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SEP 1 7 1975

Docket No. 50-321

Georgia Power Company
Oglethorpe Electric Membership Corporation
ATTN: Mr. I. S. Mitchell, III
Vice President and Secretary
Georgia Power Company
Atlanta, Georgia 30302

Gentlemen:

The Commission has issued the enclosed Amendment No. 15 to Facility Operating License No. DPR-57 for the Edwin I. Hatch Nuclear Power Plant Unit No. 1. The amendment also includes Change No. 15 to the Technical Specifications in accordance with your application dated March 25, 1975.

The amendment modifies the Technical Specifications to (1) revise the surveillance requirements for temperature monitoring during reactor coolant heatup and cooldown, and (2) complete the pressure versus minimum temperature curves for the reactor pressure vessel regions remote from the core beltline.

Copies of the related Safety Evaluation and Federal Register Notice are also enclosed.

Sincerely,

/S/

George Lear, Chief
Operating Reactors Branch #3
Division of Reactor Licensing

Enclosures:
1. Amendment No. 15
2. Safety Evaluation
3. Federal Register Notice

cc w/encls:
See next page

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x7872 SURNAME ➤	CParrish	JGuibert:esp		GLear	GLear
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Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

Georgia Power Company &
Oglethorpe Electric Membership Corporation

SEP 1 7 1975

cc: w/enclosures

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

GEORGIA POWER COMPANY

OGLETHORPE ELECTRIC MEMBERSHIP CORPORATION

EDWIN I. HATCH NUCLEAR PLANT UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 15
License No. DPR-57

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

   A. The application for amendment by Georgia Power Company and Oglethorpe Electric Membership Corporation (the licensees) dated March 25, 1975, 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; and

   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.

2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Facility License No. DPR-57 is hereby amended to read as follows:

"(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications, as revised by issued changes thereto through Change No. 15."

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

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Reactor Licensing

Attachment:
Change No. 15 to the
Technical Specifications

Date of Issuance: SEP 1 7 1975

ATTACHMENT TO LICENSE AMENDMENT NO. 15

CHANGE NO. 15 TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-57

DOCKET NO. 50-321

Replace pages 3.6-1 - 3.6-2, 3.6-15 - 3.6-16, 3.6-17 - 3.6-18, with the attached revised pages (no change has been made on pages 3.6-2 and 3.6-18).

Replace Figures 3.6-1 - 3.6-2, and 3.6-3 - 3.6-4 (no change has been made on Figures 3.6-1 and 3.6-4).

3.6. PRIMARY SYSTEM BOUNDARY

Applicability

The Limiting Conditions for Operation apply to the operating status of the reactor coolant system.

Objective

The objective of the Limiting Conditions for Operation is to assure the integrity and safe operation of the reactor coolant system.

Specifications

A. Reactor Coolant Heat-Up and Cooldown

The average rate of reactor coolant temperature change during normal heatup or cooldown shall not exceed $100^{\circ}F$/hr when averaged over a one-hour period.

B. Reactor Vessel Temperature and Pressure

The reactor vessel shell temperatures during inservice hydrostatic or leak testing shall be at or above the higher of the temperatures shown on the two curves of Figure 3.6-2 where the lower curve, RPV shell beltline region is increased by the expected shift in RT_{NDT} from Figure 3.6-1.

4.6 PRIMARY SYSTEM BOUNDARY

Applicability

The Surveillance Requirements apply to the periodic examination and testing requirements for the reactor coolant system.

Objective

The objective of the Surveillance Requirements is to determine the condition of the reactor coolant system and the operation of the safety devices related to it.

