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SUBJECT: Application for amend to License DPR-49,consisting of RTS-208,removing RSCS requirements from TS.

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Iowa Electric Light and Power Company

July 6, 1990
NG-90-0593

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Request for Technical Specification Change
(RTS-208): Revision of TS Section 3.3,
"Reactivity Control".
Reference: NRC SER to NEDE-240111-P-A, Amendment
17, December 27, 1987.
File: A-117

Dear Mr. Murley:

In accordance with the Code of Federal Regulations, Title 10, Sections 50.59 and 50.90, Iowa Electric Light and Power Company hereby requests revision of the Technical Specifications (TSs) for the Duane Arnold Energy Center (DAEC). This revision includes changes necessary to remove Rod Sequence Control System (RSCS) requirements from the TSs and reduce the Rod Worth Minimizer (RWM) low power setpoint (LPSP) to 20% of rated power in accordance with Amendment 17 to General Electric Topical Report, NEDE-240111-P-A (GESTAR II). In addition, changes to TS Section 3.3, Reactivity Control, have been made to improve its organization, clarity and consistency with Standard Technical Specifications.

This entire application, RTS-208 (Attachments 1 and 2), has been reviewed and approved by the DAEC Operations Committee and the DAEC Safety Committee.

A copy of this submittal, which includes a no significant hazards analysis, is being forwarded to our appointed State Official pursuant to the requirements of 10 CFR 50.91.

A001
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This application is true and accurate to the best of my knowledge and belief.

IOWA ELECTRIC LIGHT AND POWER COMPANY

By _____
DANIEL L. MINECK
Manager, Nuclear Division

Subscribed and sworn to before me on this 10th day of July, 1990.

_____
Notary Public in and for the State of Iowa

Attachments: 1) Evaluation of Change Pursuant to 10 CFR 50.92
2) Proposed change RTS-208 to the Duane Arnold Energy Center Technical Specifications and List of Affected Pages.

cc: P. Bessette
L. Liu
L. Root
R. McGaughy
J.R. Hall (NRC-NRR)
A. Bert Davis
NRC Resident Office
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EVALUATION OF CHANGE PURSUANT TO 10 CFR 50.92

BACKGROUND

Technical Specifications (TSs) Section 3.3, REACTIVITY CONTROL, contains the operability and surveillance requirements for the Rod Sequence Control System (RSCS) and Rod Worth Minimizer (RWM). The rod withdrawal and insertion sequences imposed by these systems do not allow a rod drop power excursion to result in a peak fuel enthalpy in excess of 280 cal/gm. An enthalpy of 280 cal/gm is well below the level at which rapid fuel dispersal could occur (i.e., 425 cal/gm).

The RWM and RSCS are not required to impose any restrictions at core power levels greater than the Low Power Setpoint (LPSP), which is currently 20% of rated power. Analysis has shown that it is impossible to reach 280 cal/gm from a control rod drop at power levels greater than 20%, regardless of the rod pattern. However, in order to account for possible instrument inaccuracies DAEC TSs require RSCS and RWM to remain operable until 30% power.

Amendment 17 to General Electric Standard Application for Reactor Fuel, NEDE-240111-P-A (GESTAR II), requested Commission approval to:

1. Eliminate the required use of the RSCS while retaining the RWM to provide backup to the operator for control rod pattern control.

2. Lower the LPSP of the RWM to 10% of rated thermal power from its current 20% level.

On December 27, 1987, the NRC approved Amendment 17 to GESTAR II (Ref. NRC SER to Amendment 17) for use as a reference in licensee applications.

In accordance with Amendment 17 to GESTAR II, we propose to eliminate the requirement for use of the RSCS and to decrease the LPSP from the existing 30% setpoint to 20% power. The 20% LPSP allows for a 10% error in the power sensing instruments.

In addition, the proposed amendment would make changes to TS Section 3.3 to improve organization and clarity and achieve better consistency with Standard Technical Specifications.

