



Commonwealth Edison

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March 28, 1988

Mr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Quad Cities Station Unit 2
Proposed Technical Specification
Amendment - Unit 2 Cycle 10 Reload
NRC Docket No. 50-265

References: Listed in Attachment 1

Dear Mr. Murley:

Pursuant to 10 CFR 50.90 and 10 CFR 50.59, Commonwealth Edison Company (CECo) proposes to amend Facility Operating License DPR-30, Appendix A, Technical Specifications, to support operation of Quad Cities Unit 2 during Cycle 10. The changes involve the addition of Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits for the reload fuel and adjustment of the Minimum Critical Power Ratio (MCPR) limit to reflect the results of Cycle 10 transient analyses. The transient and accident analyses have been performed to support several Equipment Out-Of-Service and Expanded Operating Domain modes and the respective Technical Specifications changes. These changes are similar to those previously approved in the NRC SER for Quad Cities Unit 1 Cycle 10 (Amendment No. 103 to DPR-29).

The following documents are provided as attachments to support our proposed amendment:

- Attachment 1: Summary of Unit 2 Cycle 10 Reload and Related Analyses and List of References.
- Attachment 2: Evaluation of Significant Hazards Consideration
- Attachment 3: Proposed License and Technical Specification Changes for Quad Cities Unit 2 (Summary and Revised Pages).
- Attachment 4: General Electric Supplemental Reload Licensing Submittal for Unit 2 Cycle 10
- Attachment 5: NEDE-31345P "Quad Cities Station Units 1 and 2 SAFER/GESTR - LOCA Loss-of-Coolant Accident Analysis," Revision 1 dated January, 1988.

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March 28, 1988

Attachment 6: NEDE-31449, "Extended Operating Domain and Equipment Out-of-Service for Quad Cities Nuclear Power Station Units 1 and 2," dated June, 1987.

Please note that Attachment 5 is considered proprietary to General Electric and the associated affidavit has been included.

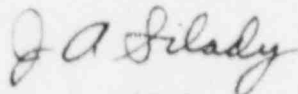
The analyses discussed in Attachment 4, 5, and 6 apply improved GE methods which have been generically reviewed and approved by the Staff and have been previously utilized on other reload applications including Quad Cities Cycle Unit 1 Cycle 10.

The proposed amendment has been On-Site and Off-Site reviewed and approved. We have reviewed this amendment request and determined that No Significant Hazards Consideration (NSHC) exists. CECO has notified the State of Illinois of our request and NSHC determination by providing a copy of this letter and the Attachments to the designated State Official.

In accordance with 10 CFR 170, a fee remittance in the amount of \$150.00 is enclosed.

We request your approval of this amendment by June 15, 1988 to support necessary preparations for the Cycle 10 start-up. If you have any further questions regarding this submittal, please contact this office.

Very truly yours,



J. A. Silady

Nuclear Licensing Administrator

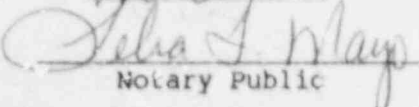
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Enclosure: Fee Remittance

Attachments (6)

cc: A.B. Davis - Region III Inspector
NRC Resident Inspector - Quad Cities
T. Ross - NR?
M.C. Parker - IDNS

SUBSCRIBED AND SWORN to
before me this 28th day
of March, 1988



Notary Public

ATTACHMENT 1

SUMMARY OF QUAD CITIES UNIT 2 CYCLE 10 RELOAD AND RELATED ANALYSES

A. BACKGROUND

Quad Cities Unit 2 Cycle 10 (QC2 C10) will use 92 BD300C and 72 BD316A fuel bundles. Both reload fuel types are GE8X8EB fuel, which is discussed in section B. Additional information on this reload may be found in the Supplemental Reload Licensing Submittal (Reference 1) which is enclosed as Attachment 4.

This reload was performed by GE using their new advanced reload licensing methods. These new methods are known as the GEMINI methods and replace the GENESIS methods. ECCS aspects of this reload were analyzed with GE's SAFER/GESTR-LOCA methods rather than the SAFE/REFLOOD LOCA methods. Key input parameters were reviewed by CECO Nuclear Fuel Services Department and the Station Staff. The GEMINI and SAFER/GESTR-LOCA methods were previously used for the Q1 C10 reload (Reference 13).