Specifications

A. Reactor Coolant Heat-up and Cooldown

The reactor coolant system temperature and pressure shall be determined to be within the limits of Specifications 3.6.A and 3.6.B at least once every 30 minutes during reactor coolant heatup and cooldown. 15

B. Reactor Vessel Temperature and Pressure

Reactor vessel metal temperature at the outside surface of the bottom head in the vicinity of the control rod drive housing and reactor vessel shell adjacent to shell flange shall be recorded at least every 15 minutes during in-service hydrostatic or leak testing when the vessel pressure is $\geq$312 psig.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS

3.6.B. Reactor Vessel Temperature and Pressure (Continued)

During heatup by non-nuclear means, cooldown following nuclear shutdown or low level physics tests, the reactor vessel shell and fluid temperatures of Specification 4.6.A shall be at or above the higher of the temperatures of Figure 3.6-3 where the dashed line curve, RPV beltline is increased by the expected shift in RT_{NDT} from Figure 3.6-1.

During all operation with a critical core, other than for low level physics tests, the reactor vessel shell and fluid temperatures of Specification 4.6.A shall be at or above the higher of the temperatures of Figure 3.6-4 where the dashed line curve, RPV beltline, is increased by the expected shift in RT_{NDT} from Figure 3.6-1.

3.6.C. Reactor Vessel Head Stud Tensioning

The reactor vessel head bolting studs shall not be under tension unless the temperature of the vessel head flange and the head is greater than 70°F.

D. Idle Recirculation Loop Startup

The pump in an idle recirculation loop shall not be started unless the temperatures of the coolant within the idle and operating recirculation loops are within 50°F of each other.

4.6.B. Reactor Vessel Temperature and Pressure (Continued)

Test specimens representing the reactor vessel, base weld and weld heat affected zone metal shall be installed in the reactor vessel adjacent to the vessel wall at the core midplane level. The number and type of specimens will be in accordance with GE report NEDO-10115. The specimens shall meet the intent of ASTM E 185-70. Samples shall be withdrawn at one fourth and three fourths service life.

Neutron flux wires shall be installed in the reactor vessel adjacent to the reactor vessel wall at the core midplane level. The wires shall be removed and tested during the first refueling outage to experimentally verify the calculated values of neutron fluence at one fourth of the beltline shell thickness that are used to determine the NDTT shift from Figure 3.6-1.

C. Reactor Vessel Head Stud Tensioning

When the reactor vessel head studs are under tension and the reactor is in the Cold Shutdown Condition, the reactor vessel shell temperature immediately below the head flange shall be permanently recorded.

D. Idle Recirculation Loop Startup

Prior to and during startup of an idle recirculation loop, the temperature of the reactor coolant in the operating and idle loops shall be compared and permanently recorded.

3.6 PRIMARY SYSTEM BOUNDARY

A. Reactor Coolant Heatup and Cooldown

The vessel has been analyzed for stresses caused by thermal and pressure transients. Heating and cooling transients throughout plant life at uniform rates of 100 F per hour were considered in the temperature range of 100 to 546 F and were shown to be within the requirements for stress intensity and fatigue limits of Section III of the ASME Boiler and Pressure Vessel Code (1965 Edition including Winter 1966 addenda).

B. Reactor Vessel Temperature and Pressure

Operating limits on the reactor vessel pressure and temperature during normal heatup and cooldown, and during inservice hydrostatic testing, were established using Appendix G of the Summer 1972 Addenda to Section III of the ASME Boiler and Pressure Vessel Code, 1971 Edition, as a guide. These operating limits assure that a large postulated surface flaw, having a depth of one-quarter of the material thickness, can be safely accommodated in regions of the vessel shell remote from discontinuities. For the purpose of setting these operating limits the reference temperature, RT_{NDT}, of the vessel material was estimated from impact test data taken in accordance with requirements of the Code to which this vessel was designed and manufactured. (1965 Edition to Winter 1966 addenda).

The limitations for the core beltline region were established assuming
RT_{NDT} established from dropweight tests for base metal and Charpy 15
V notch testing for weld metal and heat affected weld zones.

The limitations for areas of the vessel shell remote from the core beltline region were established assuming RT_{NDT} = +40 F, which was the highest NDTT permissible by the reactor vessel purchase specification.