Iowa Electric Light and Power Company, Docket No. 50-331

Duane Arnold Energy Center, Linn County, Iowa

Date of Amendment Request: July 6, 1990

Description of Amendment Request: The proposed license amendment would 1) eliminate the required use of the RSCS, 2) lower the LPSP for RWM operability to 20% of rated core power from its current 30% level, 3) revise the control rod operability and surveillance requirements for greater clarity and consistency with the Standard Technical Specifications (NUREG-0123) and 4) make administrative changes to TS Section 3.3.

ELIMINATION OF RSCS

RSCS is a hard wired system designed to monitor and, when necessary, block operator control rod selection, withdrawal and insertion actions thereby assisting in preventing significant control rod pattern errors which could allow a control rod to have a high reactivity worth (if dropped). A significant pattern error is one of the several abnormal events which must occur simultaneously in order to have a rod drop accident (RDA) which might exceed fuel energy density limit criteria for the event. It was designed only for possible mitigation of the RDA and is active during low power operation (generally less than 20% rated power). Power level for the automatic cutout of the RSCS function is sensed by first stage turbine pressure. Because the instrument can have an error of ±10% full power, RSCS operation at the DAEC is required up to 30% of rated power.

A similar pattern control function is performed by the RWM, a computer controlled system. The RWM sequence logic is stored in the plant process computer. Whenever control rods are moved by the reactor operator, the new control rod positions are compared by the computer to the stored sequence. Whenever control rod movements deviate from the sequence in memory, the RWM system generates "error signals" thereby preventing the control rod movement. Power level for automatic cutout of the RWM function is sensed by feedwater and steam flow and is set nominally at 30% rated power to be consistent with the RSCS setting.

In accordance with Amendment 17 to GESTAR II and the NRC Safety Evaluation Report (SER) to this amendment, we propose to eliminate the required use of the RSCS from the Technical Specifications because it is redundant to RWM. As a related change we propose to eliminate the TS requirements for indication of full-in and full-out control rod positions. (The only function of this indication is to provide control rod position information to the RSCS.)

The NRC has accepted General Electric Topical Report NEDE-24011-P-A for use as a reference in licensee applications and provided the following guidance in the SER for those licensees wanting to make changes suggested in the GE Topical Report.

1. The RWM TSs should contain provisions for minimizing control rod operations without the RWM.

   The DAEC has replaced its original RWM system with a state-of-the-art Nuclear Measurement Analysis and Control (NUMAC) RWM system. This stand alone microprocessor-based system provides an effective control rod monitoring routine and has exhibited superior reliability and availability. Therefore, we feel the exceptional operating history of this system combined with our commitment to providing a reliable RWM system addresses the Staff concerns and ensures operability without including operational restrictions on the RWM in the TSs.

2. The TS change request should discuss second operator procedures including a review of related forms and quality control to ensure that the second operator provides an effective and truly independent monitoring process.

The DAEC RWM Inoperative Verification procedure specifically requires that a second Licensed Reactor Operator, with no other duties, verify the control rod movements performed by the reactor operator at the console. The rod movement sequences and associated sign-off sheets are provided to the second operator for verification of each step and rod movement made by the first operator. Monitoring of rod movement by the second operator, at the process computer console, provides an independent assessment of the first operator's actions.

3. The Banked Position Withdrawal Sequence (BPWS) or an improved version should be used in order to reduce potential maximum rod worths.

   The Reduced Notch Worth Procedure (RNWP), an extension of the BPWS, is utilized at the DAEC to reduce potential rod worths. The TSs are being revised, however, to allow use of BPWS or RNWP for greater operational flexibility.

REDUCTION OF RWM LPSP

A RDA can exceed fuel energy density limits only if it occurs when reactor conditions and related parameters are within a narrow range of possible conditions. An early study concluded that the probability of having a RDA exceeding 280 cal/gm is about 10^{-12} per reactor year; thus there is a large margin to an acceptance criteria of 10^{-7} per reactor year. Since this study was conducted, about 10 times the number of reactor years included in that study have accumulated and there has been no occurrence of a rod drop or even a combination of any two of the necessary initiating events. This increased statistical data indicates that the individual probabilities used in the early study have remained about the same or decreased.

