Regulatory File Cy.

Commonwealth Edison Company

ONE FIRST NATIONAL PLAZA ★ CHICAGO, ILLINOIS

Address Reply to:

POST OFFICE BOX 767 ★ CHICAGO, ILLINOIS 60690

September 27, 1971

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

Subject: Proposed Change No. 16 to Appendix A, DPR-19, AEC Dkt 50-237

Dear Dr. Morris:

Pursuant to Section 50.59 of 10 CFR 50 and paragraph 3.B of Facility License DPR-19, Commonwealth Edison Company hereby submits Proposed Change No. 16 to Appendix A of DPR-19 (Dresden Unit 2). The purpose of this change is to modify the technical specifications concerning the turbine control valve fast closure scram, surveillance of the Intermediate Range Monitors, and the addition of a rod block for the APRM and IRM. The page changes to the technical specifications are attached. A safety evaluation for the proposed change is given below.

In Proposed Change No. 11 a scram was added on loss of oil pressure to the turbine control system. Originally the scram setpoint was 1100 psig. In this change, it is proposed that the scram setpoint be equal to or greater than 900 psig. With the 1100 scram setpoint several spurious scrams occurred due to the fact that the setpoint was too close to the normal operating pressure of 1250 psig. Therefore, it is proposed that the scram be set at 900 psig which will allow adequate margin, for pressure must drop to 600 psig before the turbine control valves begin to close. Thus, there is a margin of 300 psig between the point at which scram is initiated and at which the turbine control valves actually begin to close.

At the present time, the technical specifications require that the IRM high flux and inoperative trips be functionally tested and calibrated before each startup. We have found this requirement to be excessive and unnecessary. As the reactor is started up, for example, three times in a seven day period, a functional test and calibration are required three times. The IRM instrumentation has the same drift specifications as the APRM. Therefore, as a maximum the functional test and calibration should be conducted on an interval consistent with the APRM; i.e., once per week. This frequency will provide adequate testing and calibration of this instrumentation.

Two rod block functions have been added to the technical specifications. The first is an APRM upscale rod block in the refuel and startup/hot standby mode. This rod block performs the same function as the APRM flow biased rod block; i.e., it prevents a MCHFR of less than 1.0 occurring for continuous control rod withdrawal and results in rod block before a scram occurs. In addition, the rod blocking function has been added for the IRM detector not fully inserted in the core. This rod block ensures that control rod withdrawal does not occur unless the IRM instrumentation has been inserted into the core where it can give the required protection. The above rod block functions have been added to the functional test and calibration table (Table 4.2.1).

Proposed Change No. 16 has been reviewed and approved by Commonwealth Edison's Nuclear Review Board.

In addition to three signed originals, 19 copies of this proposed change are also submitted.

Very truly yours,

Byron Lee Jr.

Byron Lee, Jr.
Assistant to the President

SUBSCRIBED and SWORN to before me this 27th day of September, 1971.

Patricia A. Nelson
Notary Public

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1.1 SAFETY LIMIT	2.1 LIMITING SAFETY SYSTEM SETTING
	H. Main Steamline Pressure initiation of main steamline isolation valve closure shall be ≤850 psig. I. Turbine Control Valve Fast Closure Scram on loss of control oil pressure shall be set * at greater than or equal to 900 psig.

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I. The turbine hydraulic control system operates using high pressure oil. There are several points in this oil system where a loss of oil pressure could result in a fast closure of the turbine control valves. This fast closure of the turbine control valves is not protected by the generator load rejection scram since failure of the oil system would not result in the fast closure solenoid valves being actuated. For a turbine control valve fast closure, the core would be protected by the APRM and high reactor pressure scrams. However, to provide the same margins as provided for the generator load rejection scram on fast closure of the turbine control valves, a scram has been added to the reactor protection system which senses failure of control oil pressure to the turbine control system. This is an anticipatory scram and results in reactor shutdown before any significant increase in pressure or neutron flux occurs. The transient response is very similar to that resulting from the generator load * rejection. The scram setpoint of 900 psig is set high enough to provide the necessary anticipatory function and low enough to minimize the number of spurious scrams. Normal operating pressure for this system is 1250 psig. Finally the control valves will not start to close until the fluid pressure is 600 psig. Therefore, the scram occurs well before valve closure begins.

