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May 21, 1971

Dr. Peter A. Morris, Director
Division of Reactor Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545

Regulatory File Cy.

Subject: Proposed Change No. 12 to Appendix A, DPR-19, AEC Dkt 50-237

Dear Dr. Morris:

Pursuant to Section 50.59 of 10 CFR Part 50 and paragraph 3.B of Facility License DPR-19, Commonwealth Edison Company hereby submits Proposed Change No. 12 to Appendix A of DPR-19 (Dresden Unit 2). The purpose of this change is to update the technical specification requirements which have resulted from changes made to the plant. These changes were made to eliminate operating problems which have been found on Dresden Unit 2 and reported to you in Special Report Nos. 1, 7, and 13, and Supplementary Information to these reports. The technical specification changes include technical specifications to ensure that the core spray, LPCI, and HPCI discharge lines will be maintained full of water, that long-term core cooling capability will be maintained, that excessive vibration of the jet pump riser does not occur, and that the isolation valves on the drywell pneumatic supply system are included in Table 3.7.1. The specific changes to the technical specifications are included in the attached pages.

The safety evaluation for each of the above items is included below:

1 - Maintenance of filled ECCS discharge piping. If the discharge piping of the ECCS are not maintained in a full condition, a water hammer problem can occur. A water hammer problem has occurred in the discharge piping of the core spray system as a result of not maintaining this line in a full condition. An analysis has been performed which shows that if a water hammer were to occur when any of these systems is called upon to operate, the system would function in accordance with the design. However, to provide additional assurance that the system will perform as designed and to eliminate any damage which could occur from a water hammer, technical specifications are being proposed which

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will assure that the discharge piping of the ECCS is maintained in a full condition. For the core spray and LPCI systems, this will be accomplished by providing a jockey pump which will take suction from the torus and maintain the discharge piping in a filled condition. The surveillance requirements of the specification require that these piping systems be vented on a periodic basis from their high point to ensure that the lines are filled. The HPCI normally takes suction from the condensate storage tank. The elevation of this tank is such that it is above the elevation of the discharge piping of the HPCI. Thus, maintenance of a filled discharge line is assured. The HPCI, however, has an alternate suction from the torus and in this mode some of the discharge piping is above the elevation of the normal water level in the torus. To ensure that this line is maintained in a filled condition when suction is being taken from the torus, surveillance requirements have been added to provide surveillance of this line so that it will be maintained in a filled condition.

2 - Long-term core cooling capability. Based on discussions with members of your Staff and General Electric, it is our understanding that the LPCI system cannot maintain clad temperatures as low as the core spray system for the long-term; i.e., greater than an hour. To ensure that in the long-term the core is maintained at the coolest possible temperature, the out-of-service specifications on the core spray system are being revised to allow one core spray system to be out-of-service for a period of 7 days. Previously, this period had been 15 days. This reduction in the out-of-service requirement gives a high probability that one of the core spray systems will be available when required and will be capable of thus maintaining clad temperatures at their lowest value.

3 - Recirculation pump speed interlocks. During the start-up of Dresden Unit 2 the vibration test program showed that the jet pump riser brace experienced high vibration whenever a mismatch in pump speed between the recirculation pumps occurred. This vibration problem can occur when pump speeds are mismatched during normal operation or following a pump trip when an attempt is made to start the inoperable pump. The proposed technical specifications impose limitations on the mismatch in pump speed which

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prevent the pump from getting into a condition in which excessive vibrations could occur. In addition, the technical specifications also impose limits on the speed at which an operating pump must be at in order to start an idle pump. Information on this subject was discussed more fully in the report submitted to you on May 14, 1971 entitled "Supplementary Information for Dresden 2 Special Report No. 1 Recirculation System Operation Limits".

4 - Isolation Valves on the drywell pneumatic supply system. A separate compressor has been added to the plant to supply air to the air operated equipment including the main steam line isolation valves within the drywell. Part of this equipment is outside the containment and therefore air lines must penetrate the containment and these lines are thus required to have automatic isolation valves. The drywell pneumatic supply system has been supplied with such isolation valves. These valves are Group II isolation valves and will isolate upon receipt of a reactor water low level signal or drywell high pressure signal. These valves are being added to Table 3.7.1 of the technical specifications to ensure their operability and surveillance.