Included as part of this reload are analyses for the following Equipment Out-Of-Service and Extended Operating domain operating modes (EOOS/EOD): increased core flow, feedwater heater(s) out-of-service, feedwater temperature reduction, relief valve out-of-service, and single loop operation. In addition, the Extended Load Line Limit Analysis (ELLLA) region of the power/flow map continues to be supported for QC2 C10. Table A-1 summarizes the analyzed, combined modes of operation.

The following sections provide a discussion on the key features of this reload, and a summary of the proposed Technical Specification changes for Unit 2 Cycle 10.

B. GE8X8EB FUEL

The reload fuel for Cycle 10 is of the GE8X8EB fuel design which includes four water rods. Previous cycles only used one or two water rods. The GE8X8EB fuel design has been reviewed and approved generically by the NRC (References 2, 3, and 4) and has been incorporated into Revision 8 of GESTAR-II (Reference 5). GE has included the bundle specific information for the QC2 C10 fuel types in Reference 9, which is enclosed as Attachment 5.

The reload fuel has several improved mechanical and nuclear features. Mechanical improvements include increased pre-pressurization for increased exposure capability, an increased pellet diameter (resulting in a smaller pellet-clad gap), an option for additional water rods, single diameter upper end plug shafts, and a streamlined upper tie plate to reduce the two-phase pressure drop. Some of the nuclear features include higher bundle enrichments, axially zoned gadolinia and the option for additional water rods mentioned earlier. Overall these features allow for improved fuel cycle costs, increased flexibility and improved operating margins including an increase in the LHGR limit from 13.4 kw/ft to 14.4 kw/ft.

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B.1 LHGR Limit

The purpose of the thermal limits on the linear heat generation rate (LHGR) are to prevent plastic strain of the cladding from exceeding 1% and to prevent fuel melting. Since the LHGR's are a function of fuel type, exposure and gadolinia, GE has calculated a new LHGR limit of 14.4 kw/ft for the GE8X8EB fuel, which conservatively applies to any exposure or gadolinia content. This LHGR limit was calculated using GESTR-MECHANICAL, the GE fuel rod thermal-mechanical performance model. The NRC has found the use of the GESTR-MECHANICAL code acceptable for determining this limit (References 2 and 3). The NRC has also indicated in Reference 2 that GE has demonstrated, using the GESTR-MECHANICAL code, compliance with the fuel design basis criteria of:

1. No fuel melting during normal steady-state operation and whole core anticipated operational occurrences.
2. A small amount of fuel melting not exceeding 1% cladding strain for local anticipated operational occurrences.

These are satisfied for GE8X8E and GE8X8EB throughout the NRC approved burnup range.

The Technical Specifications have been revised to indicate the new LHGR limit for the GE8X8EB fuel.

B.2 MAPLHGR Curves

For GE fuel, maximum average planar heat generation rate (MAPLHGR) curves have served to provide secondary limits in fuel mechanical design supplementing the traditional LHGR limit. This is in addition to their original purpose in assuring that initial conditions of the ECCS analyses remain valid. With the improved SAFER/GESTR-LOCA analyses, LOCA initial condition MAPLHGRs allowed are 12.8 kw/ft for P8X8R and 13.8 kw/ft for GE8X8EB fuel. These values are independent of nodal exposure. More restrictive MAPLHGR curves, however, are utilized to assure fuel rod mechanical integrity. These curves are provided in Appendix B of Reference 9, and are included in the proposed Technical Specification Figure 3.5-1.

