October 2, 1990

Docket Nos. 50-237
and 50-249

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Mr. Thomas J. Kovach
Nuclear Licensing Manager
Commonwealth Edison Company-Suite 300
OPUS West III
1400 OPUS Place
Downers Grove, Illinois 60515

Dear Mr. Kovach:

SUBJECT: ISSUANCE OF AMENDMENTS (TAC NOS. 74895 AND 74896)

The Commission has issued the enclosed Amendment No. 113 to Provisional Operating License No. DPR-19 for Dresden, Unit 2 and Amendment No. 109 to Facility Operating License No. DPR-25 for Dresden, Unit 3. The amendments are in response to your application dated September 29, 1989, and supplemented by a February 1, 1990 submittal.

The amendments will incorporate Anticipated Transient Without Scram (ATWS) requirements into the Technical Specifications (TS) to reflect modifications to the Standby Liquid Control System (SLCS) and the addition of the ATWS Recirculation Pump Trip (RPT). In addition it is noted that Alternate Rod Injection (ARI) requirements have not been proposed. Since the staff has not, to date, developed a standardized TS for any of the ATWS requirements, we have determined that your proposed TS changes are acceptable. Should the staff develop a standardized TS for ATWS at a later date that is technically different than that approved by this amendment, or include ARI, you will have to submit an amendment to incorporate those changes.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original Signed By:

Byron L. Siegel, Project Manager
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 113 to License No. DPR-19
2. Amendment No. 109 to License No. DPR-25
3. Safety Evaluation

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cc w/enclosures:
See next page

DOCUMENT NAME: [AMENDMENT 74895/96]

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*SEE PREVIOUS CONCURRENCE

Office:	LA/PDIII-2	PM/PDIII-2	*SRXB	PD/PDIII-2	*OGC	*SICB
Surname:	CMoore	BSiegel:ta	TCollins	RBarrett	MYoung	HLi
Date:	9/26/90	9/28/90	09/07/90	10/2/90	09/17/90	09/10/90

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

October 2, 1990

Docket Nos. 50-237
and 50-249

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Nuclear Licensing Manager
Commonwealth Edison Company-Suite 300
OPUS West III
1400 OPUS Place
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Sincerely,

Byron L. Siegel

Byron L. Siegel, Project Manager
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 113 to License No. DPR-19
2. Amendment No. 109 to License No. DPR-25
3. Safety Evaluation

cc w/enclosures:
See next page

Mr. Thomas J. Kovach
Commonwealth Edison Company

Dresden Nuclear Power Station
Unit Nos. 2 and 3

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

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-237

DRESDEN NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 113
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 29, 1989, and supplemented by a February 1, 1990 submittal, 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 Provisional Operating License No. DPR-19 is hereby amended to read as follows:

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B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 113, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective no later than 60 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Richard J. Barrett, Director
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 2, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 113

PROVISIONAL OPERATING LICENSE NO. DPR-19

DOCKET NO. 50-237

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 and contain marginal lines indicating the area of change.

REMOVE	INSERT
ii	ii
vii	vii
viii	viii
---	3/4.2-7a
---	3/4.2-18a
---	3/4.2-27a
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B 3/4.2-37	B 3/4.2-37
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3.2 LIMITING CONDITION FOR OPERATION (CONT'D)

H. Recirculation Pump Trip Initiation

The recirculation pump trip system, initiated by low low reactor water level or high reactor pressure, limiting conditions for operation are specified in Table 3.2.7.

4.2 SURVEILLANCE REQUIREMENTS (CONT'D)

H. Recirculation Pump Trip Initiation

Instrumentation and logic systems shall be functionally tested and calibrated as indicated in Table 4.2.5.

TABLE 3.2.7

INSTRUMENTATION THAT INITIATES RECIRCULATION PUMP TRIP

Trip Function	Minimum Number of Operable or Tripped Instrument Channels Per Trip System (a)	Trip Level Setting	Applicable Operational Mode	Action #
High Reactor Pressure	2	(GT/E) 1230 psig & (LT/E) 1250 psig	1 (d)	70
Low Low Reactor Water Level	2	(GT/E) 84 inches above top of active fuel (b)(c)	1 (d)	70

Action 70 The minimum number of operable trip systems shall be four, two high reactor pressure and two low low reactor water level, except that one trip system may be inoperable for up to fourteen days. If one trip system is inoperable for greater than fourteen days, or if any two trip systems are made or found to be inoperable, the reactor must be placed in at least the Startup/Hot Standby Mode in the next 8 hours.

