DCR 016

July 27, 1984

Docket No. 50-313

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Mr. John M. Griffin, Senior Vice President
of Energy Supply
Arkansas Power and Light Company
P. O. Box 551
Little Rock, Arkansas 72203

Dear Mr. Griffin:

The Commission has issued the enclosed Amendment No. 83 to Facility Operating License DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated February 27, 1984.

The amendment modifies the ANO-1 TS pressure-temperature limit curves for hydrostatic test, normal heatup and normal cooldown. Also, the amendment requires that these pressure-temperature curves be updated prior to reaching 15 effective full power years of operation.

We have discussed certain necessary changes to the Bases of the TSs with your staff, and they have agreed to these changes which are incorporated in the Bases.

As discussed in the attached Safety Evaluation, the limiting ANO-1 reactor vessel beltline material, weld metal WF-112, is being irradiated as part of the B&W Owners Group Integrated Reactor Vessel Materials Surveillance Program. According to B&W Report BAW-1543, Rev. 1, "Integrated Reactor Vessel Material Surveillance Program," weld metal WF-112 is contained in surveillance capsules OCI-A, -C and -E. Since the test results from these capsules will evaluate the effect of neutron irradiation on the ANO-1 limiting material, you must use the test results from these capsules in determining the safety margins required for their pressure-temperature limits. If test results from these capsules indicate that the ANO-1 pressure-temperature limits are non-conservative, you must revise the limits and submit them for NRC staff review.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Monthly Notice.

Sincerely,

George W. Rivenbark, Acting Chief
Operating Reactors Branch No. 4
Division of Licensing

Enclosures:
1. Amendment No. 83
2. Safety Evaluation

ORB#4:DL	ORB#4:DL	ORB#4:DL	OELD	AD:OR:DL	AD:MCEB:DE
RIngram	GVissing;ef	GRivenbark		GLainas	W Johnston
07/16/84	07/16/84	07/17/84	07/20/84	07/27/84	7/17/84

cc w/enclosure(s):

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Acting County Judge of Pope County
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ARKANSAS POWER & LIGHT COMPANY

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 83
License No. DPR-51

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

   A. The application for amendment by Arkansas Power and Light Company (the licensee) dated February 27, 1984, 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-51 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 83 , are hereby incorporated in 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

George W. Rivenbark, Acting Chief
Operating Reactors Branch No. 4
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 27, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 83

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

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 area of change.

Remove	Insert
18a	18a
19	19
20	20
20a	20a
20b	20b
20c	20c

3.1.2.7 Prior to reaching fifteen effective full power years of operation, Figures 3.1.2-1, 3.1.2-2 and 3.1.2-3 shall be updated for the next service period in accordance with 10CFR50, Appendix G, Section V.B. The service period shall be of sufficient duration to permit the scheduled evaluation of a portion of the surveillance data scheduled in accordance with Specification 4.2.7. The highest predicted adjusted reference temperature of all the beltline region materials shall be used to determine the adjusted reference temperature at the end of the service period. The basis for this prediction shall be submitted for NRC staff review in accordance with Specification 3.1.2.8. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

3.1.2.8 The updated proposed technical specifications referred to in 3.1.2.7 shall be submitted for NRC review at least 90 days prior to the end of the service period. Appropriate additional NRC review time shall be allowed for proposed technical specifications submitted in accordance with 10 CFR Part 50, Appendix G, Section V.C.

Bases

All reactor coolant system components are designed to withstand the effects of cyclic loads due to system temperature and pressure changes.[1] These cyclic loads are introduced by unit load transients, reactor trips, and unit heatup and cooldown operations. The number of thermal and loading cycles used for design purposes are shown in Table 4-8 of the FSAR. The maximum unit heatup and cooldown rate of 100F per hour satisfies stress limits for cyclic operation.[2] The 200 psig pressure limit for the secondary side of the steam generator at a temperature less than 100F satisfies stress levels for temperatures below the DTT.[3]

The major components of the reactor coolant pressure boundary have been analyzed in accordance with Appendix G to 10CFR50. Results of this analysis, including the actual pressure-temperature limitations of the reactor coolant pressure boundary, are given in BAW-1440[4] and BAW-1698[5]. The limiting weld material is being irradiated as part of the B&W Owners Group Integrated Reactor Vessel Material Surveillance Program and the identification and locations of the capsules containing the limiting weld material is discussed in the B&W report, BAW 1543, Revision 1.[6] The chemical composition of the limiting weld material is reported in the B&W Report, BAW 1511P.[7] The effect of neutron irradiation on the RT_{NDT} (8) of the limiting weld material is reported in the B&W Report, BAW 1436.