The early probability study was performed using the results of the General Electric (GE) RDA calculation methodology. More recently, Batelle National Laboratory (BNL) has performed studies of a RDA for the NRC to improve analysis methodologies. These continuing studies indicate a substantial reduction (from earlier GE studies) in enthalpy for a given control rod worth as a result of better geometrical and moderator reactivity feedback modeling. The NRC concluded from these studies that there is a large likelihood that control rod error patterns would not lead to a control rod worth which would exceed fuel damage limits in a 'zero' power RDA. The BNL study also clearly showed that in the 10 percent reactor power range (and above) peak enthalpies would always be well below the limits.

Therefore, based on the BNL and GE analyses, we propose to require operation of the RWM system only when the reactor is operating at less than 20% of rated power. The 20% LPSP allows for a conservative 10% error in the power sensing instruments.

CONTROL ROD OPERABILITY AND SURVEILLANCE REQUIREMENTS

To improve the clarity and organization of TS Section 3.3, Reactivity Controls, many of the control rod operability and surveillance requirements have been rewritten. The TS changes include reorganization of the control rod requirements for better human factors, revision of control rod operability and

surveillance requirements for better consistency with Standard Technical Specifications (STSs) and corresponding changes to the Bases section. While many of the changes are administrative in nature, several changes to control rod requirements have been made; these changes are discussed below.

Control Rod Scram Accumulator

The control rod scram accumulator Limiting Condition for Operation (LCO) has been expanded to allow one accumulator to be inoperable for no more than 8 hours provided that reactor pressure is sufficient to scram the rod. If the accumulator cannot be made operable within 8 hours or if more than one accumulator is inoperable, the associated control rod(s) must be declared inoperable. The 8 hour allowed outage time is the same time allowed by the Standard Technical Specifications for inoperable accumulators.

Control Rod Position Indication

The control rod position indication Limiting Condition for Operation (LCO) has been rewritten for improved clarity. The actions to be taken when a control rod's position cannot be verified are now stated in the inoperable control rod LCO. A surveillance requirement has been added which requires verification of each control rod position at least once per 24 hours.

Control Rod Coupling

The control rod coupling LCO has been rewritten to include more detailed requirements which are similar to those in the STS. The LCO allows only 2 hours to attempt recoupling and requires performance of the coupling surveillance upon successful coupling. The 2 hours is the same as the Standard Technical Specification allowed outage time for an uncoupled control rod. The coupling surveillance has been revised to eliminate the requirement for observing a discernible nuclear instrument response. (This response is not a valid demonstration of control rod coupling.) The requirements for "full in" and "full out" indication have been deleted because they only serve as inputs to RSCS. The actions to be taken for an uncoupled control rod are now located in the inoperable control rod LCO. The refueling coupling requirement has been relocated to TS Section 3.9, Core Alterations.

Inoperable Control Rods

The inoperable control rod LCO consolidates requirements previously located throughout TS section 3.3. In addition, the LCO now requires that the inoperable rod be fully inserted (unless it is stuck) and electrically disarmed thereby eliminating the need to verify shutdown margin. In addition, the requirement that no more than 1 inoperable rod exist in any 5 x 5 array has been changed to require that all inoperable control rods not in compliance with BPWS be separated by 2 or more operable control rods in any direction when reactor power is less than 20% of rated. This change is in accordance with BPWS/RNWP requirements.

Stuck Control Rod

The stuck control rod LCO has been expanded to specifically ensure verification of SDM and require isolation of the control rod to prevent damage to the control rod drive (CRD) and surrounding fuel should a scram occur. In addition, the requirement to shutdown the reactor if more than one control rod is stuck has been clarified.

