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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-321

EDWIN I. HATCH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 180
License No. DPR-57

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Edwin I. Hatch Nuclear Plant, Unit 1 (the facility) Facility Operating License No. DPR-57 filed by the Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees), dated October 14, 1991, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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 set forth in 10 CFR Chapter I;

   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 hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-57 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendix A and B, as revised through Amendment No. 180 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: May 20, 1992

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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-366

EDWIN I. HATCH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 121
License No. NPF-5

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Edwin I. Hatch Nuclear Plant, Unit 2 (the facility) Facility Operating License No. NPF-5 filed by the Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees), dated October 14, 1991, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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 set forth in 10 CFR Chapter I;

   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 hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-5 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendix A and B, as revised through Amendment No. 121 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: May 20, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 180

FACILITY OPERATING LICENSE NO. DPR-57

DOCKET NO. 50-321

AND

TO LICENSE AMENDMENT NO. 121

FACILITY OPERATING LICENSE NO. NPF-5

DOCKET NO. 50-366

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

	Remove Pages	Insert Pages
Unit 1	iii	iii
	1.1-12	1.1-12
	3.3-1a	3.3-1a
	3.3-5	3.3-5
	3.3-6	3.3-6
	3.3-7	3.3-7
	3.3-15	3.3-15
	3.3-16	3.3-16
	3.3-17	3.3-17
	3.3-18	3.3-18
	3.3-18a	---
	3.3-19	3.3-19
Unit 2	IV	IV
	IX	IX
	B 2-9	B 2-9
	3/4 1-9	3/4 1-9
	3/4 1-11	3/4 1-11
	3/4 1-12	3/4 1-12
	3/4 1-14	3/4 1-14
	3/4 1-15	3/4 1-15
	3/4 1-16	3/4 1-16
	3/4 10-2	3/4 10-2
	B 3/4 1-3	B 3/4 1-3
	B 3/4 1-4	B 3/4 1-4
	B 3/4 1-4a	B 3/4 1-4a
	B 3/4 1-4b	B 3/4 1-4b
	B 3/4 10-1	B 3/4 10-1

2.1.A.1.a. IRM Flux Scram Trip Setting (Continued)

tism was taken in this analysis by assuming that the IRM channel closest to the withdrawn rod is bypassed. The results of this analysis show that the reactor is scrammed and peak power limited to one percent of rated power, thus maintaining MCPR above the fuel cladding integrity Saf... Limit. Based on the above analysis, the IRM provides protection against local control rod withdrawal errors and continues withdrawal of control rods in sequence and provides backup protection for the APRM.

b. APRM Flux Scram Trip Setting (Refuel or Start & Hot Standby Mode)

For operation in the startup mode while the reactor is at low pressure, the APRM scram setting of 15 percent of rated power provides adequate thermal margin between the setpoint and the safety limit, 25 percent of rated. The margin is adequate to accommodate anticipated maneuvers associated with power plant startup. Effects of increasing pressure at zero or low void content are minor, cold water from sources available during startup is not much colder than that already in the system, temperature coefficients are small, and control rod patterns are constrained to be uniform by operating procedures backed up by the rod worth minimizer. Worth of individual rods is very low in a uniform rod pattern. Thus, of all possible sources of reactivity input, uniform control rod withdrawal is the most probable cause of significant power rise. Because the flux distribution associated with uniform rod withdrawals does not involve high local peaks, and because several rods must be moved to change power by a significant percentage of rated power, the rate of power rise is very slow. Generally, the heat flux is in near equilibrium with the fission rate. In an assumed uniform rod withdrawal approach to the scram level, the rate of power rise is no more than 5 percent of rated power per minute, and the APRM system would be more than adequate to assure a scram before the power could exceed the safety limit. The 15 percent APRM scram remains active until the mode switch is placed in the RUN position. This switch occurs when reactor pressure is greater than 825 psig.

c. APRM Flux Scram Trip Settings (Run Mode)

The APRM Flux scram trips in the run mode consist of the flow referenced simulated thermal power monitor scram setpoint and a fixed high-high neutron flux scram setpoint. In the simulated thermal power monitor, the APRM flow referenced neutron flux signal is passed through a filtering network with a time constant which is representative of the fuel dynamics. This provides a flow referenced signal that approximates the average heat flux or thermal power that is developed in the core during transient or steady-state conditions. This prevents spurious scrams, which have an adverse effect on reactor safety because of the resulting thermal stresses. Examples of events which can result in momentary neutron flux spikes are momentary flow changes in the recirculation system flow, and small pressure disturbances during turbine stop valve and turbine control valve testing. These flux spikes represent no hazard to the fuel since they are only of a few seconds duration and less than 120% of rated thermal power. The flow independent portion of this scram setpoint must be adjusted downward during single-loop operation to account for lower core flow with respect to two-loop operation with the same drive flow.