Figure 3.6-2 establishes minimum temperature requirements for leak
testing and hydrostatic testing required by the ASME Boiler and
Pressure Vessel Code, Section XI. 15

Test pressures for inservice hydrostatic and leak testing required
by the ASME B&PV Code, Section XI, are a function of testing
temperature and component material. For the Hatch 1 reactor pressure
vessel, the ISI hydrostatic test pressure would be approximately 1.1
times operating pressure, or about 1106 psig, depending on the reactor 15
water temperature.

Figure 3.6-3 provides appropriate limitations for plant heatup and cooldown when the reactor is not critical. These curves assume heatup and cooldown rates up to 100 F per hour.

Figure 3.6-4 establishes limitations for critical operations. These limits include the 40 F required by 10 CFR 50 Appendix G.

The fracture toughness of all ferritic steels gradually and uniformly decreases with exposure to fast neutrons above a threshold value, and it is prudent and conservative to account for this in the operation of the RPV. Two types of information are needed in this analysis: a) A relationship between the change in fracture toughness of the RPV steel and the neutron fluence (integrated neutron flux), and b) a measure of the neutron fluence at the point of interest in the RPV wall.

A relationship between neutron fluence and change in Charpy V, 30 foot pound transition temperature has been developed for SA302B/SA533 steel based on at least 35 experimental data points as shown in Figure 3.6-1. In turn this change in transition temperature can be related to a change in the temperature ordinate shown in Figure G 2110-1 in Appendix G of Section III of the Boiler Code.

3.6.B. Reactor Vessel Temperature and Pressure (continued)

The neutron fluence at any point in the pressure vessel wall can be computed from core physics data. The neutron fluence can also be measured experimentally on the ID of the vessel wall. At present valid experimental 15
measurements can be made only over time periods of less than 5 years because of the limitations of the dosimeter materials. This causes no problem because of the exact relationship between thermal power produced and the number of neutrons produced from a given core geometry. A single experimental measurement in a time period of one year can be used to predict the fluence for the life of the plant in terms of thermal power output if no great changes in core geometry are made.

The vessel pressurization temperature at any time period can be determined from the thermal power output of the plant and its relation to the neutron fluence and from Figures 3.6-1 and 3.6-2 for heatup or cooldown and core operation, see also curves on Figures 3.6-3 and 3.6-4. During the first fuel cycle only calculated neutron fluence values can be used. At the first refueling, neutron dosimeter wires which are installed adjacent to the vessel wall can be removed to verify the calculated neutron fluence. As more experience is gained in calculating the fluence the need to verify it experimentally will disappear. Because of the many experimental points used to derive Figure 3.6-1 there is no need to reverify it for technical reasons, but in case verification is required for other reasons, three sets of mechanical test specimens representing the base metal, weld metal and weld heat affected zone metal have been placed in the vessel. These can be removed and tested as required.

C. Reactor Vessel Head Stud Tensioning

The requirements for cold bolt-up of the reactor vessel closure are based on the NDT temperature plus 60°F which is derived from the requirements of the ASME Code to which the vessel was built. The NDT temperature of the closure flanges, adjacent head and shell material and stud material is a maximum of 10°F. The minimum temperature for bolt-up is therefore 10 + 60 = 70°F. The neutron radiation fluence at the closure flanges is well below 10^{17} nvt >1Mev and therefore radiation effects will be minor and will not influence this temperature.

D. Idle Recirculation Loop Startup

Requiring the coolant temperature in an idle recirculation loop to be within 50°F of the operating loop temperature before a recirculation pump is started prevents the potential seizure of the pump impeller within the wear rings because of the more rapid dimensional increase of the impeller during heatup arising from thermal capacity.

3.6.E. Recirculation Pump Start

The coolant in the bottom of the vessel is at a lower temperature than that in the upper regions of the vessel when there is not recirculation flow. The colder water is forced up when recirculation pumps are started. This will not result in stresses which exceed ASME Boiler and Pressure Vessel Code, Section III limits when the temperature differential is not greater than 145 F.

