Docket Nos.: 50-327
and 50-328

December 1, 1986

Mr. S. A. White
Manager of Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. White:

Subject: Issuance of Amendment No. 50 to Facility Operating License No. DPR-77 and Amendment No. 42 to Facility Operating License No. DPR-79 - Sequoyah Nuclear Plant, Units 1 and 2

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 50 to Facility Operating License No. DPR-77 and Amendment No. 42 to Facility Operating License No. DPR-79. These amendments are in response to your request dated August 8, 1986.

The amendments change the Technical Specifications to reduce the minimum flow rate requirements for Safety Injection Pumps and Centrifugal Charging Pumps. The amendments are effective as of their date of issuance. This letter should not be construed as an authorization to commence operations prior to the Tennessee Valley Authority appropriately addressing the concerns identified in the 50.54(f) letter dated September 17, 1985.

A copy of the related safety evaluation supporting Amendment No. 50 to Facility Operating License DPR-77 and Amendment No. 42 to Facility Operating License DPR-79 is enclosed.

Notice of issuance will be included in the Commission's next bi-weekly Federal Register notice.

Sincerely,

/s/
Carl R. Stahle, Project Manager
PWR Project Directorate #4
Division of PWR Licensing-A

Enclosures:
1. Amendment No. 50 to DPR-77
2. Amendment No. 42 to DPR-79
3. Safety Evaluation

cc w/enclosures: See next page

PWR#4/DPWR-A	PWR#4/DPWR-A	PWR#4/DPWR-A	ECR/DPWR-A	PWR#4/DPWR-A
MDuncan/mac	JHolonich	CStahle	BKSingh	BJYoungblood
11/16/86	11/24/86	11/18/86	11/19/86	11/19/86

Mr. S.A. White
Tennessee Valley Authority

Sequoyah Nuclear Plant

cc:
Tennessee Department of Public Health
ATTN: Director, Bureau of Environmental Health Services
Cordell Hull Building
Nashville, Tennessee 37219

J.A. Kirkebo
ATTN: D.L. Williams
Tennessee Valley Authority
400 West Summit Hill Drive, W12 A12
Knoxville, Tennessee 37902

Mr. Bob Faas
Westinghouse Electric Corp.
P.O. Box 355
Pittsburgh, Pennsylvania 15230

R. L. Gridley
Tennessee Valley Authority
5N 157B Lookout Place
Chattanooga, Tennessee 37402-2801

M. R. Harding
Tennessee Valley Authority
Sequoyah Nuclear Plant
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Soddy Daisy, Tennessee 37379

Resident Inspector/Sequoyah NPS
c/o U.S. Nuclear Regulatory Commission
2600 Igou Ferry Road
Soddy Daisy, Tennessee 37379

H.L. Abercrombie
Tennessee Valley Authority
Sequoyah Nuclear Plant
P.O. Box 2000
Soddy Daisy, Tennessee 37379

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission,
101 Marietta Street, N.W., Suite 2900
Atlanta, Georgia 30323

Mr. Michael H. Mobley, Director
Division of Radiological Health
T.E.R.R.A. Building
150 9th Avenue North
Nashville, Tennessee 37203

County Judge
Hamilton County Courthouse
Chattanooga, Tennessee 37402

December 1, 1986

AMENDMENT NO. 50 TO FACILITY OPERATING LICENSE NO. DPR-77 - Sequoyah Nuclear Plant Unit 1
AMENDMENT NO. 42 TO FACILITY OPERATING LICENSE NO. DPR-79 - Sequoyah Nuclear Plant Unit 2

DISTRIBUTION w/ enclosures:
Docket No. 50-327/328
NRC PDR
Local PDR
NSIC
PRC System
PD#4 Reading File
C. Stahle
M. Duncan
OGC-Beth
R. Diggs, ADM
T. Barnhart (8)
E.L. Jordan, DEQA:I&E
L.J. Harmon, I&E
B.J. Youngblood
J. Holonich
N. Thompson
E. Butcher
W. Jones
H. Denton
J. Taylor
G. Zech, RII
B. Hayes
K. Barr. RII
E. Fields, EICSB
H. Thompson, Jr.
M. Reinhart, AR