NOTE:

a. A channel may be placed in an inoperable status for up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one operable channel in the same trip system is monitoring that parameter.

b. Top of active fuel is defined to be 360 inches above vessel zero.

c. The trip will occur following a (GT/E) 8 & (LT/E) 10 second delay.

d. MODE 1 is the RUN MODE

Table 4.2.5

MINIMUM TEST AND CALIBRATION FREQUENCY FOR THE RECIRCULATION PUMP TRIP

Instrument Channel	Instrument Functional Test	Calibration	Instrument Check	Applicable Operational Mode
1. Reactor High Pressure	Q	R	D	1*
2. Reactor Low Low Water Level	Q	R	D	1*

*MODE 1 is the RUN MODE

3.2 LIMITING CONDITION FOR OPERATION BASES (Cont'd.)

without being affected by normal voltage fluctuations due to pumps starting. Reset of the relay, approximately 11% above the trip point, indicates that the diesel generator has restored bus voltage and will accept ECCS loads. The reset signal provides a permissive for starting ECCS pumps.

The setting for 4KV emergency bus degraded voltage is chosen to detect sustained degraded voltage which may cause equipment damage, while preventing trips caused by voltage fluctuations. The reset point for degraded voltage indicates restoration of normal bus voltage.

The recirculation pump trip (RPT) system is required by 10 CFR 50.62 to mitigate the consequences of an Anticipated Transient Without Scram (ATWS). The design of this system meets the intent of the NRC Safety Evaluation for NEDE-31096-A (Reference 1). RPT is provided to minimize reactor pressure in the highly unlikely event of a plant transient coincident with the failure of all control rods to scram. The rapid flow reduction increases core voiding providing negative reactivity. RPT is only required to operate in the RUN mode since at lower power levels the safety relief valves have sufficient capacity to relieve the steam which continues to be produced during this postulated event. The low low reactor water level trip includes a nine second delay to avoid increasing the consequences of a postulated design basis loss of coolant accident.

References

1. NEDE-31096-A, "Anticipated Transients Without Scram; Response to NRC ATWS Rule, 10 CFR 50.62," dated February 1987.

4.2 SURVEILLANCE REQUIREMENT BASES (Cont'd.)

For instruments 2-263-73A, 73B and 2-2352, 2353, the logic downstream of the output relay contacts exhibits a one-out-of-two logic and, by utilizing the Availability Criteria identified in NEDO-21617-A, each of these trip units should also be subjected to a calibration/test frequency (staggered one division out of two per two weeks) of one month. An adequate calibration/surveillance test interval for the transmitter is once per operating cycle.

The radiation monitors in the ventilation duct and on the refueling floor which initiate building isolation and standby gas treatment operation are arranged in two 1 out of 2 logic systems. The bases given above for the rod blocks applies here also and were used to arrive at the functional testing frequency.

Based on experience at Dresden Unit 1 with instruments of similar design, a testing interval of once every three months has been found to be adequate.

The automatic pressure relief instrumentation can be considered to be a 1 out of 2 logic system and the discussion above applies also.

The instrumentation which is required for the post accident condition will be tested and calibrated at regularly scheduled intervals. The basis for the calibration and testing of this instrumentation is the same as was discussed above for Protective Instrumentation in Table 4.2.4.

The analog trip units which provide the initiation signal for RPT are calibrated quarterly. The reactor pressure and level transmitters which provide the input to the analog trip units are calibrated every refueling outage, concurrent with logic tests that ensure overall system operability. An instrument check is performed on a daily basis. These frequencies are considered appropriate, commensurate with the design application and the fact that the RPT system is a backup to existing protective instrumentation.

3.4 LIMITING CONDITION FOR OPERATION

STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the operating status of the standby liquid control system.

Objective:

To assure the availability of an independent reactivity control mechanism.

Specification:

A. Normal Operation

During periods when fuel is in the reactor the standby liquid control system shall be operable except when the reactor is in the Cold Shutdown Condition and all control rods are fully inserted and Specification 3.3.A is met or as specified in 3.4.B below.

4.4 SURVEILLANCE REQUIREMENT

STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the periodic testing requirements for the standby liquid control system.

Objective:

To verify the operability of the standby liquid control system.

Specification:

A. Normal Operation

The operability of the standby liquid control system shall be verified by performance of the following tests:

1. At least once per month -

   Demineralized water shall be recycled to the test tank. Pump minimum flow rate of 40 gpm shall be verified against a system head of 1275 psig.

2. At least once during each operating cycle

   a. Manually initiate the system, except the explosion valves and pump solution in the recirculation path, to demonstrate that the pump suction line from the storage tank is not plugged.