C. SAFER/GESTR-LOCA ECCS ANALYSIS

GE has re-analyzed Quad Cities units with an improved ECCS analysis code package called SAFER/GESTR-LOCA. GESTR-LOCA is a variation of the GESTR-MECHANICAL fuel mechanical design code and is used to calculate the initial fuel assembly stored energy at the beginning of the LOCA event. SAFER is the combination of previous GE ECCS codes SAFE and REFLOOD along with some modeling improvements. CHASTE is also used for fuel heatup

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calculations. The GE ECCS methodology is described in detail in Reference 10 Volumes I, II, and III. In the SAFER/GESTR-LOCA methodology, the break spectrum is modelled using "best estimate" input parameters in accordance with the Reference 10 methods. Once the entire break spectrum has been analyzed using nominal parameters, the most limiting break is re-analyzed using input parameters fully consistent with 10 CFR 50 Appendix K criteria. This (when combined with a small uncertainty added) provides the licensing basis peak clad temperature (PCT). Additionally, experimental, code, benchmark, modeling and measurement uncertainties are combined with the nominal PCT calculation to provide an upper bound "95/95" PCT. The licensing basis PCT must be greater than the upper bound PCT. For Quad Cities:

Nominal PCT	828°F
Licensing Basis PCT (Appendix K + Adder)	1382°F
Upper bound (95/95) PCT	1275°F

As can be seen 818°F margin exists to the 10 CFR 50.46 requirement of 2200°F. Additionally 325°F margin exists between the interim NRC requirement that the upper bound PCT be below 1600°F. It should be noted that under SAFER/GESTR-LOCA the limiting break/single failure is now a design basis (double-ended guillotine) break in the recirculation suction line with DG/HPCI failure. This is different than the previous SAFE/REFLOOD analysis limiting break scenario of a design basis break in the recirculation suction line with failure of the LPCI injection valve. The DG/HPCI failure assumes two failures, and so is more conservative than the worst single active component failure.

All of the Quad Cities analyses were performed with one relief valve out of service (RVOOS); thus, no MAPLHGR penalty is required for one (1) RVOOS.

Additionally, single loop operation (SLO) was analyzed with SAFER/GESTR-LOCA. The new nominal PCT for SLO increased by 186°F to 1014°F while the Appendix K calculation increased 111°F to 1488°F. Thus, no MAPLHGR penalty is required during SLO.

D. CORE WIDE TRANSIENTS

D.1 Relief Valve Out-Of-Service (RVOOS)

All Core Wide Transients and ECCS analyses were performed with the most restrictive relief valve, i.e. the Target Rock S/KV, out-of-service. This reload package therefore includes a Technical Specification change to allow extended operation with one RVOOS and limited operation (7 days) with two RVOOS provided HPCI is demonstrated to be operable. These provisions were previously approved for the Q1 C10 reload (Reference 14).

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D.2 MCPR Safety Limit

GE has recently received approval of an upgraded MCPR fuel cladding integrity safety limit (Reference 7). The NRC has approved a MCPR fuel cladding integrity safety limit of 1.04 for all D-lattice plants with second successive reloads of high bundle initial R-factor GE fuel, e.g., P8x8R, BP8x8R, GE8x8E or GE8x8B. Quad Cities Unit 2 contains this type of fuel; therefore, the upgraded MCPR fuel cladding integrity safety limit is applicable.

D.3 Limiting MCPR Transient

The Cycle 10 MCPR operating limit required to preclude violation of the fuel cladding integrity limit would be 1.30 for P8x8R, BP8x8R and GE8x8EB fuel. This value is based on the Load Reject without Bypass (LR w/o BP) event at an extended EOC exposure with Increased Core Flow and Final Feedwater Temperature Reduction, and was calculated using Option "B" of GE's advanced reload methods (GEMINI). The current MCPR LCO of 1.38 can therefore be changed to 1.30 based on the calculated delta CPR and the 1.04 safety limit discussed above.

D.4 Compliance to ASME Pressure Vessel Code

The results of the Q2C10 analyses for the postulated MSIV closure with indirect scram and no Relief Valve credit, provided in Reference 1, indicate that the peak steamline pressure will be 1300 psig and the peak vessel pressure will be 1324 psig. These values are within the Technical Specification safety limit of 1345 psig for steam dome pressure and the ASME vessel over-pressurization limit of 1375 psig (110% of design pressure) for anywhere in the primary system.

D.5 ATWS Recirculation Pump Trip (RPT)

This reload analysis again includes the ATWS mitigating Recirculation Pump Trip (RPT) system with a trip setpoint of 1250 psig.