The inoperable (stuck) rod surveillance has been modified to eliminate the requirement to exercise rods one notch every 24 hours if two or more rods are inoperable. This surveillance is only appropriate if a rod is stuck and a common mode failure is suspected.

Rod Worth Minimizer/Reduced Notch Worth Procedure

The requirement to verify the appropriate input sequence to the RWM has been changed to allow use of the Banked Position Withdrawal Sequence (BPWS) or its equivalent (Reduced Notch Worth Procedure). Use of BPWS has been approved by the Staff in the SER for Amendment 17 to GESTAR II.

Rod Block Monitor

The RBM Surveillance Requirement has been expanded to specify that the functional test is required to be performed within 24 hours of rod withdrawal when one RBM channel is inoperable. This change provides consistency with other DAEC systems and the Bases of Section 3.3.

Reactivity Anomalies

The LCO and Surveillance Requirement for Reactivity Anomalies have been reworded to be more consistent with the requirements of the standard Technical Specifications. The LCO now allows for an investigation of the apparent anomaly prior to shutdown.

Basis for proposed no significant hazards consideration:

The commission has provided standards (10 CFR 50.92(c)) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

1. The proposed change will not increase the probability of an accident because the RDA is dependent only on the control rod drive system and mechanisms themselves, and not on the RSCS or RWM systems. The changes to the TSs for these systems affect only the analysis of the RDA.

   The consequences of the RDA as evaluated in the FSAR will not be affected by this modification because an extensive probabilistic study was performed by the NRC Staff which indicated that there was not a need for the RSCS. In addition, improvements in the RDA analysis methods indicated that the

peak fuel enthalpies resulting from a RDA are significantly lower than previously determined by less refined methods.

The RSCS is redundant to the RWM. As long as the RWM is operable, control rod pattern errors are prevented and the RSCS is not needed. In the event the RWM is out of service, the TSs require that control rod movement and compliance with the prescribed control rod pattern be verified by a second licensed reactor operator. This verification process is controlled procedurally to ensure high quality, independent review of control rod movement. Therefore, elimination of RSCS requirements from the TSs will not increase the consequences of an accident previously evaluated in the FSAR.

There will also be no increase in the consequences of a RDA as evaluated in the FSAR due to lowering the RWM LPSP from 30% to 20%. The effects of a RDA are more severe at low power levels and are less severe as power level increases. Although the original calculations for the RDA were performed at 10% power, to ensure conservatism, the NRC required that the generic BWR TSs be written to require that the RWM operates at any power level below 20% power. However, GE continued to perform the RDA analyses at and below 10% power because these produced more conservative analytical results. Recently more refined calculations by BNL have shown that even with the maximum single control rod position error, and most multiple control rod error patterns, the peak fuel rod enthalpy reached during a RDA from these control rod patterns would not exceed the NRC limit of 280 cal/gm for RDAs above 10% power, confirming the original GE analyses. Therefore, lowering our RWM LPSP from 30% to 20% will not increase the consequences of an accident previously evaluated in the FSAR.

The control rod drive scram accumulators are part of the CRD system and are provided to ensure adequate control rod scram under varying conditions. The scram accumulators are needed to scram the control rods when reactor vessel pressure is low. At higher reactor pressures, vessel pressure provides the primary energy to scram the control rods. If an accumulator is inoperable at normal operating pressures (>950 psig), the associated control rod may not meet all specified scram insertion times but reactor pressure will still ensure that a scram occurs. But, because of the large number of control rods available for scram and the assumed single failure of a control rod to scram in the safety analysis, a specified amount of time (8 hours) is allowed to restore the accumulator to OPERABLE status. The 8 hours is a conservatively short period of time and is the same time allowed by the Standard Technical Specifications for inoperable accumulators. Therefore, the changes to the inoperable accumulator LCO will not affect the probability or consequences of a previously evaluated accident.

