

ATTACHMENT A

Quad Cities Unit 1

Proposed Amendment to DPR-29
Technical Specifications

Revised Pages: 3.5/4.5-3
3.5/4.5-12

QUAD-CITIES
DPR-29

continued reactor operation is permissible only during the succeeding 7 days unless it is sooner made operable, provided that during such 7 days all active components of both core spray subsystems, the containment cooling mode of the RHR (including two RHR pumps), and the diesel generators required for operation of such components if no external source of power were available shall be operable.

6. If the requirements of Specification 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated, and the reactor shall be in the cold shutdown condition within 24 hours.

B. Containment Cooling Mode of the RHR System

1.a. Both loops of the containment cooling mode of the RHR system, as defined in the bases for Specification 3.5.B, shall be operable whenever irradiated fuel is in the reactor vessel and prior to reactor startup from a cold condition.

1.b. From the effective date of this amendment until June 1, 1982, the "A" loop of the containment cooling mode of the RHR system for each reactor may share the Unit 2 "A" and "B" RHR service water pumps using cross tie line 1/2-10124-16"-D. Consequently, the requirements of Specifications 3.5.B.2 and 3.5.B.3 will impose the corresponding surveillance testing of equipment associated with both reactors if the shared RHR service water pump or pumps, or the cross tie line, are made or found to be inoperable.

2. From and after the date that one of the RHR service water pumps is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 30 days unless such pump is sooner made operable, provided that during such 30 days all other active components of the containment cooling mode of the RHR system are operable.

containment cooling mode of the RHR, and the diesel generators required for operation of such components if no external source of power were available shall be demonstrated to be operable immediately and daily thereafter.

B. Containment Cooling Mode of the RHR System

Surveillance of the containment cooling mode of the RHR system shall be performed as follows:

1. RHR service water subsystem testing:

<i>Item</i>	<i>Frequency</i>
a. Pump and valve operability	Once/3 months
b. Flow rate test - each RHR service water pump shall deliver at least 3500 gpm against a pressure of 198 psig	After pump maintenance and every 3 months
c. A logic system functional test	Each refueling outage

2. When it is determined that one RHR service water pump is inoperable, the remaining components of that loop and the other containment cooling loop of the RHR system shall be demonstrated to be operable immediately and daily thereafter.

Should the loss of one RHR pump occur, a nearly full complement of core and containment cooling equipment is available. Three RHR pumps in conjunction with the core spray subsystem will perform the core cooling function. Because of the availability of the majority of the core cooling equipment, which will be demonstrated to be operable, a 30-day repair period is justified. If the LPCI mode of the RHR system is not available, at least two RHR pumps must be available to fulfill the containment cooling function. The 7-day repair period is set on this basis.

B. RHR Service Water

The containment cooling mode of the RHR system is provided to remove heat energy from the containment in the event of a loss-of-coolant accident. For the flow specified, the containment long-term pressure is limited to less than 8 psig and is therefore more than ample to provide the required heat-removal capability (reference SAR Section 5.2.3.2).

The Containment Cooling mode of the RHR System consists of two loops. Each loop consists of 1 Heat Exchanger, 2 RHR Pumps, and the associated valves, piping, electrical equipment, and instrumentation. The "B" loop on each unit contains 2 RHR Service Water Pumps. During the period from November 24, 1981, to June 1, 1982, the "A" loop on each unit may utilize the "A" and "B" RHR Service Water Pumps from Unit 2 via a cross-tie line. After June 1, 1982, each "A" loop will contain 2 RHR Service Water Pumps.

Either set of equipment is capable of performing the containment cooling function. Loss of one RHR service water pump does not seriously jeopardize the containment cooling capability, as any one of the remaining three pumps can satisfy the cooling requirements. Since there is some redundancy left, a 30-day repair period is adequate. Loss of one loop of the containment cooling mode of the RHR system leaves one remaining system to perform the containment cooling function. The operable system is demonstrated to be operable each day when the above condition occurs. Based on the fact that when one loop of the containment cooling mode of the RHR system becomes inoperable, only one system remains, which is tested daily, a 7-day repair period was specified.

C. High-Pressure Coolant Injection

The high-pressure coolant injection subsystem is provided to adequately cool the core for all pipe breaks smaller than those for which the LPCI mode of the RHR system or core spray subsystems can protect the core.

The HPCI meets this requirement without the use of offsite electrical power. For the pipe breaks for which the HPCI is intended to function, the core never uncovers and is continuously cooled, thus no cladding damage occurs (reference SAR Section 6.2.5.3). The repair times for the limiting conditions of operation were set considering the use of the HPCI as part of the isolation cooling system.