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 50
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Sequoyah Nuclear Plant, Unit 1 (the facility) Facility Operating License No. DPR-77 filed by the Tennessee Valley Authority (licensee), dated August 8, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the license, as amended, 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 hereby amended by page changes to the Appendix A Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 50 are hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

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B. J. Youngblood, Director
PWR Project Directorate #4
Division of PWR Licensing-A

Attachment"
Appendix A Technical
Specification Changes

Date of Issuance: December 1, 1986

PWR#4/DPWR-A	PWR#4/DPWR-A	PWR#4/DPWR-A	OGC/BETH	PWR#4/DPWR-A
MDuncan/mac	JHolonich	CStahle		BJYoungblood
11/18/86	11/18/86	11/18/86	11/25/86	11/18/86

ECR/DPWR-A
BKSingh
11/19/86

ATTACHMENT TO LICENSE AMENDMENT NO. 50

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains vertical lines indicating the areas of change.

Amended Page
3/4 5-8

SURVEILLANCE REQUIREMENTS (Continued)

h. By performing a flow balance test during shutdown following completion of modifications to the ECCS subsystem that alter the subsystem flow characteristics and verifying the following flow rates:

1. For safety injection pump lines with a single pump running:

   a. The sum of the injection line flow rates, excluding the highest flow rate is greater than or equal to 444 gpm, and

   b. The total pump flow rate is less than or equal to 675 gpm.

2. For centrifugal charging pump lines with a single pump running:

   a. The sum of the injection line flow rates, excluding the highest flow rate is greater than or equal to 316 gpm, and

   b. The total pump flow rate is less than or equal to 555 gpm.

3. For all four cold leg injection lines with a single RHR pump running a flow rate greater than or equal to 3976 gpm.

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 42
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Sequoyah Nuclear Plant, Unit 2 (the facility) Facility Operating License No. DPR-79 filed by the Tennessee Valley Authority (licensee), dated August 8, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the license, as amended, 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 hereby amended by page changes to the Appendix A Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 42 are hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/S/

B. J. Youngblood, Director
PWR Project Directorate #4
Division of PWR Licensing-A

Attachment
Appendix A Technical
Specification Changes

Date of Issuance: December 1, 1986

PWR#4/DPWR-A
MDuncan/mac
11/18/86

ECR/DPWR-A
BKSingh
11/19/86

PWR#4/DPWR-A
JHolonich
11/20/86

PWR#4/DPWR-A
CStahle
11/21/86

OGC/BETH
11/25/86

PWR#4/DPWR-A
BJYoungblood
11/28/86

ATTACHMENT TO LICENSE AMENDMENT NO. 42

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains vertical lines indicating the areas of change.

Amended Page
3/4 5-8

SURVEILLANCE REQUIREMENTS (Continued)

h. By performing a flow balance test during shutdown following completion of modifications to the ECCS subsystem that alter the subsystem flow characteristics and verifying the following flow rates:

1. For safety injection pump lines with a single pump running:

a. The sum of the injection line flow rates, excluding the highest flow rate is greater than or equal to 444 gpm, and

b. The total pump flow rate is less than or equal to 675 gpm.

2. For centrifugal charging pump lines with a single pump running:

a. The sum of the injection line flow rates, excluding the highest flow rate is greater than or equal to 316 gpm, and

b. The total pump flow rate is less than or equal to 555 gpm.