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TABLE 3.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Minimum Number of Operable Inst. Channels per Trip (1) System	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable			Action*
			Refuel (7)	Startup/Hot Standby	Run	
1	Mode Switch in Shutdown		X	X	X	A
1	Manual Scram		X	X	X	A
	IRM					
3	High Flux	≤120/125 of Full Scale	X	X	X(5)	A
3	Inoperative		X	X	X(5)	A
	APRM					
2	High Flux	Specification 2.1.A.1	X	X(9)	X	A or B
2	Inoperative		X	X(9)	X	A or B
2	Downscale	≥5/125 of Full Scale	X(12)	X(12)	X(13)	A or B
2	High Flux (15% scram)	Specification 2.1.A.2	X	X	X(14)	A
2	High Reactor Pressure	≤1060 psig	X(11)	X	X	A
2	High Drywell Pressure	≤2 psig	X(8), (10)	X(8), (10)	X(10)	A
2	Reactor Low Water Level	≥1 inch***	X	X	X	A
2	High Water Level in Scram Discharge Tank	≤50 gallons	X(2)	X	X	A
2	Turbine Condenser Low Vacuum	≥23 in. Hg Vacuum	X(3)	X(3)	X	A or C
2	Main Streamline High Radiation	≤7 X Normal Full Power Background	X(3)	X(3)	X	A or C
4 (6)	Main Streamline Isolation Valve Closure	≤10% Valve Closure	X(3)	X(3)	X	A or C
2	Generator Load Rejection	****	X(4)	X(4)	X(4)	A or C
2	Turbine Stop Valve Closure	≤10% Valve Closure	X(4)	X(4)	X(4)	A or C
2	Turbine Control-Loss of control oil pressure	Greater than or equal to 900 psig	X	X	X	A or C

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TABLE 4.1.1

SCRAM INSTRUMENTATION FUNCTIONAL TESTS

MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTR. AND CONTROL CIRCUITS

Instrument Channel	Group (3)	Functional Test	Minimum Frequency (4)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
* High Flux	C	Trip Channel and Alarm (5)	Before Each Startup (6)
* Inoperative	C	Trip Channel and Alarm	Before Each Startup (6)
APRM			
High Flux	B	Trip Output Relays (5)	Once Each Week
Inoperative	B	Trip Output Relays	Once Each Week
Downscale	B	Trip Output Relays (5)	Once Each Week
High Flux (15% scram)	B	Trip output relays	Before each start-up
High Reactor Pressure	A	Trip Channel and Alarm	(1)
High Drywell Pressure	A	Trip Channel and Alarm	(1)
Reactor Low Water Level (2)	A	Trip Channel and Alarm	(1)
High Water Level in Scram Discharge Tank	A	Trip Channel and Alarm	Every 3 Months
Turbine Condenser Low Vacuum	A	Trip Channel and Alarm	(1)
Main Steamline High Radiation (2)	B	Trip Channel and Alarm (5)	Once Each Week
Main Steamline Isolation Valve Closure	A	Trip Channel and Alarm	(1)
Generator Load Rejection	A	Trip Channel and Alarm	(1)
Turbine Stop Valve Closure	A	Trip Channel and Alarm	(1)
Turbine Control-Loss of Control Oil Pressure	A	Trip channel and alarm	(1)

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TABLE 4.1.1 (cont)

Notes:

1. Initially once per month until exposure hours (M as defined on Figure 4.1.1) is 2.0×10^5; thereafter, according to Figure 4.1.1 with an interval not less than one month nor more than three months. The compilation of instrument failure rate data may include data obtained from other Boiling Water Reactors for which the same design instrument operates in an environment similar to that of Dresden Unit 3.

2. An instrument check shall be performed on low reactor water level once per day and on high steamline radiation once per shift.

3. A description of the three groups is included in the bases of this Specification.

4. Functional tests are not required when the systems are not required to be operable or are tripped. If tests are missed, they shall be performed prior to returning the systems to an operable status.

5. This instrumentation is exempted from the Instrument Functional Test Definition (1.F). This instrument Functional Test will consist of injecting a simulated electrical signal into the measurement channels.

* 6. If reactor start-ups occur more frequently than once per week, the functional test need not be performed; i.e., the maximum functional test frequency shall be once per week.

TABLE 4.1.2

SCRAM INSTRUMENT CALIBRATION

MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration Test	Minimum Frequency (2)
* High Flux IRM	C	Comparison to APRM after Heat Balance	Every Shutdown (4)
High Flux APRM			
Output Signal	B	Heat Balance	Once Every 7 Days
Flow Bias	B	Standard Pressure and Voltage Source	Refueling Outage
High Reactor Pressure	A	Standard Pressure Source	Every 3 Months
High Drywell Pressure	A	Standard Pressure Source	Every 3 Months
Reactor Low Water Level	A	Water Level	Every 3 Months
Turbine Condenser Low Vacuum	A	Standard Vacuum Source	Every 3 Months
Main Steamline High Radiation	B	Standard Current Source (3)	Every 3 Months
Turbine Control-Loss of Control Oil Pressure	A	Pressure Source	Every 3 months

Notes:

1. A description of the three groups is included in the bases of this Specification.
2. Calibration tests are not required when the systems are not required to be operable or are tripped. If tests are missed, they shall be performed prior to returning the systems to an operable status.
3. The current source provides an instrument channel alignment. Calibration using a radiation source shall be made during each refueling outage.

