.

ACTION:

With the IC system inoperable, operation may continue provided the HPCI system is OPERABLE; restore the IC system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.

4.5 - SURVEILLANCE REQUIREMENTS

D. Isolation Condenser

The IC system shall be demonstrated OPERABLE:

1. At least once per 24 hours by:
   a. Verifying the shell side water volume to be ≥11,300 gallons.
   b. Verifying the shell side water temperature to be ≤150°F.
2. 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.
3. At least once per 18 months by performing a system functional test which includes simulated automatic actuation and verifying that each automatic valve in the flow path actuates to its correct position.
4. At least once per 5 years by verifying the system heat removal capability to be ≥252.5 $\times 10^6$ BTU/hour.

BASES

3/4.5.A ECCS - Operating

3/4.5.B ECCS - Shutdown

The Core Spray (CS) system, together with the Low Pressure Coolant Injection (LPCI) subsystem, is provided to assure that the core is adequately cooled following a loss-of-coolant accident (LOCA) and provides adequate core cooling capacity for all break sizes up to and including the double-ended reactor recirculation line break, and for smaller breaks following depressurization by the Automatic Depressurization System (ADS).

The CS system is a primary source of emergency core cooling after the reactor vessel is depressurized and a source for flooding of the core in case of accidental draining.

The surveillance requirements provide adequate assurance that the CS system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete system functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment.

The Low Pressure Coolant Injection (LPCI) subsystem is provided to assure that the core is adequately cooled following a loss-of-coolant accident. The LPCI subsystem with a minimum of three pumps will provide adequate core flooding for all break sizes up to and including the double-ended reactor recirculation line break, and for small breaks following depressurization by the ADS.

The surveillance requirements provide adequate assurance that the LPCI subsystem will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete system functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment.

The High Pressure Coolant Injection (HPCI) system is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the reactor coolant system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCI system permits the reactor to be shutdown while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCI system continues to operate until reactor vessel pressure is below the pressure at which CS operation or LPCI subsystem operation maintains adequate core cooling.

The capacity of the system is selected to provide the required core cooling. The HPCI pump is designed to deliver greater than or equal to 5000 gpm at steam supply pressures between 1150 and 150 psig. Suction piping for the system is provided from the condensate storage tank and the suppression pool. Pump suction for HPCI is normally aligned to the condensate storage tank source to minimize injection of suppression pool water into the reactor vessel. However, if the condensate storage tank water supply is low, an automatic transfer to the suppression pool water source ensures a water supply for continuous operation of the HPCI system.

With the HPCI system inoperable, adequate core cooling is assured by the OPERABILITY of the redundant and diversified Automatic Depressurization System and both the CS system and LPCI subsystem. In addition, the Isolation Condenser (IC) system, a system for which no credit is taken in the safety analysis, will automatically initiate on a sustained reactor high pressure condition. The HPCI out-of-service period of 14 days is based on the demonstrated OPERABILITY of redundant and diversified low pressure core cooling systems and the IC system.

The surveillance requirements provide adequate assurance that the HPCI system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete system functional test requires a reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to provide cooling at the earliest moment.

Upon failure of the HPCI system to function properly after a small break loss-of-coolant, the Automatic Depressurization System (ADS) automatically causes all OPERABLE main steamline relief valves to open, depressurizing the reactor so that flow from the low pressure core cooling systems can enter the core in time to limit fuel cladding temperature to less than 2200°F. ADS is conservatively required to be OPERABLE whenever reactor vessel pressure exceeds 150 psig. This pressure is substantially below that for which the low pressure core cooling systems can provide adequate core cooling for events requiring ADS.

ADS automatically controls the five main steamline relief valves although safety analyses support a minimum of 4 OPERABLE valves. It is therefore appropriate to permit one valve to be out-of-service for up to 14 days without materially reducing system reliability provided the appropriate MAPLHGR reduction factor is applied to assure compliance with 10CFR 50.46. The MAPLHGR reduction factors are contained in the CORE OPERATING LIMITS REPORT.