Figures 3.1.2-1, 3.1.2-2, and 3.1.2-3 present the pressure-temperature limit curves for hydrostatic test, normal heatup, and normal cooldown respectively. The limit curves are applicable through the fifteenth effective full power year of operation. These curves are adjusted by 25 psi and 10F for possible errors in the pressure and temperature sensing instruments. The pressure limit is also adjusted for the pressure differential between the point of system pressure measurement and the limiting component for all operating reactor coolant pump combinations.

The pressure-temperature limit lines shown on Figure 3.1.2-2 for reactor criticality and on Figure 3.1.2-1 for hydrostatic testing have been provided to assure compliance with the minimum temperature requirements of Appendix G to 10CFR50 for reactor criticality and for inservice hydrostatic testing.

The actual shift in RT_{NDT} of the beltline region material will be established periodically during operation by removing and evaluating, in accordance with Appendix H to 10CFR50, reactor vessel material irradiation surveillance specimens which are installed near the inside wall of this or a similar reactor vessel in the core region.

The spray temperature difference restriction based on a stress analysis of the spray line nozzle is imposed to maintain the thermal stresses at the pressurizer spray line nozzle below the design limits. Temperature requirements for the steam generator correspond with the measured NDTT for the shell.

The heatup and cooldown rates stated in this specification are intended as the maximum changes in temperature in one direction in a one hour period. The actual temperature linear ramp rate may exceed the stated limits for a time period provided that the maximum total temperature difference does not exceed the limit and that a temperature hold is observed to prevent the total temperature difference from exceeding the limit for the one hour period.