In our opinion, the proposed change does not result in hazards different from or greater than those analyzed in the Final Safety Analysis Report. Specifically, there is (1) no increase in the probability of, or (2) no increase in the possible consequences of, or (3) no creation of a credible probability of an accident or equipment malfunction different from those previously evaluated in the FSAR. Therefore, the margin of safety as defined in the Bases for any Technical Specification is not reduced.

Proposed Change No. 12 has been reviewed and approved by Commonwealth Edison's Nuclear Review Board.

In addition to three signed originals, 19 copies of this Proposed Change No. 12 are also submitted.

Very truly yours,

Byron Lee Jr

Byron Lee, Jr.
Assistant to the President

SUBSCRIBED and SWORN to
before me this 21st day
of May, 1971.

Patricia A. Nelson
Notary Public

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3.5 LIMITING CONDITION FOR OPERATION	4.5 SURVEILLANCE REQUIREMENT
	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, reactor operation is permissible only during the * succeeding seven days unless such subsystem is sooner made operable, pro- * vided that during such seven days all active components of the other core spray subsystem and the LPCI subsystem 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 and the LPCI subsystem 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.
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3. Except as specified in 3.5.A.5, 3.5.A.6 and 3.5.F.3 below, the LPCI subsystem shall be operable whenever irradiated fuel is in the reactor vessel.	3. LPCI Subsystem Testing shall be as specified in 4.5.A.1.a, b, c, d, and f, except that three LPCI pumps shall deliver at least 14500 gpm against a system head corresponding to a reactor vessel pressure of 20 psig.

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3.5 LIMITING CONDITION FOR OPERATION	4.5 SURVEILLANCE REQUIREMENTS
4. From and after the date that one of the LPCI pumps is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding thirty days unless such pump is sooner made operable, provided that during such thirty days the remaining active components of the LPCI and containment cooling subsystem and 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 LPCI Pumps is inoperable, the remaining active components of the LPCI and containment cooling subsystem, 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 LPCI pumps daily thereafter.
5. From and after the date that the LPCI subsystem is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days unless it is sooner made operable, provided that during such seven days all active components of both core spray subsystems, the containment cooling subsystem (including 2 LPCI pumps) and the diesel generators required for operation of such components if no external source of power were available shall be operable.	5. When it is determined that the LPCI subsystem is inoperable, both core spray subsystems, the containment cooling subsystem, 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.
6. Containment cooling spray loops are required to be operable when the reactor water temperature is greater than 212°F except that a maximum of one drywell spray loop may be inoperable for thirty days when the reactor water temperature is greater than 212°F.	6. During each five year period an air test shall be performed on the drywell spray headers and nozzles.
7. If the requirements of 3.5.A cannot be met, either 3.5.G shall be complied with or an orderly shutdown of the reactor shall be initiated and the reactor shall be in the Cold Shutdown condition within 24 hours.	

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condition will last longer than the periods specified, a report detailing the circumstances and the estimated date for returning the components or systems to an operable condition shall be submitted to the AEC prior to the end of the out-of-service period.

* H. Maintenance of Filled Discharge Pipe

Whenever core spray, LPCI, or HPCI ECCS are required to be operable, the discharge piping from the pump discharge of these systems to the last check valve shall be filled.

* H. Maintenance of Filled Discharge Pipe

The following surveillance requirements shall be adhered to to assure that the discharge piping of the core spray, LPCI, and HPCI are filled:

1. Every month prior to the testing of the LPCI and core spray systems, the discharge piping of these systems shall be vented from the high point and water flow observed.

2. Following any period where the LPCI or core spray subsystems have not been required to be operable, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.

3. Whenever the HPCI system is lined up to take suction from the torus, the discharge piping of the HPCI shall be vented from the high point of the system and water flow observed on a monthly basis.

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3.5 LIMITING CONDITION FOR OPERATION	4.5 SURVEILLANCE REQUIREMENT
	* 4. The pressure switches which monitor the discharge lines to ensure that they are full shall be functionally tested every month and calibrated every three months.

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need for core cooling arise. To assure that the remaining core spray and LPCI subsystems 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.