To preserve single failure criteria, a minimum of two independent OPERABLE low-pressure ECCS subsystems/loops are required in OPERATIONAL MODE(s) 4 and 5 to ensure adequate vessel inventory makeup in the event of an inadvertent vessel draindown. Only a single LPCI pump is required per loop because of the large injection capacity. All of the ECCS may be inoperable provided the reactor head is removed, the reactor cavity is flooded, the spent fuel gates are removed, and the water level is maintained within the limits required by the Refueling Operations specifications.

3/4.5.C Suppression Chamber

The suppression chamber is required to be OPERABLE as part of the ECCS to ensure that a sufficient supply of water is available to the HPCI and CS systems and the LPCI subsystem in the event of a LOCA. This limit on suppression chamber minimum water volume ensures that sufficient water is available to permit recirculation cooling flow to the core. The OPERABILITY of the suppression chamber in OPERATIONAL MODE(s) 1, 2 or 3 is also required by Specification 3.7.G.

Repair work might require making the suppression chamber inoperable. This specification will permit those repairs to be made and concurrently provide assurance that the irradiated fuel has an adequate cooling water supply when the suppression chamber must be made inoperable, including draining, in OPERATIONAL MODE(s) 4 or 5.

In OPERATIONAL MODE(s) 4 and 5 the suppression chamber minimum required water volume is reduced because the reactor coolant is maintained at or below 212°F. Since pressure suppression is not required below 212°F, the minimum water volume is based on net positive suction head (NPSH), recirculation volume and vortex prevention plus a safety margin for conservatism. With the suppression chamber water level less than the required limit, all ECCS subsystems are inoperable unless they are aligned to an OPERABLE condensate storage tank. When the suppression chamber level is less than 8 feet, the CS system or the LPCI subsystem is considered OPERABLE only if it can take suction from the condensate storage tank, and the condensate storage tank water level is sufficient to provide the required NPSH for the CS or LPCI pumps. Therefore, a verification that either the suppression chamber water level is greater than or equal to 8 feet or that CS or LPCI is aligned to take suction from the condensate storage tank and the condensate storage tank contains greater than or equal to 140,000 gallons of water, ensures CS or LPCI can supply at least 50,000 gallons of make-up water to the reactor pressure vessel. The CS suction is uncovered at the 90,000 gallon level.

3/4.5.D Isolation Condenser

The isolation condenser is provided for core decay heat removal following reactor isolation from the main condenser and reactor scram. The isolation condenser has a heat removal capacity sufficient to handle the decay heat production at 300 seconds following a scram. Following a reactor scram and an isolation from the main condenser, water will be lost from the reactor vessel through the relief valves during the first 300 seconds. This represents a minor loss relative to the vessel inventory.

The system may be manually initiated at any time. The system is automatically initiated on high reactor pressure in excess of 1060 psig sustained for 15 seconds. The time delay is provided to prevent unnecessary actuation of the system during anticipated turbine trips. Automatic initiation is provided to minimize the coolant loss following isolation from the main condenser. To be considered OPERABLE, the shell side of the isolation condenser must contain at least 11,300 gallons of water. Make-up water to the shell side of the isolation condenser is provided by the condensate transfer pumps from the condensate storage tank. The condensate transfer pumps are OPERABLE from on-site power. The preferred source of make-up water for the Isolation Condenser is the clean demineralized water system. The fire protection system is also available as make-up water.