REFERENCES

(1) FSAR, Section 4.1.2.4

(2) ASME Boiler and Pressure Code, Section III, N-415

(3) FSAR, Section 4.3.11.5

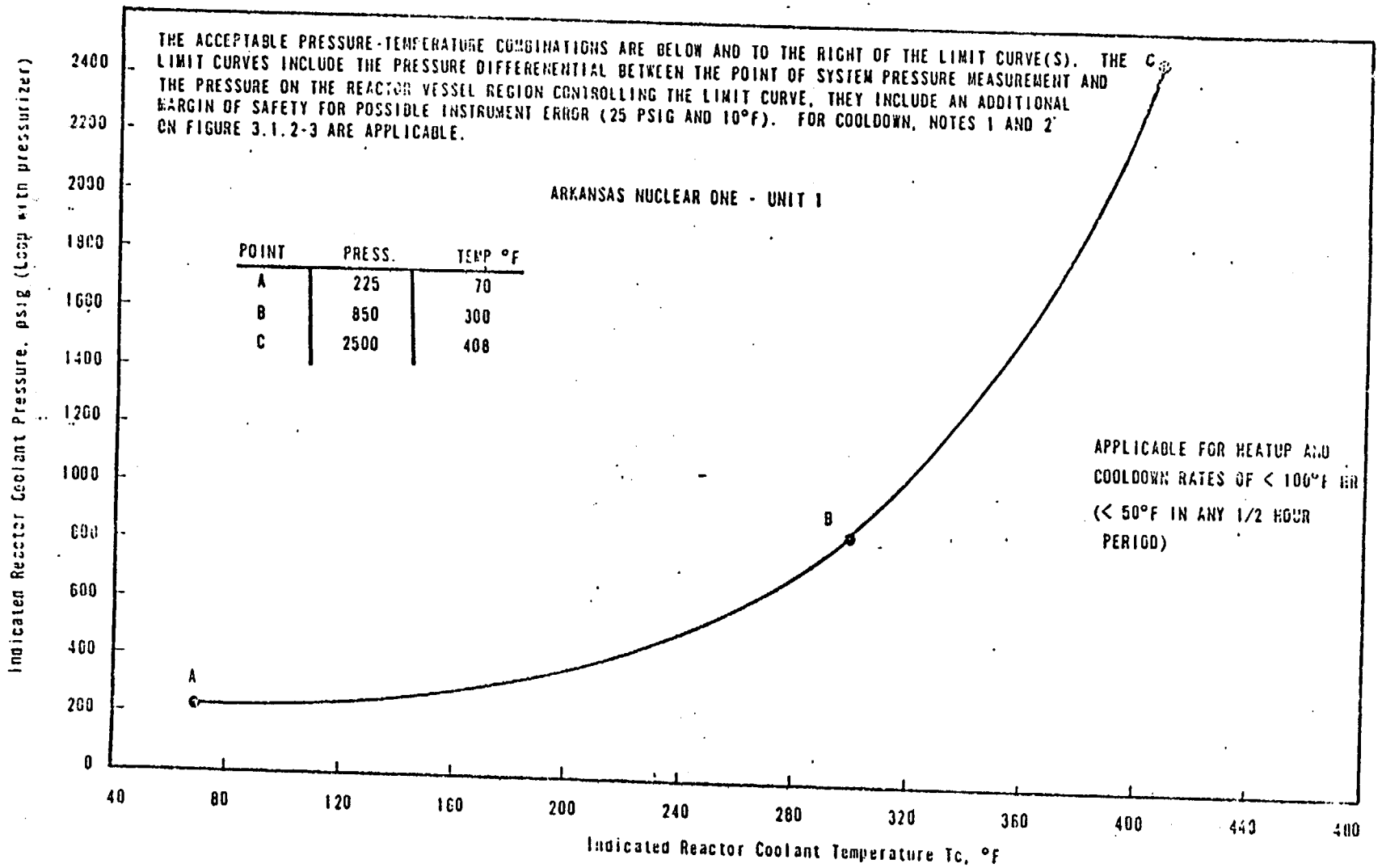
(4) BAW-1440

(5) BAW-1698

(6) BAW-1547, Revision 1

