



Commonwealth Edison
 1400 Opus Place
 Downers Grove, Illinois 60515

June 9, 1994

Mr. William T. Russell, Director
 Office of Nuclear Reactor Regulation
 U.S. Nuclear Regulatory Commission
 Washington, D.C. 20555

Attn: Document Control Desk:

SUBJECT: LaSalle County Nuclear Power Station Units 1 and 2
 Application for Amendment Request to Facility Operating Licenses
 NPF-11 and NPF-18, Appendix A, Technical Specifications
 Partial ART 3 Implementation
NRC Docket Nos. 50-373 and 50-374

Dear Mr. Russell:

Pursuant to 10 CFR 50.90, Commonwealth Edison (CECo) proposes to amend Appendix A, Technical Specifications, of Facility Operating Licenses NPF-11 and NPF-18 to implement the Thermal Limits portion of the General Electric ARTS (APRM/RBM/Technical Specification) Improvement Program.

This proposed amendment request is subdivided as follows:

1. Attachment A gives a description and safety analysis of the proposed changes in this amendment.
2. Attachment B includes a summary of the proposed changes and the marked-up Technical Specifications pages for LaSalle Units 1 and 2 with the requested changes indicated.
3. Attachment C describes CECo's evaluation performed in accordance with 10 CFR 50.92 (c), which confirms that no significant hazard consideration is involved.
4. Attachment D provides the Environmental Assessment Applicability Review.
5. Attachment E is General Electric's analysis report for the ARTS program at LaSalle.
6. Attachment F provides a Withholding Affidavit for the GE ARTS Analysis report.

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Mr. Russell

June 9, 1994

This proposed amendment has been reviewed and approved by CECo On-Site and Off-Site Review in accordance with Commonwealth Edison procedures.

The attached General Electric ARTS Analysis Report contains information proprietary to General Electric Company. In accordance with the requirements of 10CFR 2.790(b), an affidavit for this letter is enclosed as Attachment F to support the withholding of this report from public disclosure.

The requested approval timeframe is January 15, 1995 unless precluded by higher priority requests or available Staff resources.

To the best of my knowledge and belief, the statements contained above are true and correct. In some respect these statements are not based on my personal knowledge, but obtained information furnished by other Commonwealth Edison employees, contractor employees, and consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

Commonwealth Edison is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachments to the designated state official.

Please direct any questions you may have concerning this submittal to this office.



Very truly yours,

A handwritten signature in cursive script that reads "Gary G. Benes".

Gary G. Benes

Nuclear Licensing Administrator

Subscribed and Sworn to before me
on this ninth day of
June, 1994.

A handwritten signature in cursive script that reads "Mary Jo Yack".
Notary Public

Attachments:

- A. Description and Safety Analysis of the Proposed Changes
- B. Marked-Up Technical Specification Pages
- C. Evaluation of Significant Hazards Considerations
- D. Environmental Assessment Applicability Review
- E. General Electric Analysis Report for ARTS Program at LaSalle
- F. Withholding Affidavit for GE ARTS Analysis Report

cc: J. B. Martin, Regional Administrator - RIII
D. E. Hills, Senior Resident Inspector - LSCS
A. T. Gody, Jr., Project Manager - NRR
Office of Nuclear Facility Safety - IDNS

**ATTACHMENT A
DESCRIPTION AND SAFETY ANALYSIS OF THE
PROPOSED CHANGES**

DESCRIPTION OF THE CURRENT REQUIREMENT

The current Technical Specifications for LaSalle require the flow-referenced Average Power Range Monitor (APRM) trips to be lowered or the APRM readings to be increased by up to 10% when the Maximum Fraction of Limiting Power Density (MFLPD) exceeds the Fraction of Rated Power (FRP). Technical Specification 3/4.2.2, Table 4.3.1.1-1 footnote (d), Table 3.3.6-2 footnote *, and the Bases for APRM Limiting Safety System Setting assure that required adjustments are made to the APRM trips. See Attachment B for a list of effected pages.

The current Technical Specifications also require a K_f factor to be applied to the Minimum Critical Power Ratio (MCPR) at less than rated flow. While in automatic flow control, a more restrictive K_f factor is applied than for manual flow control. The K_f factor is only referenced in the Bases for 3/4.2.3, Minimum Critical Power Ratio.

BASES FOR THE CURRENT REQUIREMENT

With MFLPD higher than FRP, there is a large amount of peaking in the core. Since a flow-referenced scram would not occur as quickly as it should under the high peaking conditions, the fuel could exceed the Linear Heat Generation Rate (LHGR) limit if a transient, especially a cold water injection event, were to occur. Lowering the APRM flow-referenced trips provides assurance that a scram will occur before the LHGR limit is exceeded.