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. 168
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 28, 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. 168, 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: December 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. 164
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 28, 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. 164 , 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: December 27, 1995

ATTACHMENT TO LICENSE AMENDMENT NOS. 168 AND 164

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
3.5/4.5-1	3.5/4.5-1	3/4.5-1
3.5/4.5-2	3.5/4.5-2	3/4.5-2
3.5/4.5-3	3.5/4.5-3	3/4.5-3
3.5/4.5-4	3.5/4.5-4	3/4.5-4
3.5/4.5-5	3.5/4.5-4a	3/4.5-5
3.5/4.5-6	3.5/4.5-5	3/4.5-6
3.5/4.5-7	3.5/4.5-6	3/4.5-7
3.5/4.5-8	3.5/4.5-6a	3/4.5-8
3.5/4.5-9	3.5/4.5-7	3/4.5-9
3.5/4.5-10	3.5/4.5-8	3/4.5-10
3.5/4.5-11	3.5/4.5-9	3/4.5-11
3.5/4.5-12	3.5/4.5-10	---
3.5/4.5-13	---	---
3.5/4.5-14	---	---
3.5/4.5-15	3.5/4.5-11	B 3/4.5-1
3.5/4.5-16	3.5/4.5-12	B 3/4.5-2
3.5/4.5-17	3.5/4.5-13	B 3/4.5-3
3.5/4.5-18	3.5/4.5-14	---
3.5/4.5-19	3.5/4.5-14a	---
3.5/4.5-20	3.5/4.5-14b	---
3.5/4.5-21	3.5/4.5-15	---
3.5/4.5-22	3.5/4.5-15a	---
3.5/4.5-23	3.5/4.5-16	---
3.5/4.5-24	3.5/4.5-17	---
3.5/4.5-25	3.5/4.5-18	---
3.5/4.5-26	---	---
3.5/4.5-27	---	---

3.5 - LIMITING CONDITIONS FOR OPERATION

A. Emergency Core Cooling System - Operating

The emergency core cooling systems (ECCS) shall be OPERABLE with:

1. The core spray (CS) system consisting of two subsystems with each subsystem comprised of:
   a. One OPERABLE CS pump, and
   b. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water through the spray sparger to the reactor vessel.
2. The low pressure coolant injection (LPCI) subsystem comprised of[e]:
   a. Four OPERABLE LPCI pumps, and
   b. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water to the reactor vessel.
3. The high pressure cooling injection (HPCI) system consisting of:
   a. One OPERABLE HPCI pump, and
   b. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water to the reactor vessel.

4.5 - SURVEILLANCE REQUIREMENTS

A. Emergency Core Cooling System - Operating

The ECCS shall be demonstrated OPERABLE by:

1. At least once per 31 days:
   a. For the CS system, the LPCI subsystem and the HPCI system:
      1) Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water.
      2) 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[a] position.
   b. For the HPCI system, verifying that the HPCI pump flow controller is in the correct position.

---

e The LPCI subsystem may be considered OPERABLE during alignment and operation for decay heat removal when below the actual RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable.

a Except that an automatic valve capable of automatic return to its ECCS position when an ECCS signal is present may be in position for another mode of operation.

3.5 - LIMITING CONDITIONS FOR OPERATION

4. The automatic depressurization system (ADS) with at least 5 OPERABLE ADS valves.

APPLICABILITY:

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

ACTION:

1. For the core spray system:

   a. With one CS subsystem inoperable, provided that the LPCI subsystem is OPERABLE, restore the inoperable CS 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.

   b. With both CS subsystems inoperable, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. For the LPCI subsystem:

   a. LEFT INTENTIONALLY BLANK

4.5 - SURVEILLANCE REQUIREMENTS

2. Verifying that, when tested pursuant to Specification 4.0.E:

   a. The CS pump in each subsystem develop a flow of at least 4500 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥90 psig.

   b. Two LPCI pumps together develop a flow of at least 9,000 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥20 psig.

   c. The HPCI pump develops a flow of at least 5000 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥1150 psig when steam is being supplied to the turbine between 920 and 1005 psig[c].

3. At least once per 18 months:

   a. For the CS system, the LPCI subsystem, and the HPCI system, performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence and verifying that each automatic valve in the flow path actuates to its correct position. Actual injection of coolant into the reactor vessel may be excluded from this test.