F. Reactor Coolant Chemistry

The basis for the equilibrium coolant iodine activity limit is a computed dose to the thyroid of 30 rem at the exclusion distance during the 2 hour period following a steam line break. This dose is computed with the assumption of the release of coolant associated with a 5.5 second closure of the steam line isolation valves (52,500 lbs), Regulatory Guide 1.5 meteorology, and a site boundary distance of 1490 meters.

The maximum activity limit during a short term transient is established from consideration of a maximum iodine inhalation dose less than 300 rem. The probability of a steam line break accident coincident with an iodine concentration transient is significantly lower than that of the accident alone, since operation of the reactor with iodine levels above the equilibrium value is limited to 5 percent of total operation.

Based upon a review of daily reactor water iodine concentrations at several sites that show the iodine transients during power generation are less than a factor of ten, sampling frequencies have been established that vary with the iodine concentration in order to assure that the maximum coolant iodine concentrations are not exceeded.

Materials in the primary system in contact with the coolant are primarily stainless steel and Zircaloy. The reactor water chemistry limits are established to prevent damage to these materials. Limits are placed on conductivity and chloride concentrations. Conductivity is limited because it is continuously measured and gives an indication of abnormal conditions and the presence of unusual materials in the coolant. Chloride limits are specified to prevent stress corrosion cracking of the stainless steel. According to test data, allowable chloride concentrations could be set several orders of magnitude above the established limit at the oxygen concentration (.2-.3ppm) experienced during power operation without causing significant failures. Zircaloy does not exhibit similar stress corrosion failures. However, there are some conditions under which the dissolved oxygen content of the reactor coolant water could be higher than .2-.3ppm, such as reactor startup and hot standby. During these periods, a more restrictive limit of 0.1ppm has been established to assure that permissible chloride-oxygen combination are not exceeded. During refueling when the reactor is depressurized Specification 3.6.F.2.c would apply. Boiling occurs at higher steaming rates causing deaeration of the reactor water, thus maintaining oxygen concentration at low levels and assuring that the chloride-oxygen content is not such as would tend to induce stress corrosion cracking.