The K_f factors for manual and automatic flow control increase the MCPR limit at less than rated flow. This ensures that a slow flow runout event will not cause the MCPR to exceed the MCPR safety limit for manual flow control, and the MCPR operating limit for automatic flow control.

NEED FOR REVISION OF THE REQUIREMENT

The peaking factor setdown restriction reduces operational flexibility at LaSalle, and there are now more acceptable alternatives (the General Electric ARTS (APRM/Rod Block Monitor (RBM)/Technical Specification) Improvement Program) to the setdown requirement. Implementing ARTS also eliminates the K_f factors, but the objectives of the K_f factors are still met under the ARTS program.

**ATTACHMENT A
DESCRIPTION AND SAFETY ANALYSIS OF THE
PROPOSED CHANGES**

DESCRIPTION OF THE REVISED REQUIREMENT

An amendment to LaSalle County Station Units 1 and 2 Technical Specifications is being proposed to implement a partial application of the General Electric ARTS program.

Outlines of the changes, as well as marked-up copies of the LaSalle Units 1 and 2 Technical Specifications, are provided in Attachment B.

The requirements to increase the APRM gains by up to 10% of rated thermal power when MFLPD/FRP (T-Factor) is greater than one is deleted. Technical Specification 3/4.2.2 is deleted, Table 4.3.1.1-1 footnote (d) deletes the setdown requirement, Table 3.3.6-2 footnote * and Section 3.4.1.1 deletes reference to 3.2.2, and the Bases for 3/4.2.2 APRM Limiting Safety System Setting deletes reference to specification 3.2.2 and associated flow referenced setpoint adjustments. Sections 3.3.1, 4.3.1, 3.3.6, and 4.3.6 currently contain all of the information of Section 3.2.2 not pertaining to T, or the T-Factor surveillance. Also, sections are added to the bases describing the ARTS power- and flow-dependent MAPLHGR and MCPR limits for specifications 3/4.2.1 and 3/4.2.3, respectively. The K_T description is deleted from the MCPR Bases for Specification 3/4.2.3 as this is replaced by the new ARTS thermal limits. The power and flow dependent MAPLHGR and MCPR correction factors are cycle independent and will be contained in the Core Operating Limits Report (COLR).

A section of the Facility Operating License for Unit 1 is deleted which refers to the T-Factor and which is no longer applicable, as it describes a requirement for the first fuel cycle of operation.

BASES FOR THE REVISED REQUIREMENT

The requirement to increase the APRM readings by up to 10% of rated thermal power when MFLPD/FRP (T-Factor) is greater than one has not been necessary since GE began analyzing with GETAB/GEXL, which relies on boiling length and exit quality. The basis for this "APRM setdown" requirement originated under the now obsolete Hench-Levy Minimum Critical Heat Flux Ratio (MCHFR) thermal limit criterion which relies on localized fuel rod heat input and coolant flow. There has also been a move to secondary reliance on the flux scram for licensing transient evaluations.

There are four new ARTS thermal limits that will replace the existing T-factor correction and K_T factor. These thermal limits are based on different power and flow conditions. For off-rated power and flow conditions, correction factors are calculated and applied to the full-power operating limits for MCPR and MAPLHGR. These power and flow dependent MCPR and MAPLHGR limits will protect the fuel thermal-mechanical and transient limits at off-rated power and flow conditions--the same objectives of the T-factor correction and the K_T factor. However, the GE ARTS analysis provides better operational flexibility by incorporating the fuel peaking limits in the power and flow dependent thermal limits rather than adjusting the APRM's for T - factor.

**ATTACHMENT A
DESCRIPTION AND SAFETY ANALYSIS OF THE
PROPOSED CHANGES**

A. Scope

Attachment E provides the GE analysis supporting licensing of the ARTS program at LaSalle Units 1 and 2. This analysis will be applied in partial form at both LaSalle units. The ELLLA portion of ARTS was previously implemented at LaSalle. Now, only the remaining thermal limits changes will be implemented; no changes to the RBM will be made. The applicable portion of the GE analysis is detailed in Section 3 of the attached report. The analyses performed by GE to support the thermal limits changes do not assume that the RBM hardware changes will be made as well.

B. LOCA Analysis

The current LOCA analysis for LaSalle was verified in Attachment E to remain applicable with the introduction of ARTS. The current licensing basis PCT of 1260 degrees will not change due to application of the ARTS power- and flow-dependent limits.

C. Transient Analysis

The ARTS program uses transient analyses to define operating limits which conservatively ensure all licensing criteria will be met in the absence of the APRM setdown requirement. Criteria which ensure the licensing requirements were met by these analyses are given in Section 3.2.1 of Attachment E.

GE analyzed limiting transients (Feedwater Controller Failure (FWCF), Turbine Trip with No Bypass (TTNBP) and Load Rejection with No Bypass (LRNBP)) for different power/flow conditions to develop plant Minimum Critical Power Ratio (MCPR) and Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits. This was done without the APRM core peaking factor setdown. GE analysis methods and references are documented in Attachment E.