3.4 LIMITING CONDITION FOR OPERATION (Cont'd.)

4.4 SURVEILLANCE REQUIREMENT (Cont'd.)

b. Actuate one of the two standby liquid control systems using the normal actuation switch and pump demineralized water into the reactor vessel. Pump minimum flow rate shall be verified against a previous test at the same reactor vessel pressure. The replacement charges will be selected from a batch from which at least one charge has been successfully test fired and which will not exceed five years life when their use is terminated. Both systems shall be tested and inspected, including each explosive actuated valve, in the course of two operating cycles.

c. Test that the setting of the system pressure relief valves is between 1455 and 1545 psig.

B. Operation with Inoperable Components

From and after the date that a redundant component

B. Surveillance with Inoperable Components

When a component becomes inoperable its redundant

3.4 LIMITING CONDITION FOR OPERATION (Cont'd.)

is made or found to be inoperable, Specification 3.4.A shall be considered fulfilled, and continued operation permitted provided that the component is returned to an operable condition within 7 days.

C. The liquid poison tank shall contain a boron bearing solution of at least 3605 gallons (3329 gallons to meet shutdown requirements plus 276 gallons that are contained below the pump suction) of at least 14 wt. percent sodium pentaborate decahydrate ($Na_2B_{10}O_{16}$-$10H_2O$). At all time when the standby liquid control system is required to be operable, the solution temperature including that in the pump suction piping shall not be less than the temperature presented in Figure 3.4.2

D. If specification 3.4.A through C are not met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

4.4 SURVEILLANCE REQUIREMENT (Cont'd.)

component shall be demonstrated to be operable immediately and daily thereafter.

C. The availability of the proper boron bearing solution shall be verified by performance of the following tests:

1. At least once per month - Boron concentration shall be determined. In addition, the boron concentration shall be determined any time water or boron are added or if the solution temperature drops below the limits specified by Figure 3.4.2. Minimum concentration is 14 wt. percent sodium pentaborate.

2. At least once per day - Solution volume shall be checked.

3. At least once per day - The solution temperature shall be checked.

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3.4 LIMITING CONDITION FOR OPERATION BASES

A. The design objective of the standby liquid control system is to provide the capability of bringing the reactor from full power to a cold, xenon-free shutdown assuming that none of the withdrawn control rods can be inserted. To meet this objective, the liquid control system is designed to inject a quantity of boron which produces a concentration of no less than 600 ppm of boron in the reactor core in less than 100 minutes. 600 ppm boron concentration in the reactor core is required to bring the reactor from full power to a 3% delta k or more subcritical condition considering the hot to cold reactivity swing and xenon poisoning. An additional margin of 25% boron is added to compensate for possible imperfect mixing of the chemical solution in the reactor water, making the total concentration 750 ppm of boron in the reactor core. A minimum quantity of 3329 gallons of solution having a 14 wt. percent sodium pentaborate concentration is required to meet this shutdown requirement.

For a required pumping rate of 40 gpm, 3329 gallons per pump of at least 14 wt. percent solution will be inserted in less than 100 minutes. This insertion rate of boron solution will override the rate of reactivity insertion due to cool down of the reactor following the xenon peak. Two pump operation will enable faster reactor shutdown for ATWS events. The minimum volume required in the storage tank shall be 3605 gallons (276 are contained below the pump suction and, therefore, cannot be inserted). The monthly pump minimum flowrate test shall require a minimum flowrate of 40 gpm per pump. This requirement, combined with the solution concentration requirement of at least 14 wt. percent, will demonstrate that the Standby Liquid Control System meets the requirements of 10 CFR 50.62.

Boron concentration, solution temperature, and volume are checked on a frequency to assure a high reliability of operation of the system should it ever be required. Experience with pump operability indicates that monthly testing is adequate to detect if failures have occurred.

Components of the system are checked periodically as described above and make a functional test of the entire system on a frequency of less than once during each operating cycle unnecessary. A test of one installed explosive charge is made at least once during each operating cycle to assure that the charges have not deteriorated, the actuation circuit is functioning properly, the valve functions properly, and no flow blockages exist. The replacement charge will be selected from a batch for which there has been a successful test firing. Recommendations of the vendor shall be followed in maintaining a five-year life of the explosive charges. A continual check of the firing circuit continuity is provided by pilot lights in the control room.

3.4 LIMITING CONDITION FOR OPERATION BASES (Cont'd.)

The relief valves in the standby liquid control system protect the system piping and positive displacement pumps which are nominally designed for 1500 psig protection from over-pressure. The pressure relief valves discharge back to the standby liquid control solution tank.