---

b The HPCI system and ADS are not required to be OPERABLE when reactor steam dome pressure is ≤150 psig.

c The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS
b. LEFT INTENTIONALLY BLANK	b. For the HPCI system, verifying that: 1) The system develops a flow of ≥5000 gpm against a test line pressure corresponding to a reactor vessel pressure of ≥300 psig, when steam is being supplied to the turbine between 250 and 325 psig[c]. 2) The pump suction is automatically transferred from the condensate storage tank to the suppression chamber on a condensate storage tank water level - low signal and on a suppression chamber water level - high signal.
c. LEFT INTENTIONALLY BLANK	c. Performing a CHANNEL CALIBRATION of the ECCS discharge line "keep filled" alarm instrumentation.
3. With the HPCI system inoperable, provided both CS subsystems, the LPCI subsystem, the ADS and the Reactor Core Isolation Cooling (RCIC) system are OPERABLE, restore the HPCI system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.	d. Performing a CHANNEL CALIBRATION of the CS header ΔP instrumentation and verifying the setpoint to be ≤4.4 psid.

---

d 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.

c The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS
4. For the ADS:	4. At least once per 18 months for the ADS:
a. With one of the above required ADS valves inoperable, provided the HPCI system, both CS subsystems and the LPCI subsystem are OPERABLE, restore the inoperable ADS valve to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.	a. Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence, but excluding actual valve actuation.
b. With two or more of the above required ADS valves inoperable, be in at least HOT SHUTDOWN within 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.	b. Manually opening each ADS valve when the reactor steam dome pressure is ≥150 psig[c] and observing that either:
5. With an ECCS discharge line "keep filled" pressure alarm instrumentation CHANNEL inoperable, perform Surveillance Requirement 4.5.A.1.a.1) for CS and LPCI at least once per 24 hours.	1) The turbine control valve or turbine bypass valve position responds accordingly, or
	2) There is a corresponding change in the measured steam flow.

c The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS
6. With a CS subsystem header ΔP instrumentation CHANNEL inoperable, restore the inoperable CHANNEL to OPERABLE status within 72 hours or determine the CS header ΔP locally at least once per 12 hours; otherwise, declare the associated CS subsystem inoperable.	
7. In the event an ECCS system is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.6.B.4 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.	

3.5 - LIMITING CONDITIONS FOR OPERATION

B. Emergency Core Cooling System - Shutdown

At least two of the following four subsystems/loops shall be OPERABLE[a]:

1. One or both core spray (CS) subsystems with:

   a. An OPERABLE flow path capable of taking suction from at least one of the following water sources and transferring the water through the spray sparger to the reactor vessel:

      1) From the suppression chamber, or

      2) When the suppression chamber water level is less than the limit or is drained, from the condensate storage tank containing at least 140,000 available gallons of water.

2. One or both low pressure coolant injection (LPCI) subsystem loops with a subsystem loop comprised of:

   a. At least one OPERABLE LPCI pump, and

   b. An OPERABLE flow path capable of taking suction from at least one of the following water sources and transferring the water to the reactor vessel:

      1) From the suppression chamber, or

4.5 - SURVEILLANCE REQUIREMENTS

B. Emergency Core Cooling System - Shutdown

The required ECCS shall be demonstrated OPERABLE per Surveillance Requirement 4.5.A, except:

1. The LPCI subsystems cross-tie valves may be closed.

2. Each LPCI pump develops the required flow when tested pursuant to Specification 4.0.E.

---

a One LPCI subsystem may be aligned for decay heat removal and considered OPERABLE for the ECCS function, if it can be manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS

2) When the suppression chamber water level is less than the limit or is drained, from the condensate storage tank containing at least 140,000 available gallons of water.

APPLICABILITY:

OPERATIONAL MODE(s) 4 and 5[(b)].