3. For all four cold leg injection lines with a single RHR pump running a flow rate greater than or equal to 3976 gpm.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 50 TO FACILITY OPERATING LICENSE DPR-77

AND AMENDMENT NO. 42 TO FACILITY OPERATING LICENSE DPR-79

TENNESSEE VALLEY AUTHORITY

INTRODUCTION

In a letter dated August 8, 1986, the Tennessee Valley Authority (TVA or licensee) requested changes to the Technical Specifications for Sequoyah Nuclear Plant Units 1 and 2. The changes would modify the flow balance surveillance requirements for the safety injection pumps and the centrifugal charging pumps. The changes permit greater imbalance between the flow injected into the four loops than was previously allowed. Flow balancing is important since in loss of coolant accident analyses the loop receiving the greatest ECCS flow is assumed to be broken and to spill its portion of the injected coolant. The Technical Specifications therefore specify the minimum flow to the three lowest flow loops.

The licensee also proposes to remove the automatic closure signal from the low flow protection (miniflow) lines for the centrifugal charging pumps. Removal of the autoclosure feature provides greater protection from pump overheating at high discharge pressures but acts to reduce ECCS flow. The total requested reduction in safety injection and centrifugal charging pump flow is approximately 6% for the surveillance test which is at low pressure. The effect of not isolating the miniflow lines would be more significant at higher discharge pressures such as would occur during a small break LOCA.

EVALUATION

The licensee evaluated the effect of reduced safety injection and centrifugal charging pump flow on small break LOCAs. A sensitivity study of small break LOCA in WCAP-9600 indicates that for each percentage decrease in ECCS flow, the calculated peak cladding temperature will increase by 15°F. During the time of core uncovery for the most severe small break LOCA the reactor system pressure would be approximately 600 psig. At that pressure the open miniflow lines protecting the centrifugal charging pumps would bypass a greater fraction of the flow so that the total reduction in flow from the FSAR value would be 10%. Based on the WCAP-9600 sensitivity study of the effect of ECCS flow reduction on small break LOCA a 10% ECCS flow reduction would result in a 150°F increase in peak cladding temperature. Since the UFSAR analyses of small break LOCA predict peak cladding temperatures of less than 1500°F, the staff concludes that the 2200°F limit of 10 CFR 50.46 will not be exceeded.

The licensee performed additional large break LOCA calculations with the lower flows from the safety injection and centrifugal charging pumps. For the most severe large break LOCA the peak cladding temperature was calculated to be 2113°F which is below the limit of 2200°F. This calculation was performed in October 1983 using the 1981 version of the Westinghouse UHI ECCS Evaluation Model. The calculation conservatively assumed 10% steam generator tube plugging and is documented in the UFSAR. Since October 1983 Westinghouse made a correction in the SATAN-VI code that is a part of the 1981 UHI Evaluation model. The correction would increase the peak cladding temperature by less than 4°F. Westinghouse also informed the staff of a potential non-conservatism in the WREFLOOD code that is also part of the 1981 UHI Evaluation Model. Modification of the WREFLOOD code to correct the potential non-conservatism could increase the peak cladding temperature by 6 to 12°F. In consideration of the margin in the licensee's calculation of peak cladding temperature for large break LOCA and the small magnitude of the nonconservatisms in the computer codes, the staff concludes that the 2200°F limit on peak cladding temperature will not be exceeded and that the Sequoyah ECCS performance remains acceptable.

To aid in meeting the new minimum flow limits for the three injection lines with the lowest flow, the licensee requests that the maximum total safety injection pump flow be increased to 675 gpm from 660 gpm. This will reduce the need for throttling the pump discharge. The maximum flow is limited by NPSH concerns for the pump at high flows since the required NPSH increases with increased flow. The licensee verified that adequate NPSH would be available at the higher flow rate using pump test curves from the manufacturer. The staff concludes that this change is acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve changes in use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. The staff has determined that the amendments involve 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 these amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 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 the amendments.

CONCLUSION

The Commission made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register on September 24, 1986 (51 FR 33958) and consulted with the state of Tennessee. No public comments were received, and the state of Tennessee did not have any comments.

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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Carl R. Stahle, PWR#4, DPWR-A
Joe Holonich, PWR#4, DPWR-A
W. Jensen, PARS

Dated: December 1, 1986