3.3. REACTIVITY CONTROL

B. Inoperable Control Rods (Cont'd)

1. No Movement by Control Rod Drive Pressure (Cont'd)

If a partially or fully withdrawn control rod drive cannot be moved with drive or scram pressure, the reactor shall be brought to the Cold Shutdown Condition within 24 hours and shall not be started unless (1) investigation has demonstrated that the cause of the failure is not a failed control rod drive mechanism collet housing, and (2) adequate shutdown margin has been demonstrated as required by Specification 4.3.A.

If investigation demonstrates that the cause of control rod drive failure is a cracked collet housing or if that possibility cannot be eliminated, the reactor shall not be started until .he affected control rod drive has been replaced or repaired.

3.3.F. Operation with a Limiting Control Rod Pattern (for Rod Withdrawal Error, RWE)

A Limiting Rod Pattern for RWE exists when the MCPR is less than the value provided in the Core Operating Limits Report.

During operation with a Limiting Control Rod Pattern for RWE and when core thermal power is ≥ 30%, either:

1. Both rod block monitor (RBM) channels shall be OPERABLE, or

2. If only one RBM channel is OPERABLE, control rod withdrawal shall be blocked within 24 hours, or

3. If neither RBM channel is OPERABLE, control rod withdrawal shall be blocked.

G. Rod Worth Minimizer (RWM)

1. Operability

Whenever the reactor is in the Start & Hot Standby* or Run Mode below 10% rated thermal power, the RWM shall be OPERABLE.

a. With the RWM inoperable before the first 12 control rods are withdrawn on a startup, one startup per calendar year may be performed provided that control rod movement and compliance with the prescribed BPWS control rod pattern are verified by a second licensed operator or qualified member of the plant technical staff.

b. With the RWM inoperable after the first 12 control rods have been fully withdrawn on a startup, operation may continue provided that control rod movement and compliance with the

4.3.F. Operation with a Limiting Control Rod Pattern (for Rod Withdrawal Error, RWE)

During operation when a Limiting Control Rod Pattern for RWE exists and only one RBM channel is operable, an instrument functional test of the RBM shall be performed prior to withdrawal of the control rod(s). A Limiting Rod Pattern for RWE is defined by Specification 3.3.F.

G. Rod Worth Minimizer (RWM)

1. Operability

a. The RWM shall be demonstrated OPERABLE in the Start and Hot Standby Mode prior to withdrawal of control rods for the purpose of making the reactor critical and in the Run Mode when the RWM is initiated during control rod insertion when reducing THERMAL POWER by:

(1) Verifying proper annunciation of the selection error of at least one control rod which violates the prescribed withdrawal sequence loaded into the RWM, and

(2) Verifying the rod block function of the RWM by attempting to move a control rod that violates the prescribed withdrawal sequence loaded into the RWM.

*Entry into the Start and Hot Standby Mode and withdrawal of selected control rods is permitted for the purpose of determining the OPERABILITY of the RWM prior to withdrawal of control rods for the purpose of bringing the reactor to criticality.

3.3.G.1.b. prescribed BPWS control rod pattern are verified by a second licensed operator or qualified member of the plant technical staff.

c. With RWM inoperable on a shutdown, shutdown may continue, provided control rod movement and compliance with the prescribed BPWS control rod pattern are verified by a second licensed operator or qualified member of the plant technical staff.

4.3.G.1.b. The RWM shall be demonstrated OPERABLE after a sequence of rod moves has been loaded into the RWM by verifying that sequence conforms to BPWS.

3.3.G.2. Special Test Exceptions

The BPWS rod pattern requirements of Specification 3.3.G.1 may be suspended while in Startup and Hot Standby and Run Modes with thermal power less than 10% of rated to allow performance of SHUTDOWN MARGIN demonstrations, control rod scram time testing, control rod friction testing, or startup testing, provided the RWM is bypassed or individual rods in the RWM are bypassed and conformance to the approved control rod movement for the specified test is verified by a second licensed operator or qualified member of the plant technical staff.