ACTION:

1. With one of the above required subsystems/loops inoperable, restore at least two subsystems/loops to OPERABLE status within 4 hours or suspend all operations with a potential for draining the reactor vessel.
2. With both of the above required subsystems/loops inoperable, suspend CORE ALTERATION(s) and all operations with a potential for draining the reactor vessel. Restore at least one subsystem/loop to OPERABLE status within 4 hours or establish SECONDARY CONTAINMENT INTEGRITY within the next 8 hours.

---

b The ECCS is not required to be OPERABLE provided that the reactor vessel head is removed, the cavity is flooded, the spent fuel pool gates are removed, and water level is maintained within the limits of Specification 3.10.G and 3.10.H.

3.5 - LIMITING CONDITIONS FOR OPERATION

C. Suppression Chamber

The suppression chamber shall be OPERABLE:

1. In OPERATIONAL MODE(s) 1, 2, and 3 with a contained water volume equivalent to a water level of ≥14' 1" above the bottom of the suppression chamber.

2. In OPERATIONAL MODE(s) 4 and 5[a] with a contained volume equivalent to a water level of ≥7' above the bottom of the suppression chamber, except that the suppression chamber level may be less than the limit provided that:

   a. No operations are performed that have a potential for draining the reactor vessel,

   b. The reactor mode switch is locked in the Shutdown or Refuel position,

   c. The condensate storage tank contains ≥140,000 available gallons of water, and

   d. The ECCS systems are OPERABLE per Specification 3.5.B.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2, 3, 4 and 5[a].

4.5 - SURVEILLANCE REQUIREMENTS

C. Suppression Chamber

The suppression chamber shall be determined OPERABLE by verifying:

1. For OPERATIONAL MODE(s) 1, 2 and 3, at least once per 24 hours, the water level to be ≥14' 1".

2. For OPERATIONAL MODE(s) 4 or 5[a], at least once per 12 hours:

   a. The water level to be ≥7', or

   b. Verify the alternate conditions of Specification 3.5.C.2, or the conditions of footnote (a), to be satisfied.

---

a The suppression chamber is not required to be OPERABLE provided that the reactor vessel head is removed, the cavity is flooded or being flooded from the suppression pool, the spent fuel pool gates are removed when the cavity is flooded, and the water level is maintained within the limits of Specification 3.10.G and 3.10.H.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS

ACTION:

1. In OPERATIONAL MODE(s) 1, 2, or 3 with the suppression chamber water level less than the above limit, restore the water level to within the limit 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) 4 or 5[a] with the suppression chamber water level less than the above limit or drained and the above required conditions not satisfied, suspend CORE ALTERATION(s) and all operations that have a potential for draining the reactor vessel and lock the reactor mode switch in the Shutdown position. Establish SECONDARY CONTAINMENT INTEGRITY within 8 hours.

---

a The suppression chamber is not required to be OPERABLE provided that the reactor vessel head is removed, the cavity is flooded or being flooded from the suppression pool, the spent fuel pool gates are removed when the cavity is flooded, and the water level is maintained within the limits of Specification 3.10.G and 3.10.H.

3.5 - LIMITING CONDITIONS FOR OPERATION

D. Reactor Core Isolation Cooling System

The reactor core isolation cooling (RCIC) system shall be OPERABLE with an OPERABLE flow path capable of automatically taking suction from the suppression chamber and transferring the water to the reactor pressure vessel.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3 with reactor steam dome pressure >150 psig.

ACTION:

With the RCIC system inoperable, operation may continue provided the HPCI system is OPERABLE; restore the RCIC system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.

4.5 - SURVEILLANCE REQUIREMENTS

D. Reactor Core Isolation Cooling System

The RCIC system shall be demonstrated OPERABLE:

1. At least once per 31 days by:

   a. Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water.

   b. 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.

   c. Verifying that the pump flow controller is in the correct position.