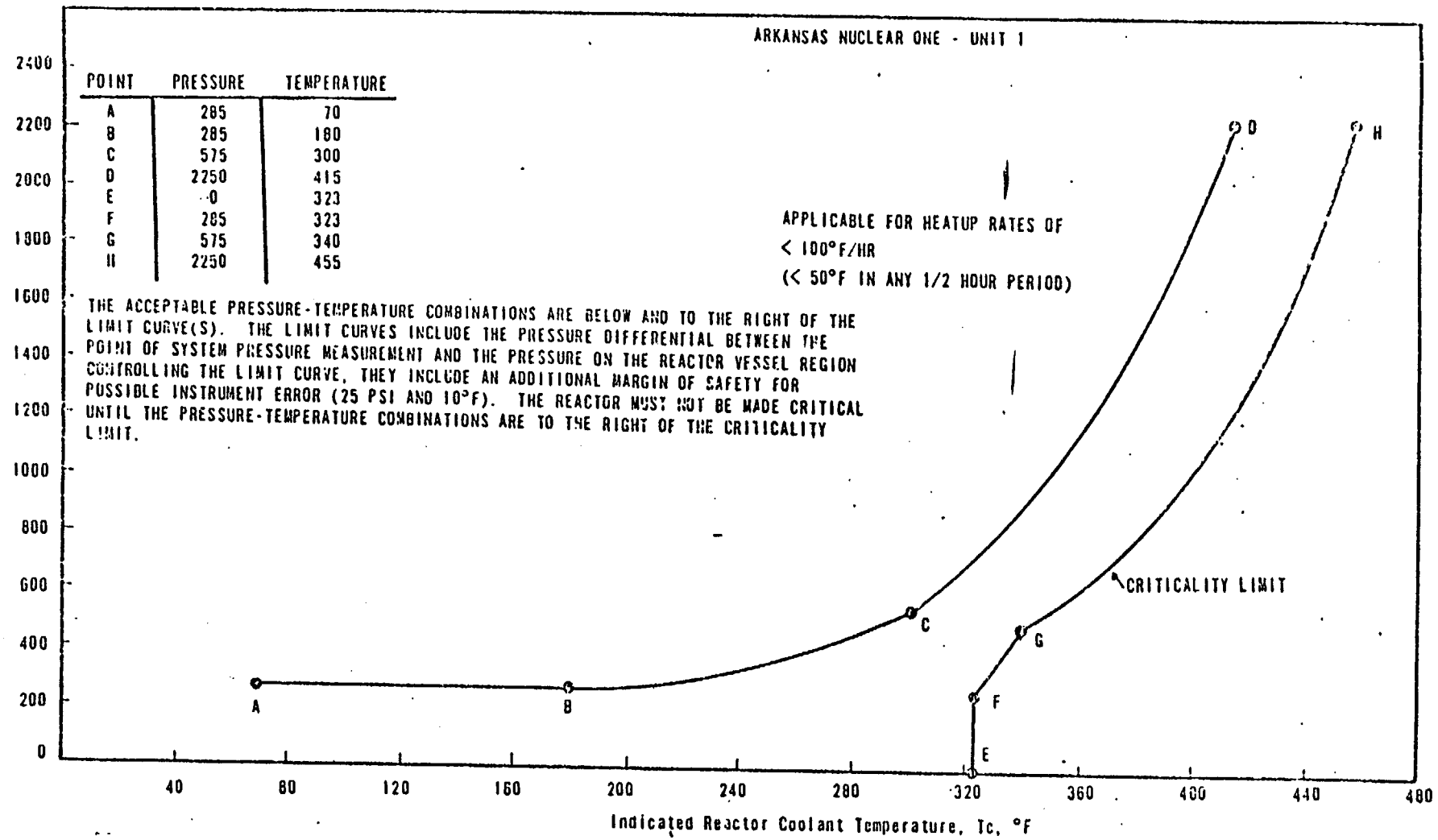
(7) BAW-1511 P

(8) BAW-1436



REACTOR COOLANT SYSTEM INSERVICE HYDROSTATIC TEST HEATUP AND COOLDOWN LIMITATIONS APPLICABLE FOR FIRST 15.0 EFFECTIVE FULL POWER YEARS

