

October 15, 1985

Docket No. 50-334

~~DISTRIBUTION~~

~~Docket File~~

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EJordan	CParrish
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WJones	TBarnhart 4
ACRS 10	MVirgilio
CMiles	RDiggs
GHsii	RBallard

Mr. J. J. Carey, Vice President
Nuclear Group
Duquesne Light Company
Post Office Box 4
Shippingport, PA 15077

Dear Mr. Carey:

SUBJECT: ISSUANCE OF AMENDMENT (LICENSING ACTION TAC 59311)

The Commission has issued the enclosed Amendment No.97 to Facility Operating License No. DPR-66 for the Beaver Valley Power Station, Unit No. 1. The amendment consists of changes to the Technical Specifications in response to your application dated July 12, 1985.

The amendment changes the Technical Specifications for Beaver Valley Unit No. 1 by deleting the rod bow penalty multiplier from Section 3.2.3, "Nuclear Enthalpy Hot Channel Factor." The basis of the change is contained in a Westinghouse Topical Report, WCAP-8691, Revision 1, which we have approved on December 29, 1982.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular bi-weekly Federal Register notice.

Sincerely,

/s/PTam

Peter S. Tam, Project Manager
Operating Reactors Branch No. 1
Division of Licensing

Enclosures:

1. Amendment No. 97 to DPR-66
2. Safety Evaluation

cc w/enclosures:

See next page

ORB#1:DL CP
CParrish
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HThompson
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Mr. J. J. Carey
Duquesne Light Company

cc:

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Beaver Valley 1 Power Station

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Duquesne Light Company

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Beaver Valley 1 Power Station

cc:

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

DUQUESNE LIGHT COMPANY

OHIO EDISON COMPANY

PENNSYLVANIA POWER COMPANY

DOCKET NO. 50-334

BEAVER VALLEY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 97
License No. DPR-66

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company (the licensees) dated July 12, 1985, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-66 is hereby amended to read as follows:

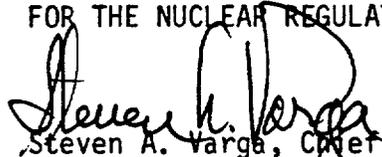
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(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 97, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This amendment is effective on issuance, to be implemented within 30 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 15, 1985

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 97 TO FACILITY OPERATING LICENSE NO. DPR-66

DOCKET NO. 50-334

Revise Appendix A as follows:

Remove Pages

Insert Pages

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3/4 2-8

3/4 2-9a

B 3/4 2-5

B 3/4 2-5

POWER DISTRIBUTION LIMITS

NUCLEAR ENTHALPY HOT CHANNEL FACTOR - $F_{\Delta H}^N$

LIMITING CONDITION FOR OPERATION

3.2.3 $F_{\Delta H}^N$ shall be limited by the following relationship:

$$F_{\Delta H}^N \leq 1.55 [1 + 0.3 (1-P)]$$

where $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

APPLICABILITY: MODE 1

ACTION:

With $F_{\Delta H}^N$ exceeding its limit:

- a. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to $\leq 55\%$ of RATED THERMAL POWER within the next 4 hours.
- b. Demonstrate thru in-core mapping that $F_{\Delta H}^N$ is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 2 hours, and
- c. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER, subsequent POWER OPERATION may proceed provided that $F_{\Delta H}^N$ is demonstrated through in-core mapping to be within its limit at a nominal 50% of RATED THERMAL POWER prior to exceeding this THERMAL power, at a nominal 75% of RATED THERMAL POWER prior to exceeding this THERMAL power and within 24 hours after attaining 95% or greater RATED THERMAL POWER.

POWER DISTRIBUTION LIMITS

BASES

Fuel rod bowing reduces the value of the DNB ratio. Credit is available to offset this reduction in the generic margin. The generic design margins, totaling 9.1% DNBR, and completely offsets any rod bow penalties (< 3% for the worst case which occurs at a burnup of 33,000 MWD/MTU).

This margin includes the following:

1. Design Limit DNBR of 1.30 vs. 1.28
2. Grid Spacing (K_s) of 0.046 vs. 0.059
3. Thermal Diffusion Coefficient of 0.038 vs. 0.059
4. DNBR Multiplier of 0.865 vs. 0.88
5. Pitch reduction

The radial peaking factor $F_{xy}(Z)$ is measured periodically to provide assurance that the hot channel factor, $F_Q(Z)$, remains within its limit. The F_{xy} limit for Rated Thermal Power (F_{xy}^{RTP}) as provided in the Radial Peaking Factor Limit Report per specification 6.9.1.14 was determined from expected power control maneuvers over the full range of burnup conditions in the core.

3/4.2.4 QUADRANT POWER TILT RADIO

The quadrant power tilt ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during startup testing and periodically during power operation.