2. At least once per 92 days, when tested pursuant to 4.0.E, by verifying that the RCIC pump develops a flow of ≥400 gpm in the test flow path with a system head corresponding to reactor vessel operating pressure when steam is being supplied to the turbine between 920 and 1005 psig[a].

3. At least once per 18 months by:

   a. Performing a system functional test which includes simulated automatic actuation and restart and verifying that each automatic valve in the flow path actuates to its correct position. Actual injection of coolant into the reactor vessel may be excluded.

---

a The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

3.5 - LIMITING CONDITIONS FOR OPERATION	4.5 - SURVEILLANCE REQUIREMENTS
	b. Verifying that the system will develop a flow of ≥400 gpm in the test flow path when steam is supplied to the turbine at a pressure between 250 and 325 psig[a].
	c. Verifying that the suction for the RCIC system is automatically transferred from the condensate storage tank to the suppression pool on a condensate storage tank water level - low signal and on a suppression pool water level - high signal.

a The provisions of Specification 4.0.D are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

BASES

3/4.5.A ECCS - Operating

3/4.5.B ECCS - Shutdown

The Core Spray (CS) system, together with the Low Pressure Coolant Injection (LPCI) subsystem, is provided to assure that the core is adequately cooled following a loss-of-coolant accident (LOCA) and provides adequate core cooling capacity for all break sizes up to and including the double-ended reactor recirculation line break, and for smaller breaks following depressurization by the Automatic Depressurization System (ADS).

The CS system is a primary source of emergency core cooling after the reactor vessel is depressurized and a source for flooding of the core in case of accidental draining.

The surveillance requirements provide adequate assurance that the CS system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete system functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment.

The Low Pressure Coolant Injection (LPCI) subsystem is provided to assure that the core is adequately cooled following a loss-of-coolant accident. The LPCI subsystem with a minimum of three pumps will provide adequate core flooding for all break sizes up to and including the double-ended reactor recirculation line break, and for small breaks following depressurization by the ADS.

The surveillance requirements provide adequate assurance that the LPCI subsystem will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete system functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment.

The High Pressure Coolant Injection (HPCI) system is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the reactor coolant system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCI system permits the reactor to be shutdown while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCI system continues to operate until reactor vessel pressure is below the pressure at which CS operation or LPCI subsystem operation maintains adequate core cooling.

The capacity of the system is selected to provide the required core cooling. The HPCI pump is designed to deliver greater than or equal to 5000 gpm at steam supply pressures between 1150 and 150 psig. Suction piping for the system is provided from the condensate storage tank and the suppression pool. Pump suction for HPCI is normally aligned to the condensate storage tank source to minimize injection of suppression pool water into the reactor vessel. However, if the condensate storage tank water supply is low, an automatic transfer to the suppression pool water source ensures a water supply for continuous operation of the HPCI system.

With the HPCI system inoperable, adequate core cooling is assured by the OPERABILITY of the redundant and diversified Automatic Depressurization System and both the CS system and LPCI subsystem. In addition, the Reactor Core Isolation Cooling (RCIC) system, a system for which no credit is taken in the safety analysis, will automatically initiate on a reactor low water level condition. The HPCI out-of-service period of 14 days is based on the demonstrated OPERABILITY of redundant and diversified low pressure core cooling systems and the RCIC system.

The surveillance requirements provide adequate assurance that the HPCI system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete system functional test requires a reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to provide cooling at the earliest moment.

Upon failure of the HPCI system to function properly after a small break loss-of-coolant, the Automatic Depressurization System (ADS) automatically causes all OPERABLE main steamline relief valves to open, depressurizing the reactor so that flow from the low pressure core cooling systems can enter the core in time to limit fuel cladding temperature to less than 2200°F. ADS is conservatively required to be OPERABLE whenever reactor vessel pressure exceeds 150 psig. This pressure is substantially below that for which the low pressure core cooling systems can provide adequate core cooling for events requiring ADS.