B. Only one of the two standby liquid control pumping circuits is needed for proper operation of the system. If one pumping circuit is found to be inoperable, there is no immediate threat to shutdown capability, and reactor operation may continue while repairs are being made. Assurance that the remaining system will perform its intended function and that the reliability of the system is good is obtained by demonstrating operation of the pump in the operable circuit at least once daily.

C. The solution saturation temperature of 14 wt. percent sodium pentaborate, is 62°F. To guard against boron precipitation, the solution including that in the pump suction piping is kept at least 10°F above the saturation temperature by a tank heater and by heat tracing in the pump suction piping. The 10°F margin is included in Figure 3.4.2. Temperature and liquid level alarms for the system are annunciated in the control room.

Pump operability is checked on a frequency to assure a high reliability of operation of the system should it ever be required.

Once the solution has been made up, boron concentration will not vary unless more boron or more water is added. Level indication and alarm indicate whether the solution volume has changed which might indicate a possible solution concentration change. Considering these factors, the test interval has been established.

4.4 SURVEILLANCE REQUIREMENT BASES

Periodic tests to demonstrate two-pump flow capability are not feasible in the present system configuration and are unnecessary because the flow path integrity can be determined from the test of a single pump. Comparison of single-pump test pressures with previous results and correlation of these data with initial two-pump test will be used to verify the capability of the piping to support two-pump flow.

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

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-249

DRESDEN NUCLEAR POWER STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 109
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 29, 1989, and supplemented by a February 1, 1990 submittal, 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. 109, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective no later than 60 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Richard J. Barrett, Director
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 2, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 109

FACILITY OPERATING LICENSE NO. DPR-25

DOCKET NO. 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 and contain marginal lines indicating the area of change.

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---	3/4.2-18a
---	3/4.2-27a
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3.2 LIMITING CONDITION FOR OPERATION (CONT'D)

H. Recirculation Pump Trip Initiation

The recirculation pump trip system, initiated by low low reactor water level or high reactor pressure, limiting conditions for operation are specified in Table 3.2.7

4.2 SURVEILLANCE REQUIREMENTS (CONT'D)

H. Recirculation Pump Trip Initiation

Instrumentation and logic systems shall be functionally tested and calibrated as indicated in Table 4.2.5

TABLE 3.2.7

INSTRUMENTATION THAT INITIATES RECIRCULATION PUMP TRIP

Trip Function	Minimum Number of Operable or Tripped Instrument Channels Per Trip System (a)	Trip Level Setting	Applicable Operational Mode	Action #
High Reactor Pressure	2	(GT/E) 1230 psig & (LT/E) 1250 psig	1 (d)	70
Low Low Reactor Water Level	2	(GT/E) 84 inches above top of active fuel (b)(c)	1 (d)	70

Action 70 The minimum number of operable trip systems shall be four, two high reactor pressure and two low low reactor water level, except that one trip system may be inoperable for up to fourteen days. If one trip system is inoperable for greater than fourteen days, or if any two trip systems are made or found to be inoperable, the reactor must be placed in at least the Startup/Hot Standby Mode in the next 8 hours.

NOTE:

a. A channel may be placed in an inoperable status for up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one operable channel in the same trip system is monitoring that parameter.

b. Top of active fuel is defined to be 360 inches above vessel zero.

c. The trip will occur following a (GT/E) 8 & (LT/E) 10 second delay.

d. MODE 1 is the RUN MODE

Table 4.2.5

MINIMUM TEST AND CALIBRATION FREQUENCY FOR THE RECIRCULATION PUMP TRIP

Instrument Channel	Instrument Functional Test	Calibration	Instrument Check	Applicable Operational Mode
1. Reactor High Pressure	Q	R	D	1*
2. Reactor Low Low Water Level	Q	R	D	1*

*MODE 1 is the RUN MODE

3.2 LIMITING CONDITION FOR OPERATION BASES (Cont'd.)

Reset of the relay, approximately 11% above the trip point, indicates that the diesel generator has restored bus voltage and will accept ECCS Loads. The reset signal provides a permissive for starting ECCS pumps.

The setting for 4KV emergency bus degraded voltage is chosen to detect sustained degraded voltage which may cause equipment damage, while preventing trips caused by voltage fluctuations. The reset point for degraded voltage indicates restoration of normal bus voltage.

The recirculation pump trip (RPT) system is required by 10 CFR 50.62 to mitigate the consequences of an Anticipated Transient Without Scram (ATWS). The design of this system meets the intent of the NRC Safety Evaluation for NEDE-31096-A (Reference 1). RPT is provided to minimize reactor pressure in the highly unlikely event of a plant transient coincident with the failure of all control rods to scram. The rapid flow reduction increases core voiding providing negative reactivity. RPT is only required to operate in the RUN mode since at lower power levels the safety relief valves have sufficient capacity to relieve the steam which continues to be produced during this postulated event. The low low reactor water level trip includes a nine second delay to avoid increasing the consequences of a postulated design basis loss of coolant accident.