D. Automatic Pressure Relief

The relief valves of the automatic pressure relief subsystem are a backup to the HPCI subsystem. They enable the core spray subsystem or LPCI mode of the RHR system to provide protection against the small pipe break in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to actuate the core spray subsystems or LPCI mode of the RHR system. The core spray subsystem and/or the LPCI mode of the RHR system provide sufficient flow of coolant to limit fuel cladding temperatures to less than 2200°F, to assure that core geometry remains intact, to limit the core wide clad metal-water reaction to less than 1%, and to limit the calculated local metal-water reaction to less than 17%.

Loss of 1 of the relief valves affects the pressure relieving capability and, therefore, a 7 day repair period is specified. Loss of more than one relief valve significantly reduces the pressure relief capability, thus a 24-hour repair period is specified based on the HPCI system availability during this period.

E. RCIC

The RCIC system is provided to supply continuous makeup water to the reactor core when the reactor 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.

ATTACHMENT B

Quad Cities Unit 2

Proposed Amendment to DPR-30
Technical Specifications

Revised Pages: 3.5/4.5-3
3.5/4.5-11

**QUAD-CITIES
DPR-30**

continued reactor operation is permissible only during the succeeding 7 days unless it is sooner made operable, provided that during such 7 days all active components of both core spray subsystems, the containment cooling mode of the RHR (including two RHR pumps), and the diesel generators required for operation of such components if no external source of power were available shall be operable.

6. If the requirements of Specification 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated, and the reactor shall be in the cold shutdown condition within 24 hours.

B. Containment Cooling Mode of the RHR System

1.a. Both loops of the containment cooling mode of the RHR system, as defined in the bases for Specification 3.5.B, shall be operable whenever irradiated fuel is in the reactor vessel and prior to reactor startup from a cold condition.

1.b. From the effective date of this amendment until June 1, 1982, the "A" loop of the containment cooling mode of the RHR system for each reactor may share the Unit 2 "A" and "B" RHR service water pumps using cross tie line 1/2-10124-16"-D. Consequently, the requirements of Specifications 3.5.B.2 and 3.5.B.3 will impose the corresponding surveillance testing of equipment associated with both reactors if the shared RHR service water pump or pumps, or the cross tie line, are made or found to be inoperable.

2. From and after the date that one of the RHR service water pumps is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 30 days unless such pump is sooner made operable, provided that during such 30 days all other active components of the containment cooling mode of the RHR system are operable.

containment cooling mode of the RHR, and the diesel generators required for operation of such components if no external source of power were available shall be demonstrated to be operable immediately and daily thereafter.

B. Containment Cooling Mode of the RHR System

Surveillance of the containment cooling mode of the RHR system shall be performed as follows:

1. RHR service water subsystem testing:

<i>Item</i>	<i>Frequency</i>
a. Pump and valve operability	Once/3 months
b. Flow rate test - each RHR service water pump shall deliver at least 3500 gpm against a pressure of 198 psig	After pump maintenance and every 3 months
c. A logic system functional test	Each refueling outage

2. When it is determined that one RHR service water pump is inoperable, the remaining components of that loop and the other containment cooling loop of the RHR system shall be demonstrated to be operable immediately and daily thereafter.

3.5 LIMITING CONDITIONS FOR OPERATION BASES

A. Core Spray and LPCI Mode of the RHR System

This specification assures that adequate emergency cooling capability is available.

- Based on the loss-of-coolant analyses included in References 1 and 2 and in accordance with 10 CFR 50.46 and Appendix K, core cooling systems provide sufficient cooling to the core to dissipate the energy associated with the loss-of-coolant accident, to limit the calculated peak cladding temperature to less than 2200° F, to assure that core geometry remains intact, to limit the corewide cladding metal-water reaction to less than 1%, and to limit the calculated local metal-water reaction to less than 17%.

The allowable repair times are established so that the average risk rate for repair would be no greater than the basic risk rate. The method and concept are described in Reference 3. Using the results developed in this reference, the repair period is found to be less than half the test interval. This assumes that the core spray subsystems and LPCI constitute a one-out-of-two system; however, the combined effect of the two systems to limit excessive cladding temperature must also be considered. The test interval specified in Specification 4.5 was 3 months. Therefore, an allowable repair period which maintains the basic risk considering single failures should be less than 30 days, and this specification is within this period. For multiple failures, a shorter interval is specified; to improve the assurance that the remaining systems will function, a daily test is called for. Although it is recognized that the information given in Reference 3 provides a quantitative method to estimate allowable repair times, the lack of operating data to support the analytical approach prevents complete acceptance of this method at this time. Therefore, the times stated in the specific items were established with due regard to judgment.

Should one core spray subsystem become inoperable, the remaining core spray subsystem and the entire LPCI mode of the RHR system are available should the need for core cooling arise. To assure that the remaining core spray, the LPCI mode of the RHR system, and the diesel generators are available, they are demonstrated to be operable immediately. This demonstration includes a manual initiation of the pumps and associated valves and diesel generators. Based on judgments of the reliability of the remaining systems, i.e., the core spray and LPCI, a 7-day repair period was obtained.