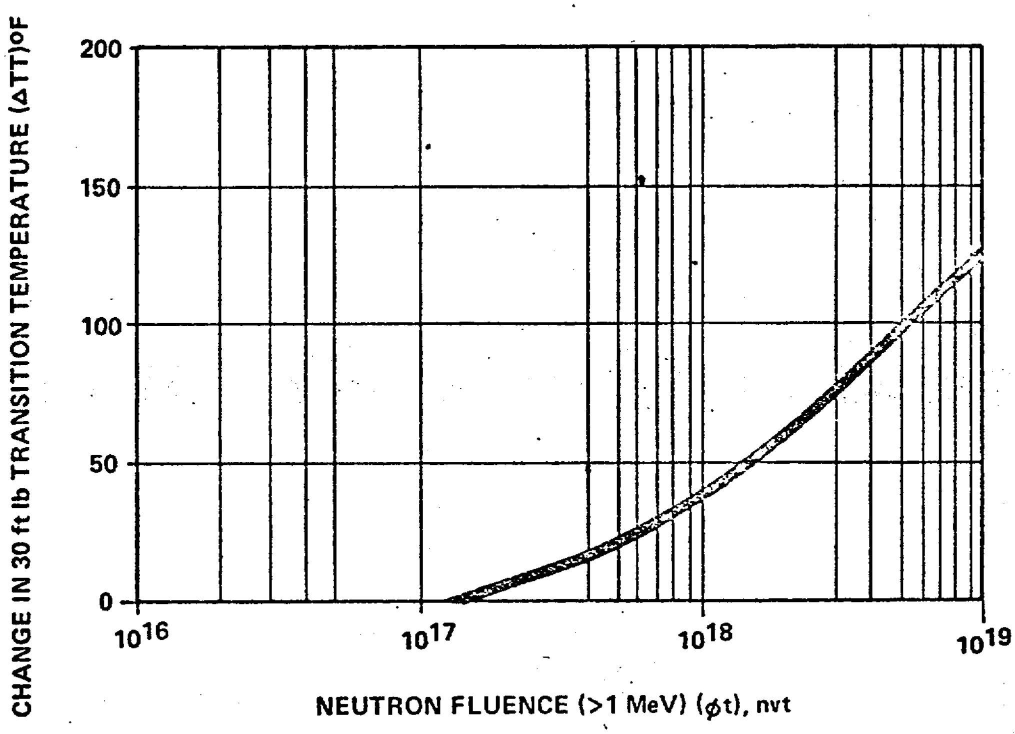

FIGURE 3.6-1
CHANGE IN CHARPY V TRANSITION TEMPERATURE
VERSUS