References

1. NEDE-31096-A, "Anticipated Transients Without Scram; Response to NRC ATWS Rule, 10 CFR 50.62," dated February 1987.

4.2 SURVEILLANCE REQUIREMENT BASES (Cont'd)

For instruments 3-263-73A, 73B and 3-2352, 2353, the logic downstream of the output relay contacts exhibits a one-out-of-two logic and, by utilizing the Availability Criteria identified in NEDO-21617-A, each of these trip units should also be subjected to a calibration/test frequency (staggered one division out of two per two weeks) of one month. An adequate calibration/surveillance test interval for the transmitter is once per operating cycle.

The radiation monitors in the ventilation duct and on the refueling floor which initiate building isolation and standby gas treatment operation are arranged in two 1 out of 2 logic systems. The bases given above for the rod blocks applies here also and were used to arrive at the functional testing frequency.

Based on experience at Dresden Unit 1 with instruments of similar design, a testing interval of once every three months has been found to be adequate.

The automatic pressure relief instrumentation can be considered to be a 1 out of 2 logic system and the discussion above applies also.

The instrumentation which is required for the post accident condition will be tested and calibrated at regularly scheduled intervals. The basis for the calibration and testing of this instrumentation is the same as was discussed above for Protective Instrumentation in Table 4.2.4.

The analog trip units which provide the initiation signal for RPT are calibrated quarterly. The reactor pressure and level transmitters which provide the input to the analog trip units are calibrated every refueling outage, concurrent with logic tests that ensure overall system operability. An instrument check is performed on a daily basis. These frequencies are considered appropriate, commensurate with the design application and the fact that the RPT system is a backup to existing protective instrumentation.

3.4 LIMITING CONDITION FOR OPERATION

STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the operating status of the standby liquid control system.

Objective:

To assure the availability of an independent reactivity control mechanism.

Specification:

A. Normal Operation

During periods when fuel is in the reactor the standby liquid control system shall be operable except when the reactor is in the Cold Shutdown Condition and all control rods are fully inserted and Specification 3.3.A is met or as specified in 3.4.B below.

4.4 SURVEILLANCE REQUIREMENT

STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the periodic testing requirements for the standby liquid control system.

Objective:

To verify the operability of the standby liquid control system.

Specification:

A. Normal Operation

The operability of the standby liquid control system shall be verified by performance of the following tests:

1. At least once per month -

   Demineralized water shall be recycled to the test tank. Pump minimum flow rate of 40 gpm shall be verified against a system head of 1275 psig.

2. At least once during each operating cycle

   a. Manually initiate the system, except the explosion valves and pump solution in the recirculation path, to demonstrate that the pump suction line from the storage tank is not plugged.

3.4 LIMITING CONDITION FOR OPERATION (Cont'd.)

B. Operation with Inoperable Components

From and after the date that a redundant component

4.4 SURVEILLANCE REQUIREMENT (Cont'd.)

b. Actuate one of the two standby liquid control systems using the normal actuation switch and pump demineralized water into the reactor vessel. Pump minimum flow rate shall be verified against a previous test at the same reactor vessel pressure. The replacement charges will be selected from a batch from which at least one charge has been successfully test fired and which will not exceed five years life when their use is terminated. Both systems shall be tested and inspected, including each explosive actuated valve, in the course of two operating cycles.

c. Test that the setting of the system pressure relief valves is between 1455 and 1545 psig.

B. Surveillance with Inoperable Components

When a component becomes inoperable its redundant

3.4 LIMITING CONDITION FOR OPERATION (Cont'd.)

is made or found to be inoperable, Specification 3.4.A shall be considered fulfilled, and continued operation permitted provided that the component is returned to an operable condition within 7 days.

C. The liquid poison tank shall contain a boron bearing solution of at least 3605 gallons (3329 gallons to meet shutdown requirements plus 276 gallons that are contained below the pump suction) of at least 14 wt. percent sodium pentaborate decahydrate ($Na_2B_{10}O_{16}$-$10H_2O$). At all times when the standby liquid control system is required to be operable, the solution temperature including that in the pump suction piping shall not be less than the temperature presented in Figure 3.4.2.

D. If specification 3.4.A through C are not met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

4.4 SURVEILLANCE REQUIREMENT (Cont'd.)

component shall be demonstrated to be operable immediately and daily thereafter.