Figure 3.1.2-1

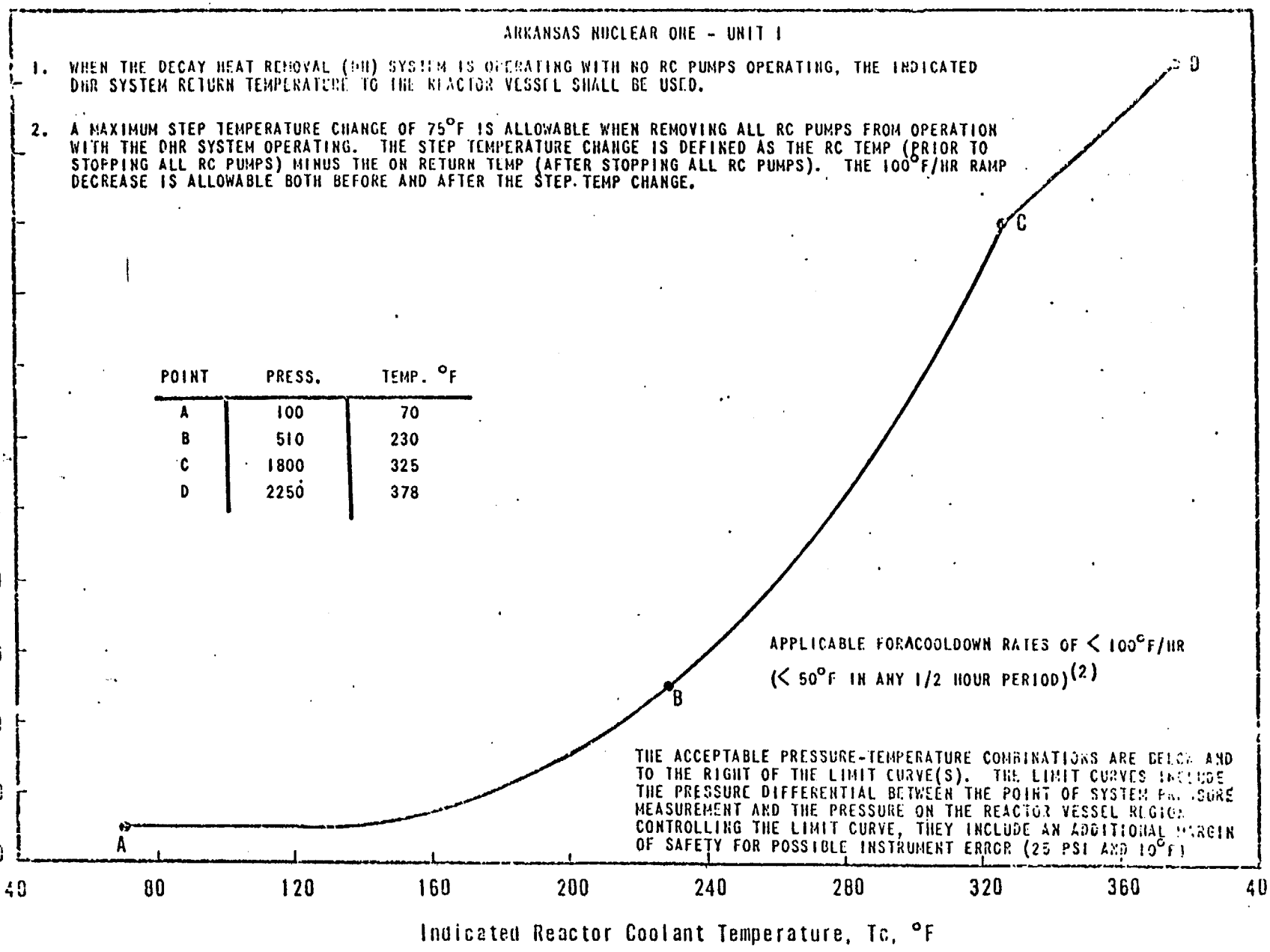


POINT	PRESSURE	TEMPERATURE
A	285	70
B	285	180
C	575	300
D	2250	415
E	0	323
F	285	323
G	575	340
H	2250	455

THE ACCEPTABLE PRESSURE-TEMPERATURE COMBINATIONS ARE BELOW AND TO THE RIGHT OF THE LIMIT CURVE(S). THE LIMIT CURVES INCLUDE THE PRESSURE DIFFERENTIAL BETWEEN THE POINT OF SYSTEM PRESSURE MEASUREMENT AND THE PRESSURE ON THE REACTOR VESSEL REGION CONTROLLING THE LIMIT CURVE, THEY INCLUDE AN ADDITIONAL MARGIN OF SAFETY FOR POSSIBLE INSTRUMENT ERROR (25 PSI AND 10°F). THE REACTOR MUST NOT BE MADE CRITICAL UNTIL THE PRESSURE-TEMPERATURE COMBINATIONS ARE TO THE RIGHT OF THE CRITICALITY LIMIT.

REACTOR COOLANT SYSTEM, NORMAL OPERATION-HEATUP LIMITATIONS, APPLICABLE FOR FIRST 15.0 EFFECTIVE FULL POWER YEARS

Figure 3.1.2-2



REACTOR COOLANT SYSTEM, NORMAL OPERATION-COOLDOWN LIMITATIONS APPLICABLE FOR FIRST 15.0 EFFECTIVE FULL POWER YEARS

Figure 3.1.2-3

Amendment No. 28,83

20c

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 83 TO FACILITY OPERATING LICENSE NO. DPR-51

ARKANSAS POWER & LIGHT COMPANY

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

Introduction

By letter dated February 27, 1984, Arkansas Power and Light Company (AP&L or the licensee) requested amendment to the Technical Specifications (TSs) appended to Facility Operating License DPR-51 for Arkansas Nuclear One, Unit 1 (ANO-1). The amendment would change the ANO-1 pressure-temperature limit curves for hydrostatic test, normal heatup, and normal cooldown (Figures 3.1.2-1, 3.1.2-2 and 3.1.2-3 of the TSs), to be applicable for a period of time corresponding to 15 effective full power years (EFPY). The proposed change would require these proposed pressure-temperature curves to be updated prior to reaching 15 EFPY of operation.

Background and Discussion

Pressure-temperature limits must be calculated in accordance with the requirements of Appendix G, 10 CFR 50, which became effective on July 26, 1983. Pressure-temperature limits that are calculated in accordance with the requirements of Appendix G, 10 CFR 50, are dependent upon the initial RT_{NDT} for the limiting materials in the beltline and closure flange regions of the reactor vessel and the increase in RT_{NDT} resulting from neutron irradiation damage to the limiting beltline material.