NEUTRON EXPOSURE

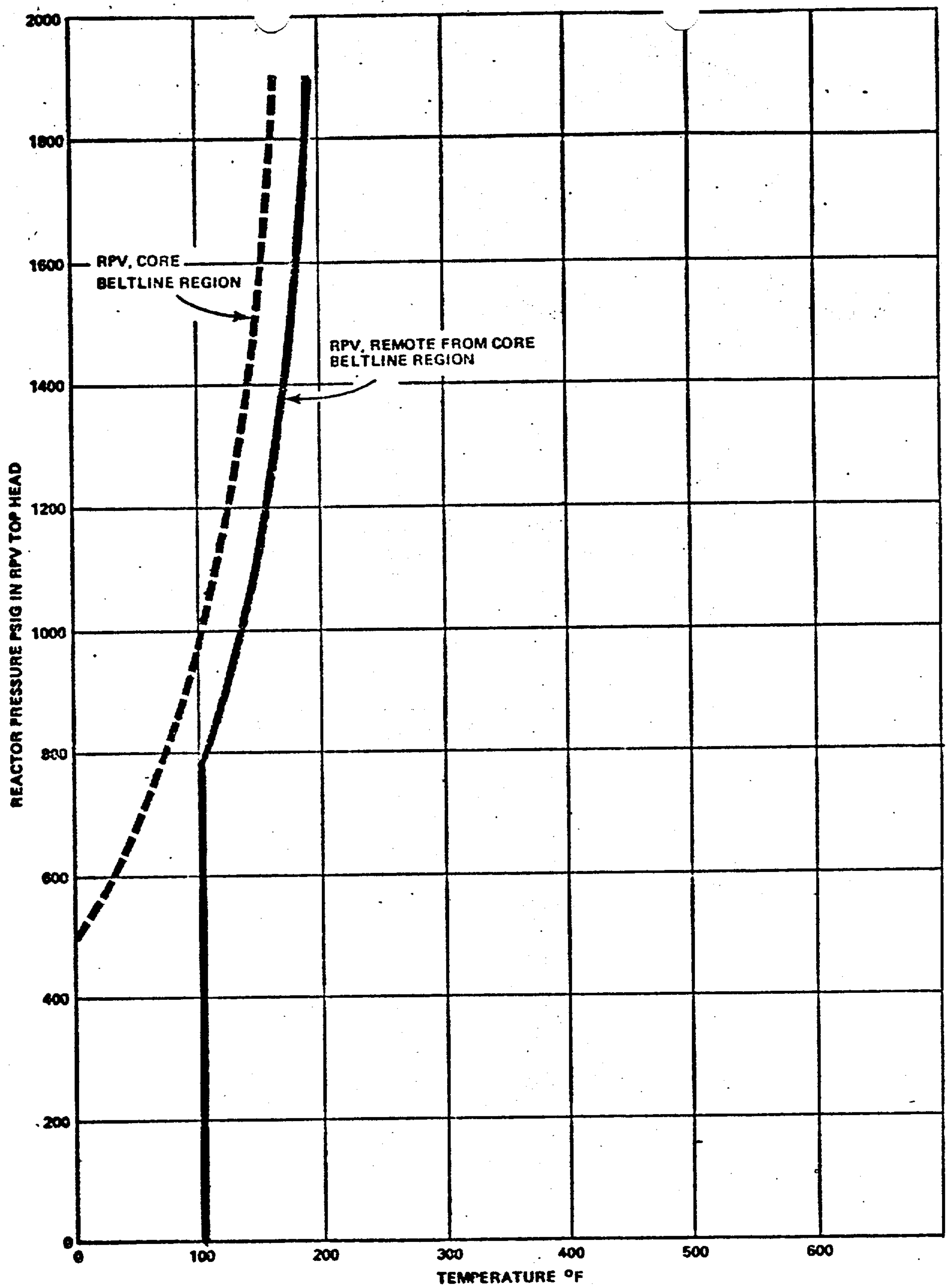

FIGURE 3.6-2
Minimum Temperature
for Inservice Hydrostatic