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Should the loss of one LPCI pump occur, a nearly full complement of core and containment cooling equipment is available. Three LPCI 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 subsystem is not available, at least 2 LPCI pumps must be available to fulfill the containment cooling function. The 7-day repair period is set on this basis.

B. Containment Cooling Service Water – The containment heat removal portion of the LPCI/containment cooling subsystem 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, therefore, is more than ample to provide the required heat removal capability. Ref. Section 5.2.3.2 SAR.

The containment cooling subsystem consists of two sets of 2 service water pumps, 1 heat exchanger and 2 LPCI pumps. Either set of equipment is capable of performing the containment cooling function. Loss of one containment cooling service water pump does not seriously jeopardize the containment cooling capability as any 2 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 1 containment cooling subsystem 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 facts that when one containment cooling subsystem 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 or core spray subsystems can protect the core.

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

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Dresden Units 2 and 3 share certain process systems such as the makeup demineralizers and the radwaste system and also some safety systems such as the standby gas treatment system, batteries, and diesel generators. All of these systems have been sized to perform their intended function considering the simultaneous operation of both units.

For the safety related shared features of each plant, the Technical Specifications for that unit contain the operability and surveillance requirements for the shared feature; thus, the level of operability for one unit is maintained independently of the status of the other. For example, the shared diesel (2/3 diesel) would be mentioned in the specifications for both Units 2 and 3 and even if Unit 3 were in the Cold Shutdown Condition and needed no diesel power, readiness of the 2/3 diesel would be required for continuing Unit 2 operation.

G. Extended Maintenance — Nearly all maintenance can be completed within a few days. Infrequently, however, major maintenance might be required. Replacement of principal system components cou could necessitate outages of more than the time allowed for a system or component to be out of service.

* H. Maintenance of Filled Discharge Pipe - If the discharge piping of the core spray, LPCI, and HPCI are not filled, a water hammer can develop in this piping when the pump and/or pumps are started. An analysis has been done which shows that if a water hammer were to occur at the time at which the system were required, the system would still perform its design function. However, to minimize damage to the discharge piping and to ensure added margin in the operation of these systems, this technical specification requires the discharge lines to be filled whenever the system is in an operable condition.

Bases:

4.5 The testing interval for the core and containment cooling systems is based on a quantitative reliability analysis, judgment and practicality. The core cooling systems have not been designed to be fully testable during operation. For example the core spray final admission valves do not open until reactor pressure has fallen to 350 psig thus during operation even if high drywell pressure were simulated the final valves would not open. In the case of the HPCI, automatic initiation during power operation would result in pumping cold water into the reactor vessel which is not desirable.

The systems can be automatically actuated during a refueling outage and this will be done. To increase the availability of the individual components of the core and containment cooling systems the components which make up the system; i.e., instrumentation, pumps, valve operators, etc., are tested more frequently. The instrumentation is functionally tested each month. Likewise the pumps and motor-operated valves are also tested each month to assure their operability. The combination of a yearly simulated automatic actuation test and monthly tests of the pumps and valve operators is deemed to be adequate testing of these systems.

With components or subsystems out-of-service overall core and containment cooling reliability is maintained by demonstrating the operability of the remaining cooling equipment. The degree of operability to be demonstrated depends on the nature of the reason for the out-of-service equipment. For routine out-of-service periods caused by preventative maintenance, etc., the pump and valve operability checks will be performed to demonstrate operability of the remaining components. However, if a failure, design deficiency, etc., caused the out-of-service period, then the demonstration of operability should be thorough enough to assure that a similar problem does not exist on the remaining components. For example, if an out-of-service period were caused by failure of a pump to deliver rated capacity due to a design deficiency, the other pumps of this type might be subjected to a flow rate test in addition to the operability checks.

* The surveillance requirements to ensure that the discharge piping of the core spray, LPCI, and HPCI systems are filled provides for a visual observation that water flows from a high point vent. This ensures that the line is in a full condition. Between the monthly intervals at which the lines are vented, instrumentation has been provided to monitor the presence of water in the discharge piping. This instrumentation will be calibrated on the same frequency as the safety system instrumentation. This period of periodic testing ensures that during the interval between the monthly checks the status of the discharge piping is monitored on a continuous basis.