The purpose of control rod position indication is to ensure that pre-established control rod patterns are being followed during operation. While control rod position cannot affect the probability of an accident previously evaluated, it can affect the consequences of a RDA. The new TS for control rod position indication, however, only provide more information which better enables the reactor operator to determine control rod position. If a control rod's position cannot be determined by normal or alternate

means, the rod is declared inoperable and the appropriate actions must be taken. Control rod patterns must still be followed and operation of the RWM is still required below the LPSP. Therefore, the changes to the control rod position requirements cannot affect the probability or consequences of the RDA or other previously evaluated accidents.

Demonstrating that all control rods are coupled reduces the probability that a RDA will occur and therefore provides protection against violation of fuel damage criteria during reactivity initiated accidents. Continued operation with an uncoupled control rod is not desirable and, therefore, recoupling must be accomplished within two hours. This period is in accordance with the Standard Technical Specifications' allowed outage times for uncoupled control rods. Coupling still must be demonstrated by the only valid indication of coupling i.e., noting that the drive does not go to the overtravel position. The "full in" and "full out" indication was only required for operation of RSCS and does not adequately demonstrate control rod coupling. If a control rod cannot be coupled within the 2-hour period, it is declared inoperable and inserted to reduce the probability of a RDA. Therefore, the changes to the control rod coupling requirements will not affect the probability or consequences of an accident.

Although the TSs do not require that every control rod be operable, strict control over the number and distribution of inoperable rods is required to satisfy the assumptions of the safety analyses and to provide early indication of any potential generic problem in the CRD system. The organization of all inoperable rod requirements into one section better enables operators to ensure that these requirements are met. Inserting an inoperable control rod ensures that the shutdown and scram capabilities are not adversely affected. Elimination of the 5 x 5 array requirement and use of the 2 operable rod separation criteria meets the requirements of the banked position withdrawal sequence (BPWS) and therefore ensures that the control rod drop analysis remains valid. Therefore, the changes to the inoperable rod requirements will not significantly affect the probability or consequences of a previously evaluated accident.

The capability to insert the control rods ensures that the assumptions for scram reactivity in the safety analyses are not violated. The changes to the stuck control rod TSs ensure that these assumptions are met by specifically requiring that SDM be verified and by clarifying existing requirements. Exercising control rods at least once every 24 hours after a stuck rod is detected is a valid means to identify a common mode failure in the CRD system. However, exercising rods because two or more are inoperable (but not stuck) is not technically warranted. Therefore, the requirement to exercise all withdrawn or partially withdrawn control rods at least once every 24 hours when two or more rods are inoperable has been deleted. The changes to the stuck rod requirements will not significantly increase the probability or consequences of an accident.

As stated previously, the RWM cannot cause or prevent a RDA but can only limit the consequences. Verification of the correct sequence input to the RWM assures that the RWM will control rod movement so that the drop of an in-sequence 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 a peak fuel enthalpy in excess of 280 cal/gm. The RNWP currently in use with the RWM is an extension of BPWS which was originally used to limit the consequences of a RDA and is still a valid rod control sequence (ref. NRC SER to Amendment 17). Therefore, use of BPWS or its equivalent RNWP cannot increase the probability or consequences of an accident previously evaluated.

The RBM provides local protection of the core i.e., the prevention of boiling transition in a local region of the core, from a single rod withdrawal error from a limiting control rod pattern. Requiring the functional test to be performed (within 24 hours of rod movement) when one RBM channel is inoperable does not affect this safety function. The RBM is demonstrated by its monthly instrument functional tests to be operable and is considered operable until proven otherwise. This is no different from other DAEC systems. If, however, one channel is inoperable, the bases of Section 3.3 clearly indicate the need to test the remaining channel for operability. Therefore, the probability or consequences of a previously evaluated accident has not significantly increased.