* 4. If reactor start-ups occur more frequently than once per week, the functional test need not be performed; i.e., the maximum functional test frequency shall be once per week.

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TABLE 3.2.3

INSTRUMENTATION THAT INITIATES ROD BLOCK

Minimum No. of Operable Inst. Channels Per Trip System(1)	Instrument	Trip Level Setting
1	APRM upscale (flow bias)(7)	$\leq$ 0.650W + 43(2)
* 1	APRM upscale (refuel and Startup/Hot Standby mode)	$\leq$ 12/125 full scale
2	APRM downscale (7)	$\geq$ 3/125 full scale
1	Rod block monitor upscale (flow bias)(7)	$\leq$ 0.650W + 45(2)
1	Rod block monitor downscale (7)	$\geq$ 5/125 full scale
3	IRM downscale (3)	$\geq$ 5/125 full scale
3	IRM upscale	$\leq$ 108/125 full scale
* 3	IRM detector not fully inserted in the core	
2(5)	SRM detector not in startup position	(4)
2(5)(6)	SRM upscale	$\leq 10^5$ counts/sec

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TABLE 3.2.3 (cont)

Notes:

* 1. For the Startup/Hot Standby and Run positions of the Reactor Mode Selector Switch, there shall be two operable or tripped trip systems for each function, except the SRM rod blocks, IRM upscale, IRM downscale and IRM detector not fully inserted in the core need not be operable in the "Run" position and APRM downscale, APRM upscale, RBM upscale, and RBM downscale need not be operable in the Startup/Hot Standby mode. If the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days the system shall be tripped. If the first column cannot be met for both trip systems, the systems shall be tripped.

2. W is the reactor recirculation loop flow in percent. Trip level setting is in percent of full power.

3. IRM downscale may be bypassed when it is on its lowest range.

4. This function may be bypassed when the count rate is $\geq$100 cps.

5. One of the four SRM inputs may be bypassed.

6. This SRM function may be bypassed in the higher IRM ranges when the IRM upscale rod block is operable.

7. Not required while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MW(t).

TABLE 4.2.1

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CORE AND CONTAINMENT COOLING SYSTEMS INSTRUMENTATION, ROD BLOCKS, AND ISOLATIONS

	Instrument Channel	Instrument Functional Test (2)	Calibration (2)	Instrument Check (2)
	ECCS INSTRUMENTATION			
	1. Reactor Low-Low Water Level	(1)	Once/3 Months	Once/Day
	2. Drywell High Pressure	(1)	Once/3 Months	None
	3. Reactor Low Pressure	(1)	Once/3 Months	None
	4. Containment Spray Interlock			
	a. 2/3 Core Height	(1)	Once/3 Months	None
	b. Containment High Pressure	(1)	Once/3 Months	None
	5. Low Pressure Core Cooling Pump Discharge	(1)	Once/3 Months	None
	6. Undervoltage Emergency Bus	Refueling Outage	Refueling Outage	None
	7. Sustained High Reactor Pressure	(1)	Once/3 Months	None
	ROD BLOCKS			
	1. APRM Downscale	(1) (3)	Once/3 Months	None
	2. APRM Flow Variable	(1) (3)	Refueling Outage	None
*	3. APRM Upscale (Startup/Hot Standby)	(2) (3)	(2) (3)	(2)
	4. IRM Upscale	(2) (3)	(2) (3)	(2)
	5. IRM Downscale	(2) (3)	(2) (3)	(2)
*	6. IRM detector not fully inserted in the core	(2)	N/A	None
	7. RBM Upscale	(1) (3)	Refueling Outage	None
	8. RBM Downscale	(1) (3)	Once/3 Months	None
	9. SRM Upscale	(2) (3)	(2) (3)	(2)
	10. SRM Detector Not in Startup Position	(2) (3)	(2) (3)	(2)
	MAIN STEAM LINE ISOLATION			
	1. Steam Tunnel High Temperature	Refueling Outage	Refueling Outage	None
	2. Steam Line High Flow	(1)	Once/3 Months	Once/Day
	3. Steam Line Low Pressure	(1)	Once/3 Months	None
	4. Steam Line High Radiation	(1) (3)	Once/3 Months (4)	Once/Day

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Two sensors on the isolation condenser supply and return lines are provided to detect the failure of isolation condenser line and actuate isolation action. The sensors on the supply and return sides are arranged in a 1 out of 2 logic and, to meet the single failure criteria, all sensors and instrumentation are required to be operable. The trip settings of 20 psig and 32" of water and valve closure time are such as to prevent uncovering the core or exceeding site limits. The sensors will actuate due to high flow in either direction.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI piping. Tripping of this instrumentation results in actuation of HPCI isolation valves; i.e., Group 4 valves. Tripping logic for this function is the same as that for the isolation condenser and thus all sensors are required to be operable to meet the single failure criteria. The trip settings of 200°F and 300% of design flow and valve closure time are such that core uncovery is prevented and fission product release is within limits.

