

April 10, 1991

Docket No. 50-346

Mr. Donald C. Shelton
Vice President, Nuclear
Toledo Edison Company
300 Madison Avenue
Toledo, Ohio 43652

DISTRIBUTION

Docket File
NRC & Local PDRs
PD33 Gray File
JZwolinski
PKreutzer
JHall
OGC-WF1
DHagan
EJordan

JHannon
GHill(4)
Wanda Jones
JCalvo
ACRS(10)
GPA/PA Edison
ARM/LFMB
PDIII-3 r/f

Dear Mr. Shelton:

SUBJECT: AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. NPF-3
(TAC NO. 79449)

The Commission has issued Amendment No. 154 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1. The amendment revises the Technical Specifications in response to your application dated February 6, 1991.

This amendment changes the end-of-cycle negative moderator temperature coefficient (MTC) from -3.0×10^{-4} delta k/k/°F to -3.62×10^{-4} delta k/k/°F.

A copy of the Safety Evaluation is also enclosed. Notice of issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Original signed by

James R. Hall, Sr. Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 154 to License No. NPF-3
2. Safety Evaluation

cc: See next page

LA/PDIII-3/DRP345
PKreutzer
3/29/91

PM/PDIII-3/DRP345
JHall/bj
4/1/91

D/PDIII-3/345
JHannon
4/1/91

OGC-WF1
myung
4/3/91

AMD 79449

NRC FILE CENTER COPY



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

April 10, 1991

Docket No. 50-346

Mr. Donald C. Shelton
Vice President, Nuclear - Davis-Besse
Centerior Service Company
Toledo Edison Company
300 Madison Avenue
Toledo, Ohio 43652

Dear Mr. Shelton:

SUBJECT: AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. NPF-3
(TAC NO. 79449)

The Commission has issued Amendment No. 154 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1. The amendment revises the Technical Specifications in response to your application dated February 6, 1991.

This amendment changes the end-of-cycle negative moderator temperature coefficient (MTC) from -3.0×10^{-4} delta k/k/°F to -3.62×10^{-4} delta k/k/°F.

A copy of the Safety Evaluation is also enclosed. Notice of issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

A handwritten signature in cursive script that reads "James R. Hall".

James R. Hall, Sr. Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 154 to License No. NPF-3
2. Safety Evaluation

cc: See next page

Mr. Donald C. Shelton
Toledo Edison Company

Davis-Besse Nuclear Power Station
Unit No. 1

cc: David E. Burke, Esq.
The Cleveland Electric
Illuminating Company
P. O. Box 5000
Cleveland, Ohio 44101

Mr. Robert W. Schrauder
Manager, Nuclear Licensing
Toledo Edison Company
Edison Plaza
300 Madison Avenue
Toledo, Ohio 43652

Gerald Charnoff, Esq.
Shaw, Pittman, Potts
and Trowbridge
2300 N Street N.W.
Washington, D.C. 20037

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Mr. Robert B. Borsum
Babcock & Wilcox
Nuclear Power Generation Division
Suite 525, 1700 Rockville Pike
Rockville, MD 20852

Resident Inspector
U. S. Nuclear Regulatory Commission
5503 N. State Route 2
Oak Harbor, Ohio 43449

Mr. Murray R. Edelman
Executive Vice President -
Power Generation
Centerior Service Company
6200 Oak Tree Boulevard
Independence, Ohio 44101

Radiological Health Program
Ohio Department of Health
1224 Kinnear Road
Columbus, Ohio 43212

Attorney General
Department of Attorney
General
30 East Broad Street
Columbus, Ohio 43215

Mr. James W. Harris, Director
(Addressee Only)
Division of Power Generation
Ohio Department of Industrial Relations
2323 West 5th Avenue
P. O. Box 825
Columbus, Ohio 43216

Ohio Environmental Protection Agency
DERR--Compliance Unit
PO Box 1049
1800 Watermark Drive
ATTN: Zack A. Clayton
Columbus, Ohio 43266-0149

President, Board of
County Commissioners of
Ottawa County
Port Clinton, Ohio 43452