Monitoring for reactivity anomalies guards against large, unexpected reactivity insertions which could have the potential for damaging the reactor. During normal plant operation, reactivity anomaly monitoring is relatively straight forward. Operation at off-rated conditions, however, makes it possible to operate with rod patterns significantly different from target rod patterns. Therefore, the technical specification for reactivity anomalies has been revised to allow for an investigation of the apparent anomaly. This requirement is similar to what is required by Standard Technical Specifications. Therefore, these changes cannot significantly increase the probability or consequences of a previously evaluated accident.

The various administrative changes to Section 3.3 (reorganization, renumbering, etc.) only serve to clarify and better define current requirements and do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The changes to the Bases of Section 3.3 only reflect the above changes to LCO and Surveillance Requirements and do not involve any increase in the probability or consequences of an accident previously evaluated.

2. The proposed change does not create the possibility for an accident different from any previously evaluated because operation of the RSCS and RWM cannot cause or prevent an accident. They function to minimize the consequences of a RDA. The RDA is already evaluated in the FSAR, and the effect of the proposed changes on this analysis is discussed in item 1 above. Elimination of the RSCS and lowering the RWM setpoint will have no impact on the operation of any other systems and cannot create the possibility for an accident to occur which has not already been evaluated.

   The changes to the control rod position indication and coupling requirements cannot create a new or different kind of accident; the revised TSs will only provide more detailed information to the operators. Rod position

information and coupling are still required. If these requirements cannot be met, the rods must be declared inoperable and the appropriate actions taken.

The changes to the scram accumulator requirements cannot cause a new kind of accident because the accumulators only serve to minimize the consequences of previously evaluated accidents. The function and design of the accumulators and control rods has not been changed.

The changes to the TS requirements applicable to inoperable and stuck control rod requirements cannot cause a new kind of accident; the actions required by these TSs only serve to minimize the consequences of accidents previously evaluated and assure that the assumptions of the safety analyses remain valid. No changes have been made which affect the operation of the control rods or any other system important to safety.

Use of the BPWS cannot create a new or different kind of accident because BPWS (and RNWP) only serve to limit the consequences of a RDA.

The RBM Surveillance Requirement cannot create the possibility of a different accident because the RBM system acts to prevent boiling transition in the core during single rod withdrawal errors with a limiting control rod pattern. This transient has been evaluated previously and the changes to the surveillance requirement do nothing to affect this analysis. No changes are being made which can affect other systems or create a new or different kind of accident.

The changes to the Reactivity Anomaly LCO and Surveillance Requirements cannot create a new and different kind of accident because no actual changes are being made to the plant and reactivity monitoring is still required at the specified intervals.

The various administrative changes to Section 3.3 (reorganization, renumbering, etc.) only serve to clarify and better define current requirements and do not create any new or different kind of accidents.

The changes to the Bases of Section 3.3 only reflect the changes to LCOs and Surveillance Requirements previously discussed and cannot create the possibility of an accident different from those previously evaluated.

3. The margin of safety will not be reduced by the elimination of RSCS. An extensive NRC study has determined that the possibility of a RDA resulting in unacceptable consequences is so low as to eliminate any need for the RSCS. The RSCS is redundant in function to the RWM; its elimination does not affect the monitoring of control rod patterns by the RWM.

   The NUMAC RWM is a state-of-the-art system and has exhibited high reliability and availability during its operating history. If, however, the RWM is out of service below 20% power, control rod movement and compliance with prescribed control rod patterns will be verified by a second licensed operator. The procedure specifically requires that a second licensed operator verify the first operator's actions while he performs rod movements. The rod movement sequences with their respective sign-off sheets

are provided for verification by the second operator of each step and rod movement made by the first operator.

The margin of safety will not be reduced by lowering the RWM LPSP from 30% to 20% because calculations performed by GE and BNL have shown that even with the maximum single control rod position error and multiple error patterns, the peak fuel rod enthalpy during a RDA from these patterns would not exceed the NRC limit (280 cal/gm) above 10% power.