E. LOCAL TRANSIENTS

E.1 Rod Withdrawal Error

For the past several cycles a plant/cycle specific Rod Withdrawal Error (RWE) event has not been analyzed, but rather a statistical generic analysis was referenced. Due to the incorporation of the new GE8x8EB fuel, GE performed a cycle specific analysis. The results of this analysis calculated a delta CPR of 0.12 for the current rod block setpoint of 107%, which when added to the safety limit provides an event MCPR LCO of 1.16. The delta CPR for a rod block monitor (RBM) setpoint of 108 was calculated to be 0.20, which provides an event MCPR LCO of 1.24. This is bounded by both the LR w/o BP event and the proposed Technical Specification operating limit of 1.30. The Technical Specification for the RBM upscale trip level setting has been revised from $0.65W_D+42$ to $0.65W_D+45$ so that at 100% drive flow the rod block setting is equal to 108%.

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E.2 Fuel Loading Error Event

The worst case bundle misorientation for Q2 C10 results in MCPR equal to or less than the 1.07 safety limit when its initial MCPR is less than or equal to 1.21 (1.19 + 0.02, GE calculation plus an NRC imposed variable water gap penalty). This is bounded by the initial CPRs required by the Q2C10 LR w/o BP analysis and the proposed Quad Cities Unit 2 Technical Specification operating limit of 1.30.

F. STABILITY ANALYSIS

The NRC approval of GE's Amendment 8 to GESTAR II (Reference 5) stated that a cycle specific stability analysis was not required for BWR 3's since they have been shown to have adequate stability margins. As a result, GE did not provide a stability analysis in the supplemental reload licensing submittal for Q2 C10. However, GE was later requested and did provide a stability analysis for Q2 C10.

The Q2 C10 decay ratio at the intersection of the natural recirculation line and the extrapolated APRM rod block line power level is 0.58. Since the existing and proposed Technical Specifications do not allow continued operation on natural circulation, combinations of low flow and high power sufficient to produce high decay ratios are not permitted. GE has also confirmed that the reduced slope of 0.58 for APRM Rod Block flow biasing was used in the Q1C10 stability analysis. This assures the continued acceptability of operating in the expanded power/flow region previously approved by the NRC.

G. ACCIDENTS

G.1 Loss of Coolant Accident

See Section C for the Peak Cladding Temperature results of the new SAFER/GESTR-LOCA analyses. Compliance with other 10 CFR 50.46 ECCS criteria was also demonstrated. Please note that NEDO-24146A "Loss of Coolant Accident Analysis for Dresden Units 2/3 and Quad Cities Units 1/2 Nuclear Power Stations" is therefore replaced by NEDC-31345P "Quad Cities Nuclear Power Station Units 1 and 2 SAFER/GESTR - LOCA Loss of Coolant Accident Analysis" (Reference 9) as the primary reference for the Quad Cities ECCS licensing basis.

G.2 Rod Drop Accident

The Rod Drop Accident (RDA) event has been statistically analyzed on a generic basis and is no longer analyzed on a plant/cycle specific basis. The generic analysis provides assurance that the 280 cal/gram enthalpy deposition limit will not be violated. GE supplemented the generic analyses with PRC 86-07 (Reference 12), which looked at different scenarios. The highest deposition of enthalpy calculated was 171 cal/gram. This provides confidence on the 95/95 level that the Technical Specification limit will not be violated in the unlikely

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event of the postulated Design Basis RDA. The generic RDA Analysis has been approved by the NRC, Quad Cities On-Site Review 84-3 and Quad Cities Off-Site Review 84-2. This is supplemented with a three one-notch error analysis which CECO has implemented for consistency with the new Rod Worth Minimizer.

H. SINGLE LOOP OPERATION (SLO)

Although Quad Cities Unit 2 currently has Technical Specifications to allow SLO with a MAPLHGR Reduction factor of 0.84, the results of the SAFER/GESTR-LOCA Analysis described in Section H.1 have shown that there is no need for a MAPLHGR penalty, therefore this penalty will be deleted from the Technical Specifications. To support the new GE8X8EB fuel design, and the increased operating domain, the Quad Cities SLO analysis previously performed (Reference 6) was reviewed to verify that it remains applicable. In Reference 11, GE considered the MCPR safety and operating limits, stability margin and LOCA analyses. They concluded that the prior SLO analyses (Reference 6) remain applicable for the new fuel type and with one relief valve out of service.