4.3.G.2. Special Test Exceptions

If the RWM or individual rods in the RWM are bypassed, a second licensed operator or qualified member of the plant technical staff shall verify that movement of control rods is in compliance with the approved control rod moves for the specified test.

H. Shutdown Requirements

If Specifications 3.3.A through 3.3.G are not met, an orderly shutdown shall be initiated and the reactor placed in the Cold Shutdown Condition within 24 hours.

3.3.F. Operation with a Limiting Control Rod Pattern (for Rod Withdrawal Error, RWE)

Surveillance Requirements:

A limiting control rod pattern for RWE is a pattern which, due to unrestricted withdrawal of any single control rod, could result in violation of the MCPR Safety Limit. Specification 3.3.F. defines a limiting control rod pattern for RWE. During use of such patterns when both RBM channels are not operable, it is judged that testing of the RBM system prior to withdrawal of control rods to assure its operability will assure that improper withdrawal does not occur. Reference NEDC-30474-P (Ref. 17) for more information.

G. Rod Worth Minimizer (RWM)

1. Operability

Limiting Conditions for Operation:

The RWM restricts withdrawals and insertions of control rods to prespecified sequences that comply with BPWS. All patterns associated with these sequences have the characteristics that, assuming the worst single deviation from the pattern, the drop of any control rod from the fully inserted position to the position of the control rod drive would not cause the reactor to sustain a power excursion resulting in any pellet average enthalpy in excess of 280 calories per gram. An enthalpy of 280 calories per gram is well below the level at which rapid fuel dispersal could occur (i.e., 425 calories per gram). Primary system damage in this accident is not possible unless a significant amount of fuel is rapidly dispersed. Reference Section 3.6.5.4, 3.6.6, 7.14.5.3, and 14.4.2, and Appendix P of the FSAR, and NEDO-21231.

The NRC requires the RWM to be highly reliable to minimize the need to depend on a second licensed operator or qualified member of the plant technical staff to verify compliance with BPWS below 10% RTP. To accomplish this, RWM must be OPERABLE during the first 12 rod withdrawals during startup. The NRC is willing to allow one startup per calendar year without the RWM to avoid delays that may occasionally occur. Below 10% RTP with the RWM inoperable, all control rod movements and compliance with the prescribed control rod patterns must be verified by a second licensed operator or qualified member of the plant technical staff.

Above 10% RTP, the RWM is not required to be OPERABLE nor is it required to be loaded with a sequence of rod moves that conforms to BPWS.

3.3.G.1. Operability (Continued)

In performing the function described above, the RWM is not required to impose any restrictions at core power levels in excess of 10% of rated. Material in the cited references shows that it is impossible to reach 280 calories per gram in the event of a control rod drop occurring at power greater than 10%, regardless of the rod pattern. This is true for all normal and abnormal patterns including those which maximize the individual control rod worth.

At power levels below 10% of rated, abnormal control rod patterns could produce rod worths high enough to be of concern relative to the 280 calorie per gram rod drop limit. In this range, the RWM constrains the control rod sequences and patterns to those which involve only acceptable rod worths.

The RWM provides automatic supervision to assure that out of sequence control rods will not be withdrawn or inserted; i.e., it limits operator deviations from planned withdrawal sequences. It serves as a backup to procedural control of control rod sequences, which limit the maximum reactivity worth of control rods. In the event that the RWM is out of service, when required, a second licensed operator or qualified member of the plant technical staff can manually fulfill the control rod pattern conformance functions of this system.

The function of the RWM makes it unnecessary to specify a license limit on rod worth to preclude unacceptable consequences in the event of a control rod drop. At low powers, below 10%, this device forces adherence to acceptable rod patterns. Above 10% of rated power, the consequences of a rod drop event without RWM are acceptable. Power level for automatic cutout of the RWM function is sensed by feedwater and steam flow.

Surveillance Requirements:

Functional testing of the RWM prior to the start of control rod withdrawal at startup and prior to attaining 10% of rated thermal power during rod insertion while shutting down will ensure reliable operation.

2. Special Test Exceptions

In order to perform the tests required in the Technical Specifications, it is necessary to bypass the BPWS restraints on control rod movement. The additional surveillance requirements ensure the specifications on heat generation rates and shutdown margin requirements are not exceeded during the period when these tests are being performed, and individual rod worths do not exceed the values assumed in the safety analysis.

