	e. Core spray header Δp instrumentation	
	check	Once/day
	calibrate	Once/3 months
	test	Once/3 months
	f. Logic system functional test	Each refueling outage
2. From and after the date that one of the core spray subsystems is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 7 days unless such subsystem is sooner made operable, provided that during such 7 days all active components of the other core spray subsystem and the LPCI mode of the RHR system and the diesel generators required for operation of such components if no external source of power were available shall be operable.	2. When it is determined that one core spray subsystem is inoperable, the operable core spray subsystem, the LPCI mode of the RHR system, 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. The operable core spray subsystem shall be demonstrated to be operable daily thereafter.
3. The LPCI mode of the RHR system shall be operable whenever irradiated fuel is in the reactor vessel and prior to reactor startup from a cold condition.	3. LPCI mode of the RHR system testing shall be as specified in Specifications 4.5.A.1.a, b, c, d, and f except that three RHR pumps shall deliver at least 14500 gpm against a system head corresponding to a reactor vessel pressure of 20 psig.
4a. From and after the date that one of the RHR 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 the remaining active components of the LPCI mode of the RHR, containment cooling mode of the RHR, all active components of both core spray subsystems and the diesel generators required for operation of such components if no external source of power were available shall be operable.	4. When it is determined that one of the RHR pumps is inoperable, the remaining active components of the LPCI mode of the RHR, containment cooling mode of the RHR, both core spray subsystems, 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 the operable RHR pumps daily thereafter.

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4b. From the effective date of this amendment until September 1, 1985, one RHR pump may be inoperable and continued reactor operation is permissible during the succeeding 60 days with the same restrictions as 3.5.A.4.a above.

5. From and after that the date the LPCI mode of the RHR system is made or found to be inoperable for any reason,

5. When it is determined that the LPCI mode of the RHR system is inoperable, both core spray subsystems, the

3.5 LIMITING CONDITION FOR OPERATION BASES

A. Core Spray and LPCI Mode of the RHR System

This specification assures that adequate emergency cooling capability is available whenever irradiated fuel is in the reactor vessel.

Based on the loss-of-coolant analytical methods described in General Electric Topical Report NEDO-20566 and the specific analysis in Reference 1, core cooling systems provide sufficient cooling to the core to dissipate the energy associated with the loss-of-coolant accident, to limit calculated fuel cladding temperature to less than 2200°F, to assure that core geometry remains intact, to limit cladding metal-water reaction to less than 1%, and to limit the calculated local metal-water reaction to less than 17%.

The limiting conditions of operation in Specifications 3.5.A.1 through 3.5.A.6 specify the combinations of operable subsystems to assure the availability of the minimum cooling systems noted above. No single failure of ECCS equipment occurring during a loss-of-coolant accident under these limiting conditions of operation will result in inadequate cooling of the reactor core.

Core spray distribution has been shown, in full-scale tests of systems similar in design to that of Quad-Cities 1 and 2, to exceed the minimum requirement by at least 25%. In addition, cooling effectiveness has been demonstrated at less than half the rated flow in simulated fuel assemblies with heater rods to duplicate the decay heat characteristics of irradiated fuel. The accident analysis is additional conservative in that no credit is taken for spray cooling of the reactor core before the internal pressure has fallen to 90 psig.

The LPCI mode of the RHR system is designed to provide emergency cooling to the core by flooding in the event of a loss-of-coolant accident. This system functions in combination with the core spray system to prevent excessive fuel cladding temperature. The LPCI mode of the RHR system in combination with the core spray subsystem provides adequate cooling for break areas of approximately 0.2 ft^2 up to and including 4.18 ft^2, the latter being the double-ended recirculation line break with the equalizer line between the recirculation loops closed without assistance from the high-pressure emergency core cooling subsystems.

The allowable repair times are established so that the average risk rate for repair would be no greater than the basic 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. During the period from July 1 to September 1, 1985, the repair period for one RHR pump may be extended to 60 days. This temporary extension of the repair period does not add a significant risk to the basic risk. 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 1 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 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.

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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 July 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 July 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.

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.

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.

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.

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For core flow rates less than rated, the steady state MCPR is increased by the formula given in the specification. This ensures that the MCPR will be maintained greater than that specified in Specification 1.1.A even in the event that the motor-generator set speed controller causes the scoop tube positoner for the fluid coupler to move to the maximum speed position.

References

1. "Loss-of-Coolant Analysis Report for Dresden Units 2, 3, and Quad Cities Units 1, 2 Nuclear Power Stations," NEDO-24146A*, April, 1979

2. "Generic Reload Fuel Application," NEDE-24011-P-A**

3. I. M. Jacobs and P. W. Marriott, GE Topical Report APED 5736, "Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards," April, 1969.

4. "Qualification of the One-Dimensional Core Transient Model for Boiling Water Reactors" General Electric Co. Licensing Topical Report NEDO 24154 Vols. I and II and NEDE-24154 Vol. III as supplemented by letter dated September 5, 1980 from R. H. Buchholz (GE) to P. S. Check (NRC).

5. Letter, R. H. Buchholz (GE) to P. S. Check (NRC) dated January 19, 1981 "ODYN Adjustment Methods For Determination of Operating Limits".

* Approved revision at time of plant operation.

** Approved revision number at time reload fuel analyses are performed.

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Post Office Box 767
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July 15, 1985

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CFR 50.59, Commonwealth Edison proposes to amend
cification, to Facility Operating License NPF-11.
ubmitted for your staff's review and approval.

ovides background and discussion. The proposed
achment B. The attached change has received both
ew and approval. We have reviewed this amendment
significant hazards consideration exists. Our
ttachment C.

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cessary to more adequately utilize the core. This
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with the requirements of 10 CFR 50.170, a fee
of $150.00 is enclosed.

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Rec'd w/check $150.00
#10266

Please direct any questions you may have concerning this matter to this office.

Three (3) signed originals and thirty-seven (37) copies of this transmittal and its attachments are provided for your use.

Very truly yours,

H. L. Massin
Nuclear Licensing Administrator

lm

Attachments A: Background and Discussion
B: Technical Specification Change to NPF-11
C: Evaluation of Significant Hazards Consideration

cc: Region III Inspector - LSCS
A. Bournia - NRR
G. Wright - State of Ill

SUBSCRIBED AND SWORN to
before me this 15th day
of July, 1985

Notary Public

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