I. INCREASED CORE FLOW/FINAL FEEDWATER TEMPERATURE REDUCTION

Operation at greater than rated core flow is supported by the analysis in Reference 11. Reference 11 reviewed the considerations of the reload licensing submittal (Reference 1) and further considerations, such as feedwater nozzle fatigue.

The Increased Core Flow (ICF) analysis was performed at the bounding condition of rated thermal power and 108% rated core flow. Where reduced feedwater temperature might affect the analysis, cases were run with a 100°F reduction in temperature, as well as the normal temperature. This assures that the analysis is valid for cycle extension using Final Feedwater Temperature Reduction (FFWTR). An exposure greater than that expected for the End-of-Cycle is assumed. The analysis concludes that operation within the ICF region will have no impact on safe plant operation, with or without FFWTR.

The operating restriction in the license for coastdown to 40% and off normal FW heating during coastdown is no longer required. The FFWTR analyses analyzed coastdown to 20% with a FW temperature reduction of 100°F, thereby bounding the license restriction and all expected coastdown needs.

As part of the Reference 11 evaluation of ICF, the following areas were determined to either be bounded by other modes, within acceptable limits, or unaffected in some cases (such as Fuel Loading Error).

- 1) Limiting MCPR transients
- 2) ASME Pressure Vessel Code
Overpressurization Compliance
- 3) Rod Withdrawal Error
- 4) Fuel Loading Error
- 5) Stability
- 6) LOCA

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- 7) RDA
- 8) Fuel and reactor internals mechanical loadings
- 9) Reactor internal vibration
- 10) Feedwater nozzle fatigue
- 11) Containment LOCA response

J. FEEDWATER HEATER OUT-OF-SERVICE

Reference 11 reviewed operation with a 100°F reduction in feedwater temperature, which could occur due to FW heater operational problems during the cycle prior to the start of coastdown. The expanded operating domain, with the exception of the Increased Core Flow (ICF) region, was examined. (Planned use of FW temperature reduction was evaluated in ICF as a cycle extension strategy. See Section I.) The reference concludes that a cycle independent MCPR limit can be established, that the effect on LOCA response is negligible, and that feedwater nozzle refurbishment requirements increase if feedwater heater out-of-service (FWHOOS) is used for greater than 10% of each cycle.

J.1 Transient Analysis

The cycle independent value of MCPR from Reference 11 which included FWHOOS, was 1.32. However, this value was calculated using a Safety Limit MCPR value of 1.07. Adjusting this to the proposed value of 1.04 for Safety Limit MCPR yields a cycle independent MCPR value of 1.29. This value is bounded by Q2C10 limiting MCPR of 1.30, therefore the cycle specific value will be used.

J.2 LOCA Analysis

The impact of FWHOOS on LOCA was reviewed in Reference 11. The peak cladding temperature (PCT) change from the nominal case was less than 10°F. In light of the large PCT margin available (see Section C above), the effect of FWHOOS on LOCA is negligible.

K. CONCLUSION

With approval of the proposed Technical Specifications, Commonwealth Edison concludes that there are no unresolved safety issues for the Quad Cities Unit 2 Cycle 10 reload in that:

- a. Neither the probability of an occurrence nor the consequence of an accident or malfunction of safety related equipment, as previously evaluated in the safety analysis report, is increased.
- b. The possibility for an accident or malfunction of a different type than previously evaluated in the safety analysis report is not created.
- c. The margin of safety, as defined in the basis for any Technical Specification, is not reduced.