State of Ohio
Public Utilities Commission
180 East Broad Street
Columbus, Ohio 43266-0573



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

TOLEDO EDISON COMPANY

CENTERIOR SERVICE COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 154
License No. NPF-3

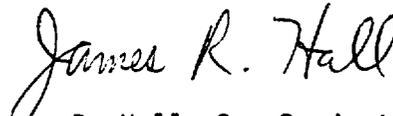
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Toledo Edison Company, Centerior Service Company, and the Cleveland Electric Illuminating Company (the licensees) dated February 6, 1991 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations 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. NPF-3 is hereby amended to read as follows:

(a) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 154, are hereby incorporated in the license. The Toledo Edison Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented not later than 45 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



James R. Hall, Sr. Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of issuance: April 10, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 154

FACILITY OPERATING LICENSE NO. NPF-3

DOCKET NO. 50-346

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Remove

3/4 1-4

6-16

Insert

3/4 1-4

6-16

REACTIVITY CONTROL SYSTEMS

BORON DILUTION

LIMITING CONDITION FOR OPERATION

3.1.1.2 The flow rate of reactor coolant through the Reactor Coolant System shall be ≥ 2800 gpm whenever a reduction in Reactor Coolant System boron concentration is being made.

APPLICABILITY: All MODES.

ACTION:

With the flow rate of reactor coolant through the Reactor Coolant System < 2800 gpm, immediately suspend all operations involving a reduction in boron concentration of the Reactor Coolant System.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The flow rate of reactor coolant through the Reactor Coolant System shall be determined to be ≥ 2800 gpm within one hour prior to the start of and at least once per hour during a reduction in the Reactor Coolant System boron concentration by either:

- a. Verifying at least one reactor coolant pump is in operation,
or
- b. Verifying that at least one DHR pump is in operation and supplying ≥ 2800 gpm to the Reactor Coolant System.

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.3 The moderator temperature coefficient (MTC) shall be:

- a. Less positive than $0.9 \times 10^{-4} \Delta k/k/^\circ F$ whenever THERMAL POWER is $< 95\%$ of RATED THERMAL POWER,
- b. Less positive than $0.0 \times 10^{-4} \Delta k/k/^\circ F$ whenever THERMAL POWER is $\geq 95\%$ of RATED THERMAL POWER, and
- c. Equal to or less negative than the limit provided in the CORE OPERATING LIMITS REPORT at RATED THERMAL POWER.

APPLICABILITY: MODES 1 and 2*#.

ACTION:

With the moderator temperature coefficient outside any of the above limits, be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.1.3.1 The MTC shall be determined to be within its limits by confirmatory measurements. MTC measured values shall be extrapolated and/or compensated to permit direct comparison with the above limits.

4.1.1.3.2 The MTC shall be determined at the following frequencies and THERMAL POWER conditions during each fuel cycle:

- a. Prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading.
- b. At any THERMAL POWER, within 7 days after reaching a RATED THERMAL POWER equilibrium boron concentration of 300 ppm.

*With $k_{eff} \geq 1.0$.

#See Special Test Exception 3.10.2.

ADMINISTRATIVE CONTROLS

power operation), supplementary reports shall be submitted at least every three months until all three events have been completed.

ANNUAL OPERATING REPORT

6.9.1.4 Annual reports covering the activities of the unit during the previous calendar year shall be submitted prior to March 31 of each year.

6.9.1.5 Reports required on an annual basis shall include:

- a. A tabulation on an annual basis of the number of station, utility and other personnel (including contractors) receiving exposures greater than 100 mrem/yr and their associated man rem exposure according to work and job functions^{1/}, e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance (described maintenance), waste processing, and refueling. The dose assignment to various duty functions may be estimates based on pocket dosimeter, TLD, or film badge measurements. Small exposures totalling less than 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources shall be assigned to specific major work functions.
- b. The complete results of steam generator tube inservice inspections (Specification 4.4.5.5.b).
- c. The results of specific activity analysis in which the primary coolant exceeded the limits of Specification 3.4.8. The following information shall be included: (1) Reactor power history starting 48 hours prior to the first sample in which the limit was exceeded; (2) Results of the last isotopic analysis for radioiodine performed prior to exceeding the limit, results of analysis while limit was exceeded and results of one analysis after the radioiodine activity was reduced to less than limit. Each result should include date and time of sampling and the radioiodine concentrations; (3) Clean-up system flow history starting 48 hours prior to the first sample in which the limit was exceeded; (4) Graph of the I-131 concentration and one other radioiodine isotope concentration in

^{1/} This tabulation supplements the requirements of §20.407 of 10 CFR Part 20.