3.6 LIMITING CONDITION FOR OPERATION	4.6 SURVEILLANCE REQUIREMENT
* H. Jet Pump Flow Mismatch 1. Whenever both recirculation pumps are in operation, pump speeds shall be maintained within 10% of each other when power level is greater than 80% and within 15% of each other when power level is less than 80%. 2. Whenever one pump is operable and the remaining pump is in a tripped condition, the operable pump shall be at a speed less than 65% before starting the inoperable pump.	

* H. Jet Pump Flow Mismatch - During the start-up of Dresden Unit 2 it was found that a flow mismatch between the two sets of jet pumps caused by a difference in recirculation pump speed of the two recirculation loops could set up a vibration condition in the jet pump riser. Investigation of this condition revealed that there was no vibration until a mismatch in speed of 27% occurred. The 10% and 15% speed mismatch restrictions provide additional margin before a pump vibration problem will occur. This speed restriction, however, was also applied to match the recirculation loop selection logic setting to the permitted recirculation flow variations between the recirculation loops. The LPCI loop selection logic has been previously described in the Dresden Nuclear Power Station Units 2 and 3 FSAR, Amendments 7 and 8. For some limited low probability accidents with the recirculation loop operating with large speed differences, it is possible for the logic to select the wrong loop for injection. For these limited conditions the core spray itself is adequate to prevent fuel temperatures from exceeding allowable limits. However, to limit the probability even further, a procedural limitation has been placed on the allowable variation in speed between the recirculation pumps.

TABLE 3.7.1

PRIMARY CONTAINMENT ISOLATION

Isolation Group	Valve Identification	Number of Power Operated Valves		Maximum Operating Time (sec)	Normal Position	Action on Initiating Signal
		Inboard	Outboard			
1	Main Steam Line Isolation	4	4	$3 \leq T \leq 5$	O	GC
1	Main Steam Line Drain	1		≤ 35	C	SC
1	Main Steam Line Drain		1	≤ 35	C	SC
1	Recirculation Loop Sample Line	1	1	≤ 5	O	SC
1	Isolation Condenser Vent to main steam line	1		≤ 5	O	GC
1	Isolation Condenser Vent to main steam line		1	≤ 5	O	GC
2	Drywell floor drain		2	≤ 20	O	GC
2	Drywell Equipment drain		2	≤ 20	O	GC
2	Drywell Vent		2	≤ 10	C	SC
2	Drywell Vent Relief		1	≤ 15	C	SC
2	Drywell Inert and purge line		1	≤ 10	C	SC
2	Drywell N_2 Makeup		1	≤ 15	C	SC
2	Drywell and Suppression Chamber N_2 Makeup		1	≤ 15	C	SC
2	Suppression Chamber N_2 Makeup		1	≤ 15	C	SC
2	Suppression Chamber inert and purge		1	≤ 10	C	SC
2	Drywell and Suppression chamber vent from reactor building		1	≤ 10	C	SC
2	Drywell vent to standby gas treatment system		1	≤ 10	C	SC
2	Suppression chamber vent		1	≤ 10	C	SC
2	Suppression chamber vent relief		1	≤ 15	C	SC
2	Drywell air sampling system		10	≤ 5	O	GC
* 2	Drywell Pneumatic Supply Isolation		2	≤ 10	O	GC
3	Cleanup demineralizer System	1		≤ 30	O	GC
3	Cleanup demineralizer System		2	≤ 30	O	GC
3	Shutdown cooling system	2		≤ 40	C	SC
3	Shutdown cooling system		1	≤ 40	C	SC
3	Shutdown cooling system		1	≤ 40	C	SC
3	Reactor head cooling line		1	≤ 15	C	SC
4	HPCI Turbine Steam supply	1		≤ 25	O	GC
4	HPCI Turbine Steam supply		1	≤ 25	O	GC
5	Isolation condenser steam supply	1		≤ 30	O	GC
5	Isolation condenser steam supply		1	≤ 30	O	GC
5	Isolation condenser condensate return	1		≤ 30	O	GC
5	Isolation condenser condensate return		1	≤ 30	C	SC

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