The limit of 1.02 at which corrective action is required provides DNB and linear heat generation rate protection with x-y plane power tilts.

The two-hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned rod. In the event such action does not correct the tilt, the margin for uncertainty on F_Q is reinstated by reducing the maximum

allowed power by 3 percent for each percent of tilt in excess of 1.0.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 97 TO FACILITY OPERATING LICENSE NO. DPR-66
DUQUESNE LIGHT COMPANY
OHIO EDISON COMPANY
PENNSYLVANIA POWER COMPANY
BEAVER VALLEY POWER STATION, UNIT NO. 1
DOCKET NO. 50-334

INTRODUCTION

By letter dated July 12, 1985 (Ref. 1), Duquesne Light Company requested an amendment to the Technical Specifications of Beaver Valley Power Station, Unit 1. Specifically, the amendment is to delete the rod bow penalty applied to the enthalpy rise hot channel factor specified in the Limiting Condition for Operation 3.2.3. Our evaluation regarding this TS change follows.

DISCUSSION AND EVALUATION

The limiting Condition for Operation 3.2.3 of the Beaver Valley Unit 1 Technical Specifications specifies the allowable value of the nuclear enthalpy hot channel factor, $F_{\Delta H}^N$, as a function of thermal power level. In the same specification, the allowable $F_{\Delta H}^N$ is further reduced by a penalty multiplier which is dependent on the magnitude of the rod bow penalty. Figure 3.2-4 of the Technical Specifications specifies the value of the rod bow penalty as a function of fuel exposure.

Fuel rod bowing reduces the channel gap size between adjacent fuel rods which results in reduction in the critical heat flux (CHF) as well as the departure from nucleate boiling ratio (DNBR). Thus a rod bow penalty is applied to the calculated DNBR.

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The Beaver Valley - 1 fuel design is the Westinghouse 17x17 standard fuel assembly with R-mixing vane grids. The grid spacing span is roughly 20 inches. The CHF and hence DNBR are calculated using the W-3 CHF correlation. W-3 was originally developed with the CHF data obtained with fluid flowing inside heater tubes and annuli. Based on the R-grid fuel rod bundle CHF data, Westinghouse later modified the W-3 correlation by applying a modified R-grid spacer factor and a correlation multiplier.

In the DNB design analysis, safety margin was increased by using a conservative correlation multiplier, DNBR limit, pitch reduction, and conservative values of thermal diffusion coefficient and axial grid spacing coefficient which affect the spacer factor. For the 17x17 standard R-grid fuel design, a generic margin of 9.1% DNBR has been quantified (Ref. 2) which can be used to compensate for the rod bow penalty on DNBR reduction. If the generic margin is insufficient to cover the penalty, plant-specific reduction in the allowable $F_{\Delta H}^N$ is required to compensate for the DNBR reduction.

The fuel rod bow penalty calculation is described in the Westinghouse topical report WCAP-8691, Revision 1, "Fuel Rod Bow Evaluation" (Ref. 3). Prior to the approval of this topical report, the rod bow penalty was calculated using the NRC interim method, which resulted in a higher rod bow penalty than the generic margin. The rod bow topical report has since been approved (Ref. 4); the magnitude of rod bow penalty calculated with the approved method has been greatly reduced. For the Westinghouse 17x17 R-grid fuel assembly, the rod bow penalty is less than 3% at 33,000 MWD/MTU which is the maximum burnup of concern with respect to the rod bow penalty. This rod bow penalty of less than 3% is fully compensated by the generic margin of 9.1%. Therefore, no rod bow penalty is required on DNBR as well as the allowable $F_{\Delta H}^N$. The proposed removal of Figure 3.2-4 and the rod bow penalty multiplier on $F_{\Delta H}^N$ from the current Technical Specification LCO 3.2.3 is therefore acceptable.

The basis of Technical Specification 3/4.2.3 is also revised to reflect the change in LCO 3.2.3. The magnitude and source of the generic margin and the magnitude of rod bow penalty are also included in the proposed bases. This revision provides clear accounting of the margin and penalty and is acceptable.

Environmental Consideration

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Sec 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that:

- (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner,
- and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

REFERENCES

1. Letter from J. J. Carey (Duquesne Light Company) to S. A. Varga (NRC), "Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, License No. DPR-66, Proposed Operating License Change Request No. 110", July 12, 1985.
2. Letter from E. P. Rahe, Jr. (Westinghouse) to J. R. Miller (NRC), "Remaining Response to Request Number 1 for Additional Information on WCAP-8691, Revision 1", NS-EPR-2572, March 16, 1982.
3. WCAP-8691, Revision 1, "Fuel Rod Bow Evaluation", July 1979.
4. Letter from C. Thomas (NRC) to E.P. Rahe (Westinghouse), December 29, 1982.

Dated: October 15, 1985

Principal Contributor:

Gene Hsii