ADMINISTRATIVE CONTROLS

microcuries per gram as a function of time for the duration of the specific activity above the steady-state level; and (5) The time duration when the specific activity of the primary coolant exceeded the radioiodine limit.

MONTHLY OPERATING REPORT

6.9.1.6 Routine reports of operating statistics, shutdown experience and challenges to the Pressurizer Pilot Operated Relief Valve (PORV) and the Pressurizer Code Safety Valves shall be submitted on a monthly basis to arrive no later than the 15th of each month following the calendar month covered by the report, as follows: The signed original to the Nuclear Regulatory Commission, Document Control Desk, Washington, D. C. 20555, and one copy each to the Region III Administrator and the Davis-Besse Resident Inspector.

CORE OPERATING LIMITS REPORT

6.9.1.7 Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT before each reload cycle and any remaining part of a reload cycle for the following:

- 3.1.1.3c Negative Moderator Temperature Coefficient Limit
- 3.1.3.6 Regulating Rod Insertion Limits
- 3.1.3.7 Rod Program
- 3.1.3.8 Xenon Reactivity
- 3.1.3.9 Axial Power Shaping Rod Insertion Limits
- 3.2.1 AXIAL POWER IMBALANCE
- 3.2.4 QUADRANT POWER TILT

The analytical methods used to determine the core operating limits addressed by the individual Technical Specifications shall be those previously reviewed and approved by the NRC, specifically:

- 1) BAW-10122A Rev. 1, "Normal Operating Controls," May 1984
- 2) BAW-10116A, "Assembly Calculations and Fitted Nuclear Data," May 1977
- 3) BAW-10117P-A, "Babcock & Wilcox Version of PDQ User's Manual," January 1977
- 4) BAW-10118A, "Core Calculational Techniques and Procedures," December 1979
- 5) BAW-10124A, "FLAME 3 - A Three-Dimensional Nodal Code for Calculating Core Reactivity and Power Distributions," August 1976
- 6) BAW-10125A, "Verification of Three-Dimensional FLAME Code," August 1976
- 7) BAW-10152A, "NOODLE - A Multi-Dimensional Two-Group Reactor Simulator," June 1985



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. NPF-3

TOLEDO EDISON COMPANY

CENTERIOR SERVICE COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter dated February 6, 1991 (Ref. 1), Toledo Edison Company (the licensee) requested an amendment to the Davis-Besse Nuclear Power Station (DBNPS), Unit No. 1, Technical Specifications (TS). The licensee proposed changing the DBNPS TS and Core Operating Limits Report (COLR) in areas affecting the limits specified for the maximum allowed end-of-cycle (EOC) negative moderator temperature coefficient (MTC). This is currently specified in TS 3.1.1.3.C. It is specified for rated thermal power and currently must be determined to be less (negative) than -3.0×10^{-4} delta k/k/°F. Surveillance specifications of TS 4.1.1.3(.1) and (.2.b) require a measurement toward EOC when the moderator boron at full power is 300 ppm. Measurements are to be extrapolated to the specified conditions. Failure to meet the limit would require shut down of the reactor.

The introduction of increased cycle length (18 months) and other reload pattern changes has lead to increased EOC core burnup for DBNPS and this leads, via increased plutonium, to a larger (more negative) MTC than has been experienced in past cycles. Recent calculations by TE for DBNPS, using a three dimensional methodology rather than the two dimensional methods previously used, has indicated that the measured coefficient required near EOC may exceed the current TS limit and require an early shutdown of the cycle. To forestall this, the licensee has reevaluated safety analysis events for DBNPS requiring the use of the negative MTC in the analysis, and has, as a result of this study, proposed a new TS value for the negative MTC which would be likely to satisfy the requirements of both the safety analyses and the TS measurements. At the same time, the licensee has proposed that this part of the MTC TS be removed to the DBNPS COLR since it is likely to be changed from cycle to cycle.