H. Shutdown Requirements

Should circumstances be such that the Limiting Conditions for Operation as stated in Specifications 3.3.A. through 3.3.G. cannot be met, an orderly shutdown shall be initiated and the reactor placed in the Cold Shutdown Condition within 24 hours.

I. Scram Discharge Volume Vent and Drain Valves

The scram discharge volume vent and drain valves are required to be OPERABLE, so that the scram discharge volume will be available when needed to accept discharge water from the control rods during a reactor scram and will isolate the reactor coolant system from the containment when required.

J. References

1. FSAR Section 3.4, Reactivity Control Mechanical Design.
2. FSAR Section 3.5.2, Safety Design Bases.
3. FSAR Section 3.5.4, Safety Evaluation.
4. FSAR Section 3.5, Control Rod Drive Housing Supports.
5. FSAR Section 14.4.3, Loss-of-Coolant Accident.
6. FSAR Section 14.4.2, Control Rod Drop Accident.
7. C. J. Paone, "Banked Position Withdrawal Sequence," NEDO-21231, January 1977.
8. FSAR Section 3.6.5.4, Control Rod Worth.
9. FSAR Section 3.6.6, Nuclear Evaluations.

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3.3.J. References (Continued)

10. FSAR Section 7.14.5.3, Rod Worth Minimizer Function

11. FSAR Section 3.6.4.1, Control Rods

12. FSAR Question 3.6.7, Amendment 24

13. "Average Power Range Monitor, Rod Block Monitor and Technical Specification Improvement (ARTS) Program for Edwin I. Hatch Nuclear Plant, Units 1 and 2," NEDC-30474-P, December 1983.

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

2.2 LIMITING SAFETY SYSTEM SETTINGS

BASES

2.2.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS

The Reactor Protection System Instrumentation Setpoints specified in Table 2.2.1-1 are the values at which the reactor trips are set for each parameter. The Trip Setpoints have been selected to ensure that the reactor core and reactor coolant system are prevented from exceeding their Safety Limits. Operation with a trip set less conservative than its Trip Setpoint, but within its specified Allowable Value, is acceptable on the basis that each Allowable Value is equal to or less than the drift allowance assumed for each trip in the safety analyses.

1. Intermediate Range Monitor, Neutron Flux

The IRM system consists of 8 chambers, 4 in each of the reactor trip systems. The IRM is a 5-decade, 10-range instrument. The trip setpoint of 120 divisions of scale is active in each of the 10 ranges. Thus, as the IRM is ranged up to accommodate the increase in power level, the trip setpoint is also ranged up. The IRM instruments provide for overlap with both the APRM and SRM systems.

The most significant source of reactivity changes during the power increase are due to control rod withdrawal. In order to ensure that the IRM provides the required protection, a range of rod withdrawal accidents have been analyzed, Section 7.5 of the FSAR. The most severe case involves an initial condition in which the reactor is just subcritical, and the IRM's are not yet on scale. Additional conservatism was taken in this analysis by assuming the IRM channel closest to the rod being withdrawn is bypassed. The results of this analysis show that the reactor is shutdown and peak power is limited to 1% of RATED THERMAL POWER, thus maintaining MCPR above the fuel cladding integrity Safety Limit. Based on this analysis, the IRM provides protection against local control rod errors and continuous withdrawal of control rods in sequence and provides backup protection for the APRM.

2. Average Power Range Monitor

For operation at low pressure and low flow during STARTUP, the APRM scram setting of 15/125 divisions of full scale neutron flux provides adequate thermal margin between the setpoint and the Safety Limits. The margin accommodates the anticipated maneuvers associated with power plant startup. Effects of increasing pressure at zero or low void content are minor and cold water from sources available during startup is not much colder than that already in the system. Temperature coefficients are small, and control rod patterns are constrained by the RWM.

CONTROL ROD DRIVE COUPLING

LIMITING CONDITION FOR OPERATION

3.1.3.6 All control rods shall be coupled to their drive mechanisms.

APPLICABILITY: CONDITIONS 1, 2 and 5*.