TABLE A-1

ANALYZED COMBINED MODES OF OPERATION

<u>Recirculation System Status</u>	<u>Power/Flow EOD</u>	<u>EOOS</u>
DLO	ELLLA	-
DLO	ELLLA	RVOOS
DLO	ELLLA	FWHOOS
DLO	ICF	-
DLO	ICF	RVOOS
DLO	ICF + FFWTR	-
DLO	ICF + FFWTR	RVOOS
DLO	FFWTR	-
DLO	FFWTR	RVOOS
SLC*	ELLLA	-
SLO*	ELLLA	RVOOS

* Crosstie Closed

REFERENCES

1. GE document 23A5864 "Supplemental Reload Licensing Submittal for Quad Cities Nuclear Power Station Unit 2 Reload 9," June 1988 (Attached).
2. NRC letter, M/N-148-85, H. N. Berkow to J. S. Charnley, "Acceptance for Approval of Fuel Designs Described in Licensing Topical Report NEDE-24011-P-A-6, Amendment 10 for Extended Burnup Operation," dated December 3, 1985.
3. NRC letter MFN-082-85, C. O. Thomas to J. S. Charnley, "Acceptance for Referencing of Licensing Topical Report NEDE-24011-P-A-6, Amendment 10, 'General Electric Standard Application for Reactor Fuel,'" dated May 28, 1985.
4. GE letter JSC-058-84, J. S. Charnley to C. O. Thomas, "Submittal of Proposed Amendment 10 to GE LTR NEDE-24011-P-A-6," dated November 30, 1984.
5. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel", Revision 8.
6. GE document NEDO-24807, "Dresden Nuclear Power Station Units 2 and 3 and Quad Cities Nuclear Power Station, Units 1 and 2 Single Loop Operation," dated December 1980.
7. NRC letter, A.C. Thaudani (NRC) to J.S. Charnley (GE), "Acceptance for Referencing of Amendment 14 to General Electric Licensing Topical Report NEDE-24011-P-A, 'General Electric Standard Application for Reactor Fuel' (TAC No. 60113)," dated December 27, 1987.
8. NRC letter C. O. Thomas to H. C. Pfefferlen, "Acceptance for Referencing of Licensing Topical Report NEDE-24011, Rev. 6, Amendment 8, 'Thermal Hydraulic Stability Amendment to GESTAR II,'" dated April 24, 1985.
9. GE document NEDC-31345P, "Quad Cities Station Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," Revision 1, dated January, 1988 (Attached).
10. NEDC-23785P, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident," Volume I, II, and III.
11. GE document NEDE-31449, "Extended Operating Domain and Equipment Out-of-Service for Quad Cities Nuclear Power Station Units 1 and 2," dated June 1987 (Attached).
12. GE letter G-EBO-7-190, J. A. Miller to H. E. Bliss, "GE PRC 86-07 Limiting Control Rod Sequence for CRDA", May 6, 1987.
13. GE document 23A5831 "Supplemental Reload Licensing Submittal for Quad Cities Nuclear Power Station Unit 1 Reload 9," June 1987.
14. NRC letter, T.M. Ross to L.D. Butterfield dated December 15, 1987 transmitting NRC SER for Quad Cities Unit 1 Cycle 10 Reload (Amendment No. 103 to DPR-29).

ATTACHMENT 2

QUAD CITIES UNIT 2 CYCLE 10 RELOAD

SIGNIFICANT HAZARDS EVALUATION

Commonwealth Edison proposes to amend Facility Operating License DPR-30 for Quad Cities Unit 2 to support the Cycle 10 core reload. The proposed revisions include three types of changes: (a) changes specific to the cycle 10 reload fuel and related analyses including improved methodology, (b) changes resulting from analyses to expand the operating region and allowable equipment out-of-service, (c) changes that are administrative or provide clarification.

Description of Amendment Request

The Technical Specification changes specific to the Cycle 10 reload fuel and analyses including improved analytical methodologies:

- 1) Incorporation of the Cycle 10 Minimum Critical Power Ratio (MCPR) limit and new T_{AVE} values.
- 2) Addition of Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits for the reload fuel.
- 3) Addition of an LHGR limit specific to the GE8X8EB fuel.
- 4) Increasing the rod block monitor (RBM) setpoint.
- 5) Reduction of the MCPR fuel cladding safety limit from 1.07 to 1.04 as generically approved by the NRC for this type of fuel.