ADS automatically controls the five main steamline relief valves although the safety analyses support a minimum of 4 OPERABLE valves. It is therefore appropriate to permit one valve to be out-of-service for up to 14 days without materially reducing system reliability.

To preserve single failure criteria, a minimum of two independent OPERABLE low-pressure ECCS subsystems/loops are required in OPERATIONAL MODE(s) 4 and 5 to ensure adequate vessel inventory makeup in the event of an inadvertent vessel draindown. Only a single LPCI pump is required per loop because of the large injection capacity. All of the ECCS may be inoperable provided the reactor head is removed, the reactor cavity is flooded, the spent fuel gates are removed, and the water level is maintained within the limits required by the Refueling Operations specifications.

3/4.5.C Suppression Chamber

The suppression chamber is required to be OPERABLE as part of the ECCS to ensure that a sufficient supply of water is available to the HPCI and CS systems and the LPCI subsystem in the event of a LOCA. This limit on suppression chamber minimum water volume ensures that sufficient water is available to permit recirculation cooling flow to the core. The OPERABILITY of the suppression chamber in OPERATIONAL MODE(s) 1, 2 or 3 is also required by Specification 3.7.G.

Repair work might require making the suppression chamber inoperable. This specification will permit those repairs to be made and concurrently provide assurance that the irradiated fuel has an

adequate cooling water supply when the suppression chamber must be made inoperable, including draining, in OPERATIONAL MODE(s) 4 or 5.

In OPERATIONAL MODE(s) 4 and 5 the suppression chamber minimum required water volume is reduced because the reactor coolant is maintained at or below 212°F. Since pressure suppression is not required below 212°F, the minimum water volume is based on net positive suction head (NPSH), recirculation volume and vortex prevention plus a safety margin for conservatism. With the suppression chamber water level less than the required limit, all ECCS subsystems are inoperable unless they are aligned to an OPERABLE condensate storage tank. When the suppression chamber level is less than 7 feet, the CS system or the LPCI subsystem is considered OPERABLE only if it can take suction from the condensate storage tank, and the condensate storage tank water level is sufficient to provide the required NPSH for the CS or LPCI pumps. Therefore, a verification that either the suppression chamber water level is greater than or equal to 7 feet or that CS or LPCI is aligned to take suction from the condensate storage tank and the condensate storage tank contains greater than or equal to 140,000 gallons of water, ensures CS or LPCI can supply at least 50,000 gallons of make-up water to the reactor pressure vessel. The CS suction is uncovered at the 90,000 gallon level.

3/4.5.D Reactor Core Isolation Cooling

The Reactor Core Isolation Cooling (RCIC) system is provided to supply continuous makeup water to the reactor core when the feedwater system is isolated from the turbine and when the feedwater system is not available. Under these conditions, the pumping capacity of the RCIC system is sufficient to maintain the water level above the core without any other water system in operation. If the water level in the reactor vessel decreases to the RCIC initiation level, the system automatically starts. The system may also be manually initiated at any time. The RCIC system is conservatively required to be OPERABLE whenever reactor pressure exceeds 150 psig even though the LPCI mode of the residual heat removal (RHR) system provides adequate core cooling up to 350 psig.

The RCIC system specifications are applicable during OPERATIONAL MODE(s) 1, 2 and 3 when reactor vessel pressure exceeds 150 psig because RCIC is the primary non-ECCS source of core cooling when the reactor is pressurized.

The HPCI subsystem provides an alternate method of supplying makeup water to the reactor should the normal feedwater become unavailable. Therefore, the specification calls for an OPERABILITY check of the HPCI subsystem should the RCIC system be found to be inoperable.

The surveillance requirements provide adequate assurance that RCIC will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation during reactor operation, a complete functional test requires a reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to start cooling at the earliest possible moment.