ACTION:

a. In CONDITION 1 or 2, with one control rod not coupled to its associated drive mechanism, the provisions of Specification 3.0.4 are not applicable, and operation may continue provided:

   1. If permitted by the RWM, the control rod drive mechanism is inserted to accomplis oupling, and recoupling is verified by demonstrati t the control rod will not go to the overtravel pos , or

   2. If recoupling is not accomplished on the first attempt or if not permitted by the RWM, the control rod is declared inoperable and fully inserted, and the requirements of Specification 3.1.3.1 are satisfied.

b. In CONDITION 5*, with a withdrawn control rod not coupled to its associated drive mechanism, within 2 hours:

   1. Insert the control rod to accomplish recoupling, and verify recoupling by demonstrating that the control rod will not go to the overtravel position, or

   2. If recoupling is not accomplished, fully insert the control rod and either electrically disarm the control rod or close the withdraw isolation valve.

   3. The provisions of Specification 3.0.3 are not applicable.

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*At least each withdrawn control rod. Not applicable to control rods removed per Specification 3.9.11.1 or 3.9.11.2.

CONTROL ROD POSITION INDICATION

LIMITING CONDITION FOR OPERATION

3.1.3.7 All control rod reed switch position indicators shall be OPERABLE.

APPLICABILITY: CONDITIONS 1, 2 and 5*.

ACTION:

a. In CONDITION 1 or 2, with one or more control rod reed switch position indicators inoperable, the provisions of Specification 3.0.4 are not applicable, and operation may continue provided that within 1 hour:

   1. The position of the control rod is determined by an alternate method, or

   2. The control rod is moved to a position with an OPERABLE reed switch position indicator, or

   3. The control rod is declared inoperable and the requirements of Specification 3.1.3.1 are satisfied;

   Otherwise, be in at least HOT SHUTDOWN within 12 hours.

b. In CONDITION 5*, with a withdrawn control rod reed switch position indicator inoperable, move the control rod to a position with an OPERABLE reed switch position indicator or fully insert the control rod. The provisions of Specification 3.0.3 are not applicable.

*At least each withdrawn control rod. Not applicable to control rods removed per Specification 3.9.11.1 or 3.9.11.2.

SURVEILLANCE REQUIREMENTS

4.1.3.7.1 The control rod reed switch position indicators shall be determined OPERABLE by verifying:

a. At least once per 24 hours, that the position of the control rod is indicated,

b. That the indicated control rod position changes during the movement of the control rod when performing Surveillance Requirement 4.1.3.1, and

c. That the control rod reed switch position indicator corresponds to the control rod position indicated by the "full-out" reed switches when performing Surveillance Requirement 4.1.3.6.b.

3/4.1.4 CONTROL ROD PROGRAM CONTROLS

ROD WORTH MINIMIZER

LIMITING CONDITION FOR OPERATION

3.1.4.1 The Rod Worth Minimizer (RWM) shall be OPERABLE.

APPLICABILITY: CONDITIONS 1 and 2*, when THERMAL POWER is less than 10% of RATED THERMAL POWER.

ACTION:

a. With the RWM inoperable before the first 12 control rods are withdrawn on a startup, one startup per calendar year may be performed provided control rod movement and compliance with the prescribed BPWS control rod pattern are verified by a second licensed operator or qualified member of the plant technical staff.

b. With the RWM inoperable after the first 12 control rods have been fully withdrawn on a startup, operation may continue provided that control rod movement and compliance with the prescribed BPWS control rod pattern are verified by a second licensed operator or qualified member of the plant technical staff.

c. With RWM inoperable on a shutdown, shutdown may continue provided control rod movement and compliance with the prescribed BPWS control rod pattern are verified by a second licensed operator or qualified member of the plant technical staff.

*Entry into OPERATIONAL CONDITION 2 and withdrawal of selected control rods is permitted for the purpose of determining the OPERABILITY of the RWM prior to withdrawal of control rods for the purpose of bringing the reactor to criticality.

3/4.1.4 CONTROL ROD PROGRAM CONTROLS

ROD WORTH MINIMIZER

SURVEILLANCE REQUIREMENTS

4.1.4.1 The RWM shall be demonstrated OPERABLE:

a. In CONDITION 2 prior to withdrawal of control rods for the purpose of making the reactor critical, and in CONDITION 1 when the RWM is initiated during control rod insertion when reducing THERMAL POWER, by.

   1. Verifying proper annunciation of the selection error of at least one out-of-sequence control rod, and

   2. Verifying the rod block function of the RWM by moving an out-of-sequence control rod.

b. By verifying the sequence of rod moves loaded into the RWM conforms to BPWS following the loading of that sequence.