The trend for the power-dependent MCPR for the FWCF event at 108% flow and off-rated conditions was shown to bound that of all other transients.

The LRNBP and FWCF transients were also analyzed assuming a combination of all currently allowed Equipment Out-of-Service (EOOS). Section 3.4 of Attachment E details the analyses.

D. ARTS Thermal Limits

Four new limits are established in the GE analysis, and will be placed in the Core Operating Limits Reports (COLRs) for both units:

- 1) A power-dependent MCPR limit, $MCPR_p$, which is a cycle-independent limit below 30% power, and a cycle-dependent limit above 30% power.
- 2) A power-dependent MAPLHGR factor, $MAPFAC_p$.

ATTACHMENT A
DESCRIPTION AND SAFETY ANALYSIS OF THE
PROPOSED CHANGES

- 3) Flow-dependent MCPR limits, $MCPR_F$, for both automatic and manual flow control, which is cycle-independent for manual flow control, and cycle-dependent for automatic flow control, and replaces the current k_f MCPR multipliers for manual and automatic flow control.
- 4) A flow-dependent MAPLHGR factor, $MAPFAC_F$.

The power-dependent MCPR limits are provided in Figures 3-2 and 3-6 of Attachment E. Above 30% power, the $MCPR_p$ limit is the product of the full power OLMCPR (cycle-specific) and the power-dependent MCPR multiplier (K_p , cycle-independent). The curve shown in the figures above 30% power is for K_p only. Between 25% and 30% power, the values shown in each figure on the two flow-dependent curves (one for operation at greater than 50% flow and one for operation at equal to or less than 50% flow) are the total power-dependent $MCPR_p$ limits, and are not cycle-dependent. Figure 3-2 gives the curves for operation without EOOS, and Figure 3-6 gives the curves for operation with EOOS. Although no thermal limits monitoring is required below 25% power, the value for operation at 25% power may be used when operating below 25% power.

The power-dependent MAPLHGR factors ($MAPFAC_p$) were selected using the same analysis results as the MCPR limits. To obtain the power-dependent MAPLHGR limit ($MAPLHGR_p$), the fuel-type dependent MAPLHGR limit is multiplied by the $MAPFAC_p$ value from Figure 3-3 of Attachment E. Again, the limits are not dependent on flow above 30% power, but are flow-dependent between 25% and 30% power. The curves are given for greater than 50% flow and equal to or less than 50% flow.

There are also flow-dependent MCPR and MAPLHGR values from 30% to 100% of rated core flow. This protects the safety limit MCPR (operating limit MCPR for automatic flow control) and the fuel thermal-mechanical design bases during flow runout transients not terminated by a reactor scram.

The flow-dependent MCPR limits ($MCPR_p$) for manual flow control are shown in Figure 3-4 of Attachment E. These limits replace the current k_f MCPR multiplier, and are cycle-independent limits, not multipliers. The only portion of this curve which needs to be adjusted on a cycle-specific basis is the flat portion at high flow, which corresponds to the cycle-specific MCPR operating limit. When this is adjusted from cycle to cycle, it does not affect the slope or position of the remaining portion of the curve. For manual flow control, the 102.5% line will be used. The maximum flow for the slow flow runout event is 102.5% and is due to a single failure which causes one recirculation loop to ramp to its maximum position.

For operation in automatic flow control, the 117% maximum flow $MCPR_F$ curve for manual flow control is adjusted, maintaining the same slope, so that the limit intercepts 100% flow at the cycle-specific operating limit MCPR value. This provides the same degree of protection as the current automatic flow K_f curve. This method is explained in Section 3.3.3 of Attachment E, and examples of possible curves are provided in Figure 1 of this evaluation.

**ATTACHMENT A
DESCRIPTION AND SAFETY ANALYSIS OF THE
PROPOSED CHANGES**

The flow-dependent MAPLHGR factors ($MAPFAC_F$) are given in Figure 3-5 of Attachment E. To obtain the flow-dependent MAPLHGR limit ($MAPLHGR_p$), the fuel-type dependent MAPLHGR limit is multiplied by the $MAPFAC_F$ value.

At a given power and flow condition, all four of the limits ($MCPR_p$, $MCPR_f$, $MAPLHGR_p$, and $MAPLHGR_f$) must be determined, and the most limiting MCPR and MAPLHGR will be chosen to be the governing limits by the unit's core monitoring software.