and Leak Tests

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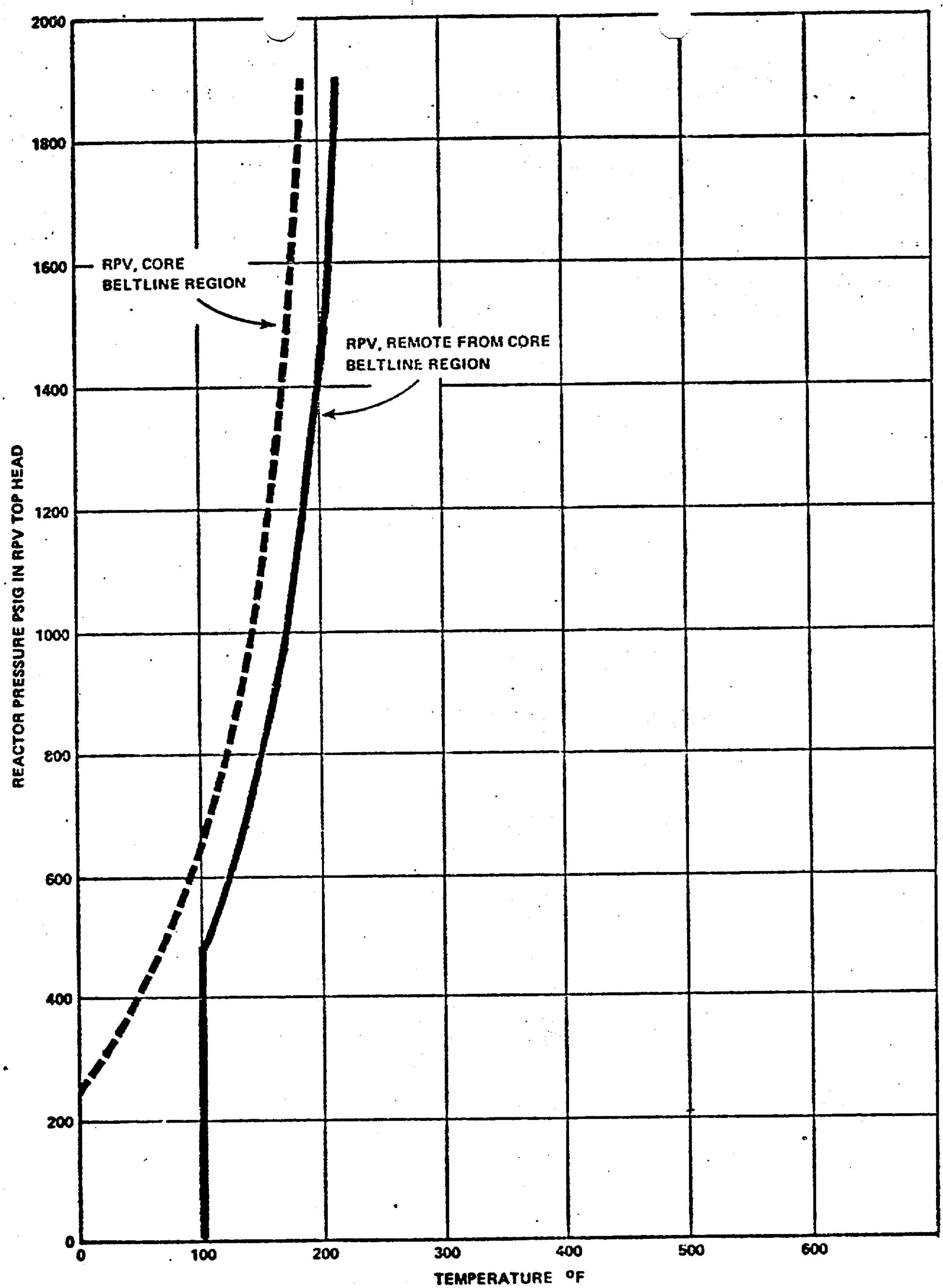