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3/4.10.2 ROD WORTH MINIMIZER

LIMITING CONDITION FOR OPERATION

3.10.2 The BPWS rod pattern requirements of Specification 3.1.4.1 may be suspended while in Conditions 1 and 2 with THERMAL POWER LESS THAN 10% of RATED to allow performance of SHUTDOWN MARGIN demonstrations, control rod scram time testing, control rod friction testing, or startup testing, provided the RWM is bypassed or individual rods in the RWM are bypassed and conformance to the approved control rod movement for the specified test is verified by a second licensed operator or qualified member of the plant technical staff.

SURVEILLANCE REQUIREMENTS

4.10.2 If the RWM or individual rods in the RWM are bypassed, verify proposed movement of control rods is in compliance with the approved control rod moves for the specified test.

CONTROL RODS (Continued)

than has been analyzed even though control rods with inoperable accumulators may still be inserted with normal drive water pressure. Operability of the accumulator ensures that there is a means available to insert the control rods even under the most unfavorable depressurization of the reactor.

Control rod coupling integrity is required to ensure compliance with the analysis of the rod drop accident in the FSAR. The overtravel position feature provides the only positive means of determining that a rod is properly coupled, and therefore, this check must be performed prior to achieving criticality after each refueling. The subsequent check is performed as a backup to the initial demonstration.

In order to ensure that the control rod patterns can be followed and therefore that other parameters are within their limits, the control rod position indication system must be OPERABLE.

The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the event of a housing failure. The amount of rod reactivity which could be added by this small amount of rod withdrawal is less than a normal withdrawal increment and will not contribute to any damage to the primary coolant system. The support is not required when there is no pressure to act as a driving force to rapidly eject a drive housing.

The required surveillance intervals are adequate to determine that the rods are OPERABLE and not so frequent as to cause excessive wear on the system components.

3/4.1.4 CONTROL ROD PROGRAM CONTROLS

Control rod withdrawal and insertion sequences are established to assure that the maximum insequence individual control rod or control rod segments which are withdrawn at any time during the fuel cycle could not be worth enough to cause the peak fuel enthalpy for any postulated control rod accident to exceed 280 cal/gm. The specified sequences are characterized by homogeneous, scattered patterns of control rod withdrawal. When THERMAL POWER is ≥ 10% of RATED THERMAL POWER, there is no possible rod worth which, if dropped at the design rate of the velocity limiter, could result in a peak enthalpy of 280 cal/gm. Thus, requiring the RWM to be OPERABLE below 10% of RATED THERMAL POWER provides adequate control.

CONTROL RODS PROGRAM CONTROLS (Continued)

The RWM provides automatic supervision to assure that out-of-sequence rods will not be withdrawn or inserted.

The analysis of the rod drop accident is presented in Section 15.1.38 of the FSAR, and the techniques of the analysis are presented in a topical report, Reference 1.

The NRC requires the RWM be highly reliable to minimize the need to depend on a second licensed operator or qualified member of the plant technical staff to verify compliance with BPWS below 10% RTP. To accomplish this, RWM must be operable during the first 12 rod withdrawals during startup. The NRC is willing to allow one startup per calendar year without RWM in order to avoid delays that may occasionally occur. Below 10% RTP with the RWM inoperable, all control rod movements and compliance with the prescribed control rod patterns must be verified by a second licensed operator or qualified member of the plant technical staff.

Above 10% of RTP, the RWM is not required to be OPERABLE nor is it required to be loaded with a sequence of rod moves that conforms to BPWS.

The RBM is designed to automatically prevent fuel damage in the event of erroneous rod withdrawal from locations of high power density during high power operation. The RBM is only required to be OPERABLE when the Limiting Condition defined in Specification 3.1.4.3 exists. Two channels are provided. Tripping one of the channels will block erroneous rod withdrawal soon enough to prevent fuel damage. This system backs up the written sequence used by the operator for withdrawal of control rods. Further discussion of the RBM system and power dependent setpoints may be found in NEDC-30474-P (Ref. 4).

3/4.1.5 STANDBY LIQUID CONTROL SYSTEM

The standby liquid control (SLC) system provides a backup reactivity control capability to the control rod scram system. The original design basis for the standby liquid control system is to provide a soluble boron concentration to the reactor vessel sufficient to bring the reactor to a cold shutdown. In addition to meeting its original design basis, the system must also satisfy the requirements of the ATWS Rule 10 CFR 50.62 paragraph (c) (4), which requires that the system have a control capacity equivalent to that for a system with an injection rate of 86 gpm of 13 weight percent unenriched sodium pentaborate, normalized to a 251 inch diameter reactor vessel.