C. The availability of the proper boron bearing solution shall be verified by performance of the following tests:

1. At least once per month - Boron concentration shall be determined. In addition, the boron concentration shall be determined any time water or boron are added or if the solution temperature drops below the limits specified by Figure 3.4.2. Minimum concentration is 14 wt. percent sodium pentaborate.

2. At least once per day - Solution volume shall be checked.

3. At least once per day - The solution temperature shall be checked.

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3.4 LIMITING CONDITION FOR OPERATION BASES

A. The design objective of the standby liquid control system is to provide the capability of bringing the reactor from full power to a cold, xenon-free shutdown assuming that none of the withdrawn control rods can be inserted. To meet this objective, the liquid control system is designed to inject a quantity of boron which produces a concentration of no less than 600 ppm of boron in the reactor core in less than 100 minutes. 600 ppm boron concentration in the reactor core is required to bring the reactor from full power to a 3% delta k or more subcritical condition considering the hot to cold reactivity swing and xenon poisoning. An additional margin of 25% boron is added to compensate for possible imperfect mixing of the chemical solution in the reactor water, making the total concentration 750 ppm of boron in the reactor core. A minimum quantity of 3329 gallons of solution having a 14 wt. percent sodium pentaborate concentration is required to meet this shutdown requirement.

For a required pumping rate of 40 gpm, 3329 gallons per pump of at least 14 wt. percent solution will be inserted in less than 100 minutes. This insertion rate of boron solution will override the rate of reactivity insertion due to cool down of the reactor following the xenon peak. Two pump operation will enable faster reactor shutdown for ATWS events. The minimum volume required in the storage tank shall be 3605 gallons (276 are contained below the pump suction and, therefore, cannot be inserted). The monthly pump minimum flowrate test shall require a minimum flowrate of 40 gpm per pump. This requirement, combined with the solution concentration requirement of at least 14 wt. percent, will demonstrate that the Standby Liquid Control System meets the requirements of 10 CFR 50.62.

Boron concentration, solution temperature, and volume are checked on a frequency to assure a high reliability of operation of the system should it ever be required. Experience with pump operability indicates that monthly testing is adequate to detect if failures have occurred.

Components of the system are checked periodically as described above and make a functional test of the entire system on a frequency of less than once during each operating cycle unnecessary. A test of one installed explosive charge is made at least once during each operating cycle to assure that the charges have not deteriorated, the actuation circuit is functioning properly, the valve functions properly, and no flow blockages exist. The replacement charge will be selected from a batch for which there has been a successful test firing. Recommendations of the vendor shall be followed in maintaining a five-year life of the explosive charges. A continual check of the firing circuit continuity is provided by pilot lights in the control room.

3.4 LIMITING CONDITION FOR OPERATION BASES (Cont'd.)

The relief valves in the standby liquid control system protect the system piping and positive displacement pumps which are nominally designed for 1500 psig protection from over-pressure. The pressure relief valves discharge back to the standby liquid control solution tank.

B. Only one of the two standby liquid control pumping circuits is needed for proper operation of the system. If one pumping circuit is found to be inoperable, there is no immediate threat to shutdown capability, and reactor operation may continue while repairs are being made. Assurance that the remaining system will perform its intended function and that the reliability of the system is good is obtained by demonstrating operation of the pump in the operable circuit at least once daily.

C. The solution saturation temperature of 14 wt. percent sodium pentaborate is 62°F. To guard against boron precipitation, the solution including that in the pump suction piping is kept at least 10°F above the saturation temperature by a tank heater and by heat tracing in the pump suction piping. The 10°F margin is included in Figure 3.4.2. Temperature and liquid level alarms for the system are annunciated in the control room.

Pump operability is checked on a frequency to assure a high reliability of operation of the system should it ever be required.

Once the solution has been made up, boron concentration will not vary unless more boron or more water is added. Level indication and alarm indicate whether the solution volume has changed which might indicate a possible solution concentration change. Considering these factors, the test interval has been established.

4.4 SURVEILLANCE REQUIREMENT BASES

Periodic tests to demonstrate two-pump flow capability are not feasible in the present system configuration and are unnecessary because the flow path integrity can be determined from the test of a single pump. Comparison of single-pump test pressures with previous results and correlation of these data with initial two-pump test will be used to verify the capability of the piping to support two-pump flow.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 113 TO PROVISIONAL OPERATING LICENSE NO. DPR-19

AND AMENDMENT NO. 109 TO FACILITY OPERATING LICENSE NO. DPR-25

COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

In July of 1984, the Code of Federal Regulations was amended to include Section 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light Water Cooled Nuclear Power Plants." An ATWS is an expected operational transient which is accompanied by a failure of the Reactor Protection System (RPS) to shutdown the reactor. In summary, the ATWS rule required the following elements for boiling water reactors such as Dresden:

1. A recirculation Pump Trip (RPT) system that automatically trips the recirculation pumps under an ATWS condition.

2. A Standby Liquid Control system (SLCS) with a minimum flow capacity and boron content equivalent in control capacity to 86 gallons per minute of 13 weight percent sodium pentaborate solution. In May of 1989, this requirement was amended to clarify the assumed isotopic enrichment of Boron-10 (natural) and assumed vessel size (251 inch diameter) for these flow rate and concentration values and to acknowledge the use of equivalent values.