The Technical Specification changes resulting from analysis performed to expand the operating region and to allow operation with certain equipment out-of-service include:

- 6) Changes to the analyzed operating region to include increased core flow (ICF) and feedwater temperature reduction (FTR).
- 7) Revision of the Automatic Pressure Relief Subsystem Technical Specification to require action only after two or more relief valves are found to be inoperable.
- 8) Deletion of the license operating restriction for coastdown to 40% power and coastdown with off-normal FW heating.

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The Technical Specification changes which are administrative or provide clarification include:

- 9) Updating references to reflect new analytical methods and models (e.g., GEMINI, SAFER/GESTR-LOCA, etc.)
- 10) Bases clarifications concerning the Automatic Pressure Relief function.

BASIS FOR PROPOSED NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Commonwealth Edison has evaluated the proposed Technical Specifications and determined that they do not represent a significant hazards consideration. Based on the criteria for defining a significant hazards consideration established in 10 CFR 50.92(c), operation of Quad Cities Unit 2 Cycle 10 in accordance with the proposed changes will not:

- a. Involve a significant increase in the probability or consequences of an accident previously evaluated because:
 - 1,2) The incorporation of the MCPR and MAPLHGR limits noted above is explicitly provided in order to establish limits on normal reactor operation which ensure that the core is operated within the assumptions and initial conditions of the accident analyses. Operation within these limits will assure that the consequences of the affected transient and accidents remain within the results of the analyses. These limits were generated using analytical methods previously approved by the NRC. The probability of an accident is not affected by this change because no physical systems or equipment which could initiate an accident are significantly affected.
 - 3) GE has calculated the LHGR limit for the GE8X8EB fuel using the GESTR-MECHANICAL code, which has been found acceptable by the NRC, and demonstrated that the new LHGR limit (together with the appropriate MAPLHGR limit) assures that the fuel design basis criteria are satisfied for GE8X8EB fuel. Therefore, the consequences of previously analyzed accidents are not significantly increased by the LHGR changes. The probability of an accident is not affected because no physical systems or equipment which could initiate an accident are significantly affected by this change.
 - 4) GE has performed a cycle specific rod withdrawal error analysis, which demonstrates that the consequences of an accident are not affected since a rod block reading of 108% results in a) an event MCPR which is bounded by the proposed MCPR LCO and b) LHGRs within the design basis. The probability of an accident is not affected by this change because no physical systems or equipment which could initiate an accident are significantly affected.

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- 6&8) The proposed changes to increase the allowable operating region, including coastdown to 20% and coastdown with off-normal FW heating, have been analyzed by GE using NRC approved methods to determine the operating restrictions (MCPR, MAPLHGR). GE demonstrated that the MCPR and MAPLHGR limits are bounded by the previous cycle and the proposed values for MCPR and MAPLHGR. The probability of an accident is not increased because operation in the expanded region does not significantly alter the normal operation of the equipment, for which failures have been previously analyzed.
- 7) GE has performed all cycle transient and LOCA analyses assuming the most limiting relief valve out-of-service.
- 8&9) These bases section changes are administrative in nature and have no impact on any systems or limits on reactor operation.
- b. Create the possibility of a new or different kind of accident from any accident previously evaluated because:
- 1-5) The proposed MCPR, MAPLHGR and LHGR limits and RBM setpoint represent limitations on core power distribution which do not directly or significantly affect the operation or function of any system or component whose failure could initiate an accident. Therefore, the possibility of a new or different kind of accident is not created.
- 6,8) The expanded operating region represents changes to the core power and flow distribution and does not significantly affect the operation or function of any system or component. The major component affected is the recirculation pumps whose failure has been previously analyzed. As a result, there is no significant impact on or addition of any system or equipment whose failure could initiate an accident.
- 7) GE assumed operation with the most limiting relief valve out-of-service in the transient and LOCA analyses. Therefore, this condition has been analyzed and no new or different accidents are created.
- 8&9) These changes are administrative in nature and have no impact on or involve modification to any system or equipment whose failure could initiate an accident.
- c. Involve a significant reduction in the margin of safety because all of the proposed changes have been analyzed to demonstrate that the consequences of transients or accidents are not increased beyond that previously evaluated and accepted at Quad Cities.