The ANO-1 reactor vessel was procured prior to the issuance of the Appendix G, 10 CFR 50 regulation. However, the ANO-1 reactor vessel materials must meet the safety margins and testing requirements of the regulation. Appendix G, 10 CFR 50, requires that samples from each reactor vessel material be

fracture toughness tested to determine their initial (unirradiated) RT_{NDT}. The limiting beltline material was fracture toughness tested to determine its initial RT_{NDT}. However, due to the unavailability of sample materials from the ANO-1 reactor vessel closure flange region, the initial RT_{NDT} of the closure flange region materials were determined using generic materials properties data. The generic materials properties data were documented in BAW Topical Report BAW-10046, "Methods of Compliance with Fracture Toughness and Operational Requirements of 10 CFR 50, Appendix G." This topical report was reviewed by the staff and found acceptable for referencing in licensing applications. The staff's review is documented in a letter from S. A. Varga to J. H. Taylor dated June 22, 1977. Based on the safety evaluation, which was attached to the Varga signed letter, the licensee's estimate for the initial RT_{NDT} for the closure flange region material may be used in determining the ANO-1 reactor vessel pressure-temperature limits. The increase in RT_{NDT} of the limiting beltline materials resulting from neutron irradiation damage was estimated by the licensee using the methodology documented in Regulatory Guide 1.99, Rev. 1, "Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials." This estimate is reported in Table 8-1 of B&W Report BAW 1698, "Analysis of Capsule ANI-B From Arkansas Power & Light Company's Arkansas Nuclear One, Unit 1." The licensee indicates that, using this Regulatory Guide methodology, the limiting beltline material is weld metal WF-112. This material was not tested as part of the ANO-1 reactor vessel material surveillance program. However, it was tested as part of the B&W Owners Group Integrated Reactor Vessel Material Surveillance Program, in which AP&L is an active member. The effect of neutron irradiation on the RT_{NDT} of weld metal WF-112 is documented in B&W Report BAW-1436, "Analysis of Capsule OCI-E, Duke Power Company, Oconee Nuclear Station-Unit 1." The WF-112 weld metal was irradiated in the Oconee Unit 1 reactor vessel and had been irradiated to 1.5×10^{18} nvt. Our review of the Charpy V-Notch data documented in BAW-1436 indicates that WF-112 weld metal had an increase in RT_{NDT} of 83°F as a result of irradiation to 1.5×10^{18} nvt. Using the WF-112 weld metal chemical composition reported in B&W Proprietary Report BAW-1511P, "Irradiation-Induced Reduction in Charpy Upper-Shelf Energy of Reactor Vessel Welds," and the Regulatory Guide 1.99, Rev. 1, method of estimating neutron irradiation damage, the estimate of increase in RT_{NDT} at

1.5×10^{18} nvt is 120°F. Since the increase in RT_{NDT} of WF-112 surveillance weld metal is significantly less than that predicted by Regulatory Guide 1.99, Rev. 1, the Regulatory Guide should provide conservative estimates as to the amount of neutron irradiation damage to weld metal WF-112.

Evaluation

We have used the unirradiated RT_{NDT} for beltline and closure flange materials, which were previously discussed, the Regulatory Guide 1.99, Rev. 1, method of estimating neutron irradiation damage, and Standard Review Plan 5.3.2 method of calculating pressure-temperature limits to evaluate the licensee's proposed pressure-temperature limits. Our evaluation indicates that the proposed pressure-temperature limit curves meet the safety margins of Appendix G, 10 CFR 50, for a period of time corresponding to 15 EFPY. Hence, the proposed curves are acceptable for incorporation into ANO-1 TSs.

As previously discussed in this evaluation, the limiting ANO-1 reactor vessel beltline material, weld metal WF-112, is being irradiated as part of the B&W Owners Group Integrated Reactor Vessel Materials Surveillance Program. According to B&W Report BAW-1543, Rev. 1, "Integrated Reactor Vessel Material Surveillance Program," weld metal WF-112 is contained in surveillance capsules OCI-A, -C and -E. Since the test results from these capsules will evaluate the effect of neutron irradiation on the ANO-1 limiting material, AP&L must use the test results from these capsules in determining the safety margins required for their pressure-temperature limits. If test results from these capsules indicate that the ANO-1 pressure-temperature limits are non-conservative, the licensee must revise the limits and submit them for NRC staff review.

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 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.

Dated: July 27, 1984

Principal Contributors: Barry Elliot and Guy Vissing