3. An Alternate Rod Insertion (ARI) system that is diverse from the RPS and has redundant scram air header pressure exhaust valves.

Commonwealth Edison Company (CECo) participated in the BWR Owners Group (BWROG) development of the licensing topical report that addressed the ATWS rule (Licensing Topical Report, Anticipated Transients Without Scram - Response to NRC ATWS Rule 10 CFR 50.62, General Electric Company NEDE-31096-P, December 1985). The staff subsequently issued a safety evaluation report (Letter, G. Lainas to T. A. Pickens (BWROG), Acceptance for Reference of LTR-31096-P, October 21, 1986) which defined the basis for NRC's acceptance of the GE licensing topical report (LTR). In a letter dated September 30, 1987, CECo endorsed the GE LTR. Subsequently, modifications were implemented at Dresden that satisfied the ATWS rule.

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In a letter dated September 29, 1989 and supplemented in a letter dated February 1, 1990, CECo proposed to amend the Dresden Technical Specifications (TS) for Dresden Units 2 and 3 to reflect the completion of modifications to the SLCS and the addition of the ATWS RPT. ARI requirements were not proposed by CECo since the BWROG and staff have not, as yet, determined the need. The February 1, 1990 submittal provided additional information and did not alter the proposed action noticed in the Federal Register on November 15, 1989 and did not affect the initial determination.

2.0 EVALUATION

2.1 Standby Liquid Control System (SLCS)

CECo has proposed changes to SLCS TS that are consistent with the requirements of the ATWS Rule 10 CFR 50.62. These proposed TS changes reflect completed modifications to the SLCS which: 1) increase the concentration of sodium pentaborate in the SLCS tank to 14 weight percent in conjunction with the capability to operate both SLCS pumps simultaneously at a total combined flow rate of 80 gpm; 2) establish a minimum deliverable sodium pentaborate decahydrate solution volume of 3329 gallons; 3) establish a minimum volume of 3605 gallons of sodium pentaborate decahydrate in the tank to assure the minimum deliverable volume and concentration; 4) permit the manual testing of the system (except explosive valves and pump solution) to demonstrate the pump suction line is not plugged; 5) increase the relief valve pressure setting range by 55 psig; and 6) raise the solution saturation temperature from 59°F to 62°F.

The staff has reviewed the TS changes proposed by CECo for the SLCS for Dresden Units 2 and 3 against the requirements of the ATWS rule 10 CFR 50.62 and concluded the following.

Increasing the SLCS sodium pentaborate concentration to 14 weight percent in conjunction with a flow rate of 80 gpm provides a boron content equivalent in control capacity to 86 gpm of 13 weight percent sodium pentaborate. This is in compliance with 10 CFR 50.62 and is, therefore, acceptable.

CECo's proposal to change the TS required liquid poison tank volume to a minimum 3329 deliverable gallons is acceptable because, with an increased solution concentration of 14%, 3329 gallons will provide the equivalent amount of poison and shutdown margin as required by 10 CFR 50.62.

Establishing a minimum poison tank volume of 3605 gallons of sodium pentaborate decahydrate solution in the TS to account for the tank volume below the pump suction assures that the 3329 gallons of poison required is deliverable and is, therefore, acceptable.

Specifying the minimum solution concentration and minimum gallons of solution in the tank eliminates the need for the existing Figure 3.4.1 which provides a Boron Concentration versus Solution Volume Curve and is, therefore, acceptable.

Additionally, the proposed surveillance to manually initiate the system once per operating cycle to demonstrate flow path integrity utilizing a single pump instead of both pumps simultaneously is acceptable. This is based upon

CECo's performance of initial two pump tests, correlation of single pump data to the initial two pump data, and subsequent comparison of periodic single pump test data with previous results and to initial test data for verification of systems capability.

Increasing the poison solution temperature from 59°F to 62°F to assure the increased concentration of sodium pentaborate will remain in solution is acceptable.