While operating with Equipment Out-of-Service, the OLMCPR limits previously determined will be used. However, the $MCPR_p$ limits (Figure 3-6, Attachment E) below 30% power remain valid for EOOS, as do the K_p factor, the $MAPFAC_p$ factor, and the $MAPFAC_f$ factor. The flat portion of the manual flow control $MCPR_f$ curve must be adjusted to correspond to the increased operating limit, but the remainder of the curve is valid for EOOS operation. When operating in automatic flow control, the 117% $MCPR_f$ curve must be adjusted so that the curve intersects 100% flow at the new EOOS operating limit.

While in Single Loop Operation (SLO), 0.01 will be added to the full power OLMCPR (which is then multiplied by K_p). This 0.01 increase is consistent with current LaSalle Technical Specification requirements. Between 25% and 30% power, the cycle-independent $MCPR_p$ limits given for both low and high flow conditions (Figure 3-6, Attachment E) are sufficient to bound Single Loop Operation. Adjustments to the $MCPR_f$ curve are made in the same manner as for EOOS conditions.

SCHEDULE REQUIREMENTS

The requested approval timeframe is January 15, 1995 unless precluded by higher priority requests or available Staff resources.

CONCLUSION

The use of the Thermal Limits portion of the GE ARTS program will create power and flow dependent MCPR and MAPLHGR limits. At any power, flow condition, the most limiting MCPR and MAPLHGR will be governing.

Curves and equations defining these limits will be placed in the COLRs for both units.

ATTACHMENT B

PROPOSED CHANGES TO THE LICENSE/TECHNICAL SPECIFICATIONS FOR OPERATING LICENSES NPF-11 AND NPF-18

SUMMARY OF PROPOSED CHANGES FOR LASALLE UNIT 1

FOL, p. 15-16, (34)		Deleted, no longer applicable; this applied to Unit 1 Cycle 1 only
Index, P. IV		Section 3/4.2.2 noted as deleted
Index, P. XII		Section 3/4.2.2 noted as deleted
B 2.2.1.2	P. B 2-10	Delete the reference made to Specification 3.2.2
3.2.2	P. 3/4 2-2	Deleted; T-factor is no longer applicable with the ARTS analysis
4.2.2	P. 3/4 2-2	Deleted; T-factor is no longer applicable with the ARTS analysis
Table 4.3.1.1	P. 3/4 3-8	Deleted Setdown requirement in Footnote (d)
Table 3.3.6-2	P. 3/4 3-53a	Deleted reference to Specification 3.2.2 in Footnote (*)
3.4.1.1	P. 3/4 4-1	Deleted reference to Specification 3.2.2 in Action a.1.d)
B 3/4.2.1	P. B 3/4 2-1	Description of ARTS MAPLHGR limits added
B 3/4.2.2	P. B 3/4 2-2	Deleted; 3/4.2.2 is deleted, Bases is no longer applicable
B 3/4.2.3	P. B 3/4 2-5 P.B. 3/4 2-6	Description of ARTS MCPR limits added, Reference to K _r factor deleted, ARTS analysis added to reference list
B 3/4.3.6	P. B 3/4 3-4	Deleted reference to Section 3/4.2 since T-factor is deleted
6.6.A.6.a.2	P. 6-25	Explanation of MCPR modified

ATTACHMENT B

PROPOSED CHANGES TO THE LICENSE/TECHNICAL SPECIFICATIONS FOR OPERATING LICENSES NPF-11 AND NPF-18

SUMMARY OF PROPOSED CHANGES FOR LASALLE UNIT 2

Index, P. IV		Section 3/4.2.2 noted as deleted
Index, P. XII		Section 3/4.2.2 noted as deleted
B 2.2.1.2	P. B 2-10	Delete the reference made to Specification 3.2.2
3.2.2	P. 3/4 2-2	Deleted; T-factor is no longer applicable with the ARTS analysis
4.2.2	P. 3/4 2-2	Deleted; T-factor is no longer applicable with the ARTS analysis
Table 4.3.1.1	P. 3/4 3-8	Deleted Setdown requirement in Footnote (d)
Table 3.3.6-2	P. 3/4 3-54	Deleted reference to Specification 3.2.2 in Footnote (*)
3.4.1.1	P. 3/4 4-1	Deleted reference to Specification 3.2.2 in Action a.1.d)
B 3/4.2.1	P. B 3/4 2-1	Description of ARTS MAPLHGR limits added
B 3/4.2.2	P. B 3/4 2-2	Deleted; 3/4.2.2 is deleted, Bases is no longer applicable
B 3/4.2.3	P. B 3/4 2-5 P.B. 3/4 2-6	Description of ARTS MCPR limits added, Reference to K _r factor deleted, ARTS analysis added to reference list
B 3/4.3.6	P. B 3/4 3-4	Deleted reference to Section 3/4.2 since T-factor is deleted
6.6.A.6.a.2	P. 6-25	Explanation of MCPR modified; Editorial change to the title from "Semiannual Radioactive Effluent Release Report" to correct name of "Core Operating Limits Report"