2.0 EVALUATION

There are six events in the DBNPS Updated Safety Analysis Report (USAR) which have potential significant cooldown and positive reactivity insertion from negative MTC. These are (1) dropped control rod, (2) RCS pump startup, (3) control rod ejection, (4) feedwater system malfunction (FSM), (5) minor secondary pipe break, and (6) steam line break (SLB). The licensee has reevaluated each of these.

For the first three of these events there are generically applicable analyses or sensitivity studies, satisfying required criteria, using a hot full power (HFP) MTC of -4.0×10^{-4} delta k/k/°F (to be designated here as -4.0) rather than the TS value of -3.0. Thus for these events a TS MTC of -4.0 would satisfy safety evaluations.

The fourth event (FSM) may occur at either HFP or hot zero power (HZP). Previous analyses used a constant MTC of -3.0 for both conditions. The HFP case is bounded by the SLB (to be considered later). The HZP event was not reevaluated by the licensee and the -3.0 MTC value at HZP will continue to apply.

The fifth event (small SLB) is bounded by the SLB and the MTC determined for that event will be satisfactory for the small SLB.

The sixth event (SLB) is of interest only at HZP, since HFP events produce a scram and become HZP events. The SLB (at HZP) has previously been analyzed with a reactivity versus moderator density curve. This yields a temperature coefficient (including Doppler reactivity) equivalent value of -3.1 and an MTC equivalent of -2.9. Since this is less (negative) than the -3.0 value used for FSM, the SLB provides the limiting MTC for HZP events.

Thus two coefficients have been defined by these events, an HFP MTC of -4.0 and an HZP temperature coefficient of -3.1 (-2.9 MTC equivalent). Since the TSs refer to an HFP MTC, the HZP must be translated to HFP conditions. The licensee has done this using the (previously NRC staff-approved) three dimensional core code NOODLE. The analysis accounts for all the core composition, configuration and temperature differences between the two states. The new TS MTC value (for HFP conditions) would be the least negative of the -4.0 value bounding several of the events and the SLB value. For DBNPS Cycle 7 (the current cycle) the latter value is -3.62 and the TS will be changed to that value (from the current -3.0).

This review has concluded that the licensee's reevaluation has examined all relevant applications of the negative MTC in the safety analyses and has provided a reasonable derivation of a limiting EOL negative MTC. The value of -3.62 derived for use in the DBNPS Cycle 7 TS is acceptable.

The licensee has also proposed that this limiting negative MTC requirement be transferred to the COLR. (Other, positive MTC, limits would remain in TS 3.1.1.3.) It is anticipated that changing core reload conditions will require the negative coefficient to change frequently for future reloads. The changes would be to TS 3.1.1.3.C, where the MTC numerical value would be indicated as

being in the COLR, and to TS 6.9.1.7, indicating the negative MTC in the list of COLR Limits. The COLR would have minor administrative changes and the value of the negative MTC limit (-3.62×10^{-4} delta k/k/°F for Cycle 7). The NOODLE code used to translate the MTC from HZP to HFP is already on the list of approved codes in the COLR methods listing. This review has concluded that the negative MTC properly falls within the class of limits for which the COLR was developed, and the changes are acceptable.

Toledo Edison has proposed to remove the numerical value of the negative MTC limit to the COLR and to change the value for DBNPS Cycle 7 from -3.0 to -3.62×10^{-4} delta k/k/°F. The staff has reviewed the information submitted with these proposed changes and based on its review has concluded that appropriate material has been submitted to justify the changes, and that the change to the MTC limit and the transfer to the COLR is acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. 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 51.22(c)(9). This amendment also involves changes in record-keeping, reporting or administrative procedures or requirements. Accordingly, with respect to these items, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(10). 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.

5.0 CONCLUSION

The staff has 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.

Principal Contributor: H. Richings

Dated: April 10, 1991