FIGURE 3.6-3
MINIMUM TEMPERATURE FOR MECHANICAL HEAT UP OR COOL DOWN FOLLOWING NUCLEAR SHUTDOWN

15

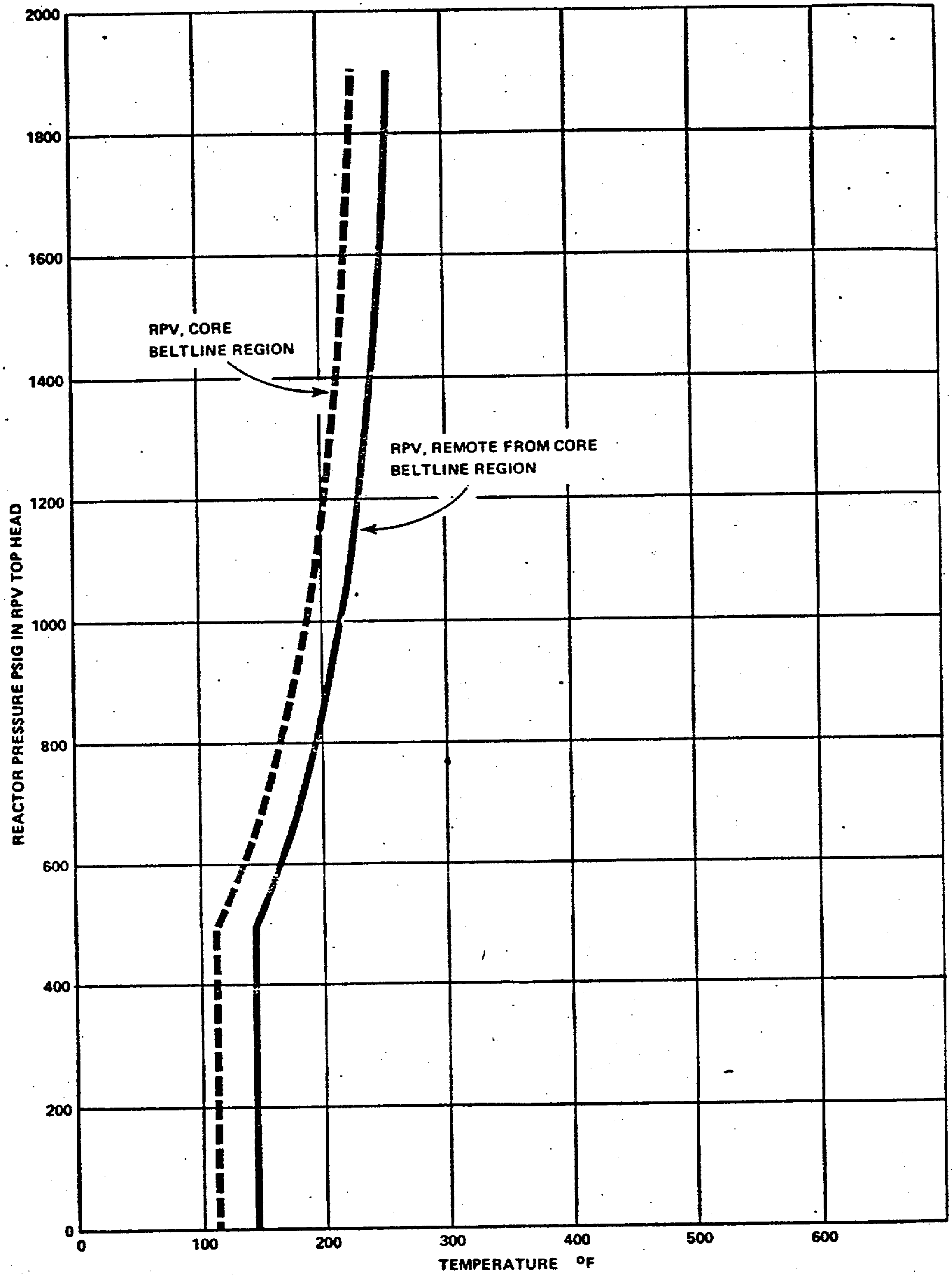

FIGURE 3.6-4
MINIMUM TEMPERATURE FOR
CORE OPERATION (CRITICALITY)
INCLUDES ADDITIONAL 40° F
MARGIN REQ'D BY 10CFR50, APP-G

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 15 TO FACILITY OPERATING LICENSE NO. DPR-57

(CHANGE NO. 15 TO TECHNICAL SPECIFICATIONS)

EDWIN I. HATCH NUCLEAR PLANT UNIT 1

GEORGIA POWER COMPANY AND

OGLETHORPE ELECTRIC MEMBERSHIP CORPORATION

DOCKET NO. 50-321

Introduction

By letter dated March 25, 1975, Georgia Power Company proposed an amendment to Facility Operating License No. DPR-57 for Edwin I. Hatch Nuclear Plant Unit 1. The proposed amendment involves changes to the Technical Specifications which would:

a. Revise the surveillance requirements for temperature monitoring during reactor coolant heatup and cooldown.

b. Incorporate the established minimum temperature requirement for leak testing and hydrostatic testing of the reactor pressure vessel into the appropriate graph (Figure 3.6-2).

c. Incorporate a minimum temperature requirement for mechanical heatup or cooldown following nuclear shutdown into the appropriate graph (Figure 3.6-3).

d. Revise the bases for the limiting conditions for operation and surveillance requirements associated with the Primary System Boundary in order to correct existing errors and to clarify the information presented.

Selected modifications to the proposed changes were made with mutual concurrence of the NRC staff and the licensee.

Discussion

The proposed changes reflect an effort by the licensee to update and clarify existing technical specifications related to the primary system boundary pressure and temperature limits.

Evaluation

Our evaluation of the proposed Technical Specification changes is as follows:

A. Changes associated with temperature monitoring during reactor coolant heatup and cooldown.

The proposed change would replace the current surveillance requirement to monitor temperatures at specific reactor coolant and reactor vessel locations with a requirement to establish that reactor pressure and temperature are within the related limits for reactor heatup and cooldown. The proposed change would require the licensee to perform surveillance to ensure that limiting conditions for operation (LCO's) are met during reactor heatup and cooldown. Adherence to the specified LCO's (3.6.A and 3.6.B) will assure (1) that reactor vessel stress limits are not exceeded during heatup and cooldown, and (2) that an adequate safety margin to prevent brittle fracture of the reactor vessel is maintained. The proposed frequency of the required surveillance (i.e., once every 30 minutes