In summary, GE has provided technical justification for the proposed changes in Amendment 17 to GESTAR II and the NRC has reviewed and accepted the GE analysis in the SER to Amendment 17. Therefore, there is no significant reduction in the margin of safety.

The margin of safety will not be affected by the changes to the control rod operability technical specifications or bases because the majority of the changes only reorganize or clarify previous requirements. The TSs still ensure that all assumptions of the safety and accident analyses are met and verified.

The proposed changes will not increase the probability or consequences of any previously analyzed accident, introduce any new or different kind of accident, or reduce any existing margin of safety. Therefore, this proposed license amendment involves no significant hazards consideration.

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Attorney for Licensee: Jack Newman, Kathleen H. Shea, Newman and Holtzinger, 1615 L. St. NW, Washington, D.C. 20036.

PROPOSED CHANGE RTS-208 TO THE DUANE ARNOLD ENERGY CENTER TECHNICAL SPECIFICATIONS

The holders of license DPR-49 for the Duane Arnold Energy Center propose to amend Appendix A (Technical Specifications) to said license by deleting current pages and replacing them with the attached new pages. A description of the changes and the List of Affected Pages are given below.

1. The Table of Contents has been revised to reflect the re-organization of Section 3.3.

2. A definition of Shutdown Margin has been added to Section 1.0.

3. Section 3.3.A.1 has been revised to include a value for shutdown margin (SDM). An Action Statement has been added requiring the plant to be in COLD Shutdown in 24 hours if SDM is not met.

4. Surveillance 4.3.A.1 has been rewritten for improved clarity.

5. A new Section 3.3.A.2 "Reactivity margin - inoperable control rods" has been added. It contains all the requirements for control rod operability. Previous Section 3.3.A.2, "Control Rod Exercise", has been revised and relocated to Section 3.3.A.2.f.

6. A new Surveillance requirement 4.3.A.2 has been named "Reactivity Margin - Inoperable Control Rods" and contains all the surveillance requirements for demonstrating control rod operability. Previous surveillance section 4.3.A.2, "Control Rod Exercise", has been revised and relocated to Section 4.3.A.2.f(i) and (ii).

7. Section 3.3.A.2.a contains accumulator operability requirements previously located in section 3.3.A.2.c. An 8 hour allowed outage time and explicit reference is made to the action statement for inoperable control rod.

8. Surveillance 4.3.A.2.a contains accumulator surveillance requirements previously located in Section 4.3.A.2.c. This requirement has been reworded for clarity.

9. Section 3.3.A.2.b contains control rod position indication requirements previously located in Section 3.3.A.2.c. This section has been clarified and explicit reference is made to the action statement for an inoperable control rod.

10. Surveillance 4.3.A.2.b has been added requiring verification of control rod position every 24 hours.

11. Section 3.3.A.2.c contains scram time requirements previously located in Section 3.3.A.2.e. The section containing actual scram time requirements has been renumbered.

12. Section 3.3.A.2.d contains control rod coupling requirements previously located in Section 3.3.B.1. This section has been rewritten to state that a maximum of 2 hours is allowed to recouple an uncoupled control rod and

to require performance of coupling surveillance requirement 4.3.A.2.d upon successful recoupling. A reference to the action statement for inoperable control rods has been added.

Control rod "Full In" and "Full Out" indication requirements previously contained in Section 3.3.B.1 have been deleted.

The discussion of requirements in the refuel condition now references the refuel control rod operability requirements.

13. Surveillance 4.3.A.2.d contains the surveillance requirements for control rod coupling previously located in section 4.3.B.1. The requirement for "Full In" and "Full Out" indication has been deleted as has the requirement to observe nuclear instrument response to verify coupling.

    The refueling surveillance requirement previously located in section 4.3.B.1.c has been relocated to Core Alterations section 4.9.

14. Section 3.3.A.2.e now specifies the actions for an inoperable control rod which were previously located in sections 3.3.A.2.b and 3.3.A.2.f. This LCO has been revised to require insertion of the inoperable control rod rather than verifying SDM is met. (A note has been added allowing bypassing the RWM to insert this rod.)