The instrumentation which initiates ECCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion the Specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCHFR does not decrease to 1.0. The trip logic for this function is 1 out of n; e.g., any trip on one of the six APRM's, 8 IRM's, or 4 SRM's will result in a rod block. The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. The minimum instrument channel requirements for the RBM may be reduced by one for a short period of time to allow for maintenance, testing, or calibration. This time period is only ~3% of the operating time in a month and does not significantly increase the risk of preventing an inadvertent control rod withdrawal.

The APRM rod block function is flow biased and prevents a significant reduction in MCHFR especially during operation at reduced flow. The APRM provides gross core protection; i.e., limits the gross core power increase from withdrawal of control rods in the normal withdrawal sequence. The trips are set so that MCHFR is maintained greater than 1.0

*The APRM rod block which is set at 12% of rated power is functional in the refuel and Startup/Hot Standby mode. This control rod block provides the same type of protection in the refuel and Startup/Hot Standby mode as the APRM flow biased rod block does in the Run mode; i.e., it prevents MCHFR from decreasing below 1.0 during control rod withdrawals and prevents control rod withdrawal before a scram is reached.

The RBM rod block function provides local protection of the core; i.e., the prevention of critical heat flux in a local region of the core, for a single rod withdrawal error from a limiting control rod pattern. The trip point is flow biased. The worst case single control rod withdrawal error has been analyzed and the results show that with the specified trip settings rod withdrawal is blocked when MCHFR is ~1.6, thus allowing adequate margin. Ref. Section 7.4.5.3 SAR. Below ~70% power the worst case withdrawal of a single control rod results in a MCHFR >1.0 without rod block action, thus below this level it is not required.

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The IRM rod block function provides local as well as gross core protection. The scaling arrangement is such that trip setting is less than a factor of 10 above the indicated level. Analysis of the worst case accident results in rod block action before MCHFR approaches 1.0. Ref. Section 7.4.4.3 SAR.

A downscale indication on an APRM or IRM is an indication the instrument has failed or the instrument is not sensitive enough. In either case the instrument will not respond to changes in control rod motion and thus control rod motion is prevented. The downscale trips are set at 5/125 of full scale.

* The rod block which occurs when the IRM detectors are not fully inserted in the core for the refuel and startup/hot standby position of the mode switch has been provided to assure that these detectors are in the core during reactor startup. This, therefore, assures that these instruments are in proper position to provide protection during reactor startup. The IRM's primarily provide protection against local reactivity effects in the source and intermediate neutron range.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapidly enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a back-up to the HPCI in the event the HPCI does not operate. The arrangement of the tripping contacts is such as to provide this function when necessary and minimize spurious operation. The trip settings given in the specification are adequate to assure the above criteria are met. Ref. Section 6.2.6.3 SAR. The specification preserves the effectiveness of the system during periods of maintenance, testing, or calibration, and also minimizes the risk of inadvertent operation; i.e., only one instrument channel out of service.

Two air ejector off-gas monitors are provided and when their trip point is reached, cause an isolation of the air ejector off-gas line. Isolation is initiated when both instruments reach their high trip point or one has an upscale trip and the other a downscale trip. There is a fifteen minute delay before the air ejector off-gas isolation valve is closed. This delay is accounted for by the 30-minute holdup time of the off-gas before it is released to the stack.

Both instruments are required for trip but the instruments are so designed that any instrument failure gives a downscale trip. The trip settings of the instruments are set so that the instantaneous stack release rate limit given in Specification 3.8 is not exceeded.

Four radiation monitors are provided which initiate isolation of the reactor building and operation of the standby gas treatment system. The monitors are located in the reactor building ventilation duct and on the refueling floor. The trip logic is a 1 out of 2 for each set and each set can initiate a trip independent of the other set. Any upscale trip will cause the desired action. Trip settings of 11 mr/hr for the monitors in the ventilation duct are based upon initiating normal ventilation isolation and standby gas treatment system operation to limit the dose

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rate at the nearest site boundary to less than the dose rate allowed by 10CFR20. Trip settings of 100 mr/hr for the monitors on the refueling floor are based upon initiating normal ventilation isolation and standby gas treatment system operation so that none of the activity released during the refueling accident leaves the reactor building via the normal ventilation stack but that all the activity is processed by the standby gas treatment system.

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