To meet its original design basis, the SLC system was designed with a sodium pentaborate solution tank, redundant pumps, and redundant explosive injection valves. The tank contains a sodium pentaborate solution of sufficient volume, concentration and B^{10} enrichment to bring the reactor to a cold shutdown. The solution is injected into the reactor vessel using one of the redundant pumps.

The volume limits in Figure 3.1.5-1 are calculated such that for a given concentration of sodium pentaborate, the tank contains a volume of solution adequate to bring the reactor to a cold shutdown, with margin. These volume limits are based on gross volume and account for the unusable volume of solution in the tank and suction lines.

To meet 10 CFR 50.62 Paragraph (c) (4), the system must have a reactivity control capacity equivalent to that of a system with an 86 gpm injection flow rate of 13 weight percent unenriched sodium pentaborate into a 251 inch diameter reactor vessel. The term "equivalent reactivity control capacity" refers to the rate at which the boron isotope B^{10} is injected into the reactor core. The standby liquid control system meets this requirement by using a sodium pentaborate solution enriched with a higher concentration of the B^{10} isotope. The minimum concentration limit of 6.2 percent sodium pentaborate solution is based on 60 atomic percent B^{10} enriched boron in sodium pentaborate and a flow rate of 41.2 gpm. The method used to show equivalence with 10 CFR 50.62 is set forth in NEDE-31096-P (Ref. 5).

Limiting Conditions for Operation are established based on the redundancy within the system and the reliability of the control rod scram system. With the standby liquid control system inoperable, reactor operation for short periods of time is justified because of the reliability of the control rod scram system. With one redundant component inoperable, reactor operation for longer periods of time is justified because the system could still fulfill its function.

STANDBY LIQUID CONTROL SYSTEM (Continued)

Surveillance requirements are established on a frequency that assures a high system reliability. Thorough testing of the system each operating cycle assures that the system can be actuated from the control room and will develop the flow rate required. Replacement of the explosive charges in the valves at regular intervals assures that these valves will not fail due to deterioration of the charges. Functional testing of the pumps is performed once per month to assure pump operability.

The sodium pentaborate solution is carefully monitored to assure its reactivity control capability is maintained. The enriched sodium pentaborate solution is made by mixing granular, enriched sodium pentaborate with water. Isotopic tests on the granular sodium pentaborate are performed to verify the actual B^{10} enrichment, prior to mixing with water. Once the enrichment is established, only the solution concentration, volume, and temperature must be monitored to insure that an adequate amount of reactivity control is available. Determining the solution concentration once per 31 days verifies that the solution has not been diluted with water. Checking the volume once each day will guard against noticeable fluid losses or dilutions, and daily temperature checks will prevent sodium pentaborate precipitation.

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1. C. J. Paone, "Banked Position Withdrawal Sequence," NEDO-21231, January 1977.

2. Deleted.

3. Deleted.

4. "Average Power Range Monitor, Rod Block Monitor and Technical Specification Improvement (ARTS) Program for Edwin I. Hatch Nuclear Plant, Units 1 and 2," NEDC-30474-P, December 1983.

5. "Anticipated Transients without Scram, Response to NRC ATWS Rule, 10 CFR 50.62", NEDE-31096-P, December 1985.

BASES

3/4.10.1 PRIMARY CONTAINMENT INTEGRITY

The requirement for PRIMARY CONTAINMENT INTEGRITY is removed during the period when open vessel tests are being performed during low power PHYSICS TESTS.

3/4.10.2 ROD WORTH MINIMIZER

In order to perform the tests required in the Technical Specifications, it is necessary to bypass the sequence restraints on control rod movement. The additional surveillance requirements ensure that the Specifications on heat generation rates and shutdown margin requirements are not exceeded during the period when these tests are being performed.

3/4.10.3 SHUTDOWN MARGIN DEMONSTRATIONS

Performance of shutdown margin demonstrations with the vessel head removed requires additional restrictions in order to ensure that criticality does not occur. These additional restrictions are specified in this LCO.

3/4.10.4 RECIRCULATION LOOPS

This special test exception permits reactor criticality under no flow conditions and is required to perform certain startup and PHYSICS TESTS while at low THERMAL POWER levels.