Revised surveillance requirements were also proposed to increase the allowable TS setpoint band for the system pressure relief valves from the current range of 1400 - 1490 psig, to a band of 1455 - 1545 psig because of increased pump discharge pressure during two pump operation. Accordingly, the allowable system pressure relief valve setpoints have been increased by approximately 55 psig and we find this acceptable.

New and revised TS bases were proposed to reflect the above changes which we find acceptable.

2.2 Recirculation Pump Trip (RPT)

TS changes proposed by CECo that reflect the installation of the RPT system have been reviewed by the staff against the requirements of the ATWS Rule (10 CFR 50.62). CECo's proposed changes include the incorporation of high reactor pressure and low-low reactor water level instrumentation that initiates recirculation pump trip and the associated operability and surveillance requirements into the TS. The RPT on low-low reactor level has an associated nine second time delay to lessen the severity of a postulated design basis Loss-of-Coolant Accident. To prevent spurious ATWS initiation a two-out-of-two taken once logic is employed.

Since the Dresden RPT system was modeled after the Monticello design which the staff approved in its safety evaluation report dated October 21, 1986, as previously mentioned, the incorporation of the low-low reactor water level trip and high reactor pressure into the TS for the instrumentation that initiates RPT is acceptable.

However, the staff, during its review of CECo's submittal, identified two issues related to the RPT that required additional information.

The first issue is related to the ATWS RPT high pressure setpoint of 1240 psig which is considerably higher than the General Electric STS value of 1120 psig. In its February 1, 1990 response, CECo cited a General Electric Analysis (MSIV Closure Event with ATWS/RPT and ARI for Dresden Units 2 and 3 and Quad Cities Units 1 and 2, NSE-45-0880, August 1980) and stated that this higher setpoint is designed to avoid ATWS RPT initiation during design basis pressurization transients, such as Load Rejection Without Bypass. ATWS RPT initiation during these pressurization transients is undesirable since it will increase the severity of the event. This adverse impact is of particular concern since a non-ATWS pressurization transient is considerably more likely to occur than a pressurization event with failure to scram.

With the proposed setpoint, the only non-ATWS pressurization transient that would result in an ATWS RPT initiation is the closure of all Main Steam Isolation Valves (MSIV) with a failure of direct scram on MSIV position. This transient scenerio does not credit the electromatic relief valves and assumes that the terminating scram signal is generated by high neutron flux. Although ATWS RPT initiation will cause the peak vessel pressure for this event to increase, margin to the ASME overpressure limit of 1375 psig is maintained. CECo has stated that this margin has been, and will continue to be, verified for each new reload core design specifically including the effects of the ATWS RPT.

Although the proposed setpoint increases the peak pressure during a limiting ATWS event (compared to ATWS peak pressure with the GE STS value) it still remains below the ASME Service Level C overpressurization limit of 1500 psig based on the General Electric analysis. The higher RPT setpoint used at the Dresden and Quad Cities units produces acceptable ATWS peak pressures primarily due to the larger total capacity of the 13 relief and safety valves compared to BWRs of similar vintage, which typically have fewer valves and lower overall capacity.

The staff has determined, based on: 1) the results of the General Electric analysis; 2) the larger relief and safety valve capacity at Dresden compared to similar BWRs; 3) the desirability of avoiding ATWS RPT during design basis pressurization transients; and 4) the peak pressure during a limiting ATWS event remaining below the ASME Service Level C overpressurization limit of 1500 psig, that CECo's high pressure setpoint of 1240 psig for ATWS RPT is acceptable.

The second issue is related to the proposed test and calibration frequencies for the RPT system. The surveillance frequencies specified in the proposed TS utilize the currently applied intervals for Dresden 2 and 3 (i.e., functional checks quarterly and instrument checks daily). This is in contrast to the GE STS surveillance frequencies which have a functional check monthly and an instrument check shiftly. The proposed frequencies, supported by General Electric recommendations, are the surveillance frequencies that have been in place at Dresden since the installation of the ATWS RPT. CECo has reviewed the surveillance records going back to 1981 which showed that there were no instances where the initiation setpoints have drifted beyond the proposed values. A review of Quad Cities surveillances also showed similar results, with minimal or no adjustments needed over the past two years. This represents 22 reactor years of operation with no appreciable instrument drift. Based on the surveillance history, the staff has determined that the surveillance frequencies proposed by CECo are acceptable.

On the basis of the review of the information provided by CECo, the staff has determined that the proposed addition of TS and TS bases for ATWS RPT are acceptable and satisfy the requirements of the ATWS Rule 10 CFR 50.62.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of these amendments will not be inimical to the common defense and security nor to the health and safety of the public.

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Dated: October 2, 1990