    The requirement that no more than 1 inoperable rod exist in any 5 x 5 array has been revised to require that all out-of-sequence (not in compliance with BPWS) inoperable control rods be separated by 2 or more operable control rods in any direction.

    A statement has been added allowing rearming of the control valves (of inoperable control rods) for testing associated with returning the rod to operable status.

    All references to RSCS have been deleted.

15. Section 3.3.A.2.f contains the requirements for a stuck rod previously located in section 3.3.A.2.a. This section has been expanded to ensure compliance with SDM and BPWS and isolation of the drive and exhaust water isolation valves.

16. Surveillance 4.3.A.2.f contains surveillance requirements for control rods previously located in section 4.3.A.2.a. The reference to 30% power has been changed to 20% power. The requirement to exercise rods every 24 hours when 2 or more rods are inoperable (other than collet housing failure) has been deleted.

17. Section 3.3.A.3 contains CRD housing requirements previously located in section 3.3.B.2. The language has been reworded for clarity and to eliminate redundancy.

18. Surveillance 4.3.A.3 contains the CRD housing surveillance requirement previously located in section 4.3.B.2.

19. Surveillance 4.3.B has been renamed "Scram Discharge Volume" and contains the scram discharge volume surveillance requirements previously located in Section 4.3.A.2.d and 4.3.A.2.e. These requirements have been reworded for clarity.

20. Section 3.3.C has been renamed "Reactivity Control Systems" and contains equipment operability requirements previously located in sections 3.3.B.3, 3.3.B.4 and 3.3.B.5. RSCS operability requirements previously located in section 3.3.B.3.a have been deleted.

21. Section 3.3.C.1 contains the RWM requirements previously located in sections 3.3.B.3.b and 3.3.B.3.c. All references to RSCS have been deleted. The requirements for operation at less than 30% power have been changed to 20% power. The statement regarding limited control rod movement has been deleted.

22. Surveillance 4.3.C has been renamed "Reactivity Control Systems" and contains RWM surveillance requirements previously located in section 4.3.B.3.b. The requirement to verify RWM operation prior to reaching 30% power during a shutdown has been revised to prior to reaching 20% power. The reference to RNWP has been changed to BPWS (or equivalent).

23. Section 3.3.C.2 contains requirements previously located in section 3.3.B.4.

24. Surveillance 4.3.C.2 contains the SRM surveillance requirements previously located in section 4.3.B.4.

25. Section 3.3.C.3 contains requirements previously located in section 3.3.B.5.

26. Surveillance 4.3.C.3 contains the RBM surveillance requirements previously located in Section 4.3.B.5. This requirement has been reworded to clarify that the instrument functional check must be performed within 24 hours of rod withdrawal if one channel of RBM is inoperable.

27. Section 3.3.D contains the control rod scram time requirements previously located in section 3.3.C. An LCO has been added requiring the plant to be in COLD Shutdown in 24 hours if the scram times are not met for operable rods.

28. Surveillance 4.3.D contains the scram insertion time surveillance requirements previously located in section 4.3.C. All references to RSCS rod sequences have been deleted and discussions of 30% power have been changed to 20% power.

29. Section 3.3.E contains information concerning reactivity anomalies previously contained in section 3.3.D. This section has been reworded for clarity and to be more consistent with Standard Technical Specifications.

30. Surveillance 4.3.E contains reactivity surveillance requirements previously located in section 4.3.D. These requirements have been reworded

for clarity and to be more consistent with Standard Technical Specifications.

31. Section 3.3.F contains the recirculation pump requirements previously located in section 3.3.E.

32. Surveillance 4.3.F contains the recirculation pump surveillance requirements previously located in section 4.3.E.

33. Section 3.3.F has been deleted.

34. The Bases of Section 3.3 have been re-organized and revised to correspond to the changes discussed above.

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