Should the loss of one RHR pump occur, a nearly full complement of core and containment cooling equipment is available. Three RHR pumps in conjunction with the core spray subsystem will perform the core cooling function. Because of the availability of the majority of the core cooling equipment, which will be demonstrated to be operable, a 30-day repair period is justified. If the LPCI mode of the RHR system is not available, at least two RHR pumps must be available to fulfill the containment cooling function. The 7-day repair period is set on this basis.

B. RHR Service Water

The containment cooling mode of the RHR system is provided to remove heat energy from the containment in the event of a loss-of-coolant accident. For the flow specified, the containment long-term pressure is limited to less than 8 psig and is therefore more than ample to provide the required heat-removal capability (reference SAR Section 5.2.3.2).

The Containment Cooling mode of the RHR System consists of two loops. Each loop consists of 1 Heat Exchanger, 2 RHR Pumps, and the associated valves, piping, electrical equipment, and instrumentation. The "B" loop on each unit contains 2 RHR Service Water Pumps. During the period from November 24, 1981, to June 1, 1982, the "A" loop on each unit may utilize the "A" and "B" RHR Service Water Pumps from Unit 2 via a cross-tie line. After June 1, 1982, each "A" loop will contain 2 RHR Service Water Pumps.

Either set of equipment is capable of performing the containment cooling function. Loss of one RHR service water pump does not seriously jeopardize the containment cooling capability, as any one of the remaining three pumps can satisfy the cooling requirements. Since there is some redundancy left, a 30-day repair period is adequate. Loss of one loop of the containment cooling mode of the RHR system leaves one remaining system to perform the containment cooling function. The operable system is demonstrated to be operable each day when the above condition occurs.

ATTACHMENT C
SAFETY ANALYSIS OF THE CROSSTIED SYSTEM

Pursuant to Title 10, Code of Federal Regulations, Part 50.59 a safety analysis of the crosstied system has been performed. It has been determined that this modification does not involve an unreviewed safety question as defined in 10CFR50.59 (c) and the basis for this determination are presented for your review.

1. The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report will not be increased. Since the RHR Service Water system is designed to mitigate the consequences of an accident, the probability of occurrence of an accident is not increased by failure of any components in this system.

As described in Section 6, Amendments 16 and 17 to the FSAR, only one RHR and one RHI Service Water pumps are required to provide containment cooling following a loss of coolant accident. A similar combination of equipment is adequate on the remaining unit to place and maintain the reactor in the cold shutdown condition. This minimum combination of equipment is only experienced in the degraded conditions of loss of off-site power,

loss of coolant accident on one unit, and failure of a diesel generator to start. Since the modification does not reduce the minimum RHR Service Water system availability as described in the FSAR, the consequences of an accident or malfunction of equipment important to safety are not increased. As will be addressed in greater detail later, redundancy of pumps remains at the original design basis of 100%.

2. The possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report is not created. This crosstie modification merely shares two RHR Service Water pumps between Units 1 and 2 in the same manner as their emergency power supply, the 1/2 diesel generator, is shared between the two units. The crosstie does not require the addition of active components, electrical interlocks, etc. The two valves being installed are for the purpose of heat exchanger inlet valve maintenance only. Without these two valves, maintenance of one inlet valve would require a containment cooling loop out of service on each unit.
3. The margin of safety as defined in the basis for any technical specification is not reduced. Since one containment cooling loop per unit composed of one RHR and one RHR Service Water pump has been previously analyzed as adequate and since

only one RHR Service Water pump can be operated on a diesel generator, the reduction from a total of eight pumps to six has no effect on the margin of safety. This is evident when examining the piping and the electrical diagrams. The Unit 1 diesel generator supplies the Unit 1 "C" or "D" pumps. The Unit 2 diesel generator supplies the Unit 2 "C" or "D" pumps. The Unit 1/2 diesel generator supplies the "A" or "B" pumps on either Unit 1 or Unit 2 depending on which unit is postulated to have the loss of coolant accident. Therefore, only six of the eight pumps are truly available and only three can be operated if all diesels are available. Identical redundancy is present under the crosstied scheme; six pumps are available but only three can be operated if all diesels are available.

Similarly, the worst case analyzed in the PSAR assumes an accident on one unit, loss of off-site power, and failure of any one of the three diesel generators to start. This set of conditions results in operability of two RHR Service Water pumps, one per unit. The same results exist in the crosstied condition.

It is therefore concluded that an unreviewed safety question does not exist and that the station can be operated with the "A" RHR Service Water loop of each unit permanently crosstied with no degradation of the original margin of safety.