Based on the above discussion, Commonwealth Edison concludes that the proposed amendments do not represent a significant hazards consideration.

ATTACHMENT 3

QUAD CITIES UNIT 2 CYCLE 10

- A. SUMMARY OF PROPOSED CHANGES
- B. PROPOSED TECHNICAL SPECIFICATIONS

Technical Specification page 3.5/4.5-10

A new maximum value for LHGR of 14.4 kw/ft is added for fuel types GE8x8E and GE8x8EB due to the advanced design of GE8 fuel.

Change Minimum Critical Power Ratio limits and associated 20% scram insertion times. This change is a result of a new computer model for the MCPR transient.

Technical Specification page 3.5/4.5-12

Change the word "or" to "and" (in two places) for clarification because Automatic Pressure Relief Valves enable both Core Spray and LPCI mode of RHR during a small pipe break in the event of HPCI failure.

Limiting condition for operation basis is also changed for the Automatic Pressure Relief subsystem to incorporate the analysis for continued operation with one relief valve out of service (Reference 11).

Technical Specification page 3.5/4.5-14

Delete Reference 5 from the basis (no longer applicable).

Technical Specification page 3.5/4.5-14a

Change 20% scram insertion time value from 0.73 seconds to 0.68 seconds due to new computer modeling of MCPR transient.

Technical Specification page 3.5/4.5-14b

Reference 1 is changed to incorporate the new Loss of Coolant Accident model (Reference 9).

Delete Reference 5 (no longer applicable).

Figure 3.5-1

Add new MAPLHGR curves for new fuel types BD300C and BD316A (Reference 9) and delete MAPLHGR curves for fuel types no longer in use.

Figure 3.5-2

Add the statement "For Flows Greater Than 100%, $K_f = 1.0$ " to the figure to address the operating region defined by the Increased Core Flow Analysis (Reference 11).

Technical Specification page 3.6/4.6-5a

Delete the MAPLHGR reduction factor during single loop operation which is no longer required as analyzed in Reference 9. Remaining sections are relabeled to reflect the deletion. Change implementation time limit from 24 to 12 hours.

Technical Specification page 3.6/4.6-13a

Discussion of the MAPLHGR reduction factor during single loop operation is deleted.

ATTACHMENT 3
(cont'd)

A. SUMMARY OF PROPOSED TECHNICAL SPECIFICATION CHANGES

QUAD CITIES UNIT 2 CYCLE 10

License page 3:

Remove restrictions on coastdown operation and off-normal feedwater heating. Reference 11 analyzes operation to as low as 20 percent power and up to a 100°F reduction in feedwater temperature, thereby bounding the previous license condition.

Technical Specification page 1.1/2.1-1

Change MCPR safety limit specified in 1.1.A from 1.07 to 1.04 as approved in Reference 7. The safety limit requirement of 1.06 for loading patterns containing no retrofit 8x8 fuel is being deleted because it is no longer applicable.

Technical Specification Page 1.1/2.1-4

Delete 7x7 discussion from the Safety Limit Basis and include the new LHGR limit of 14.4 kw/ft. for GE8 fuel types.

Technical Specification page 1.1/2.1-7

Change analyzed conditions from "up to the rated thermal power condition of 2511 MWt" to "in accordance with Regulatory Guide 1.49" which states that transients must be analyzed up to 102% of rated core thermal power.

Technical Specification Figure 2.1-3

Add operating region as defined by the increased Core Flow Analysis (Reference 11).

Technical Specification page 3.2/4.2-14

Change Rod Block Monitor intercept from 42 to 43. Also, add restriction to allow for operation with core flow greater than 98×10^6 lb/hr.

Technical Specification page 3.3/4.3-5

Change 3.3.C.5 average 20% scram insertion time from 0.73 seconds to 0.68 seconds consistent with new computer modeling of the MCPR transient.

Technical Specification page 3.5/4.5-5

The limiting conditions for operation and surveillance requirements for the Automatic Pressure Relief Subsystem are changed to reflect the analysis for continued operation with one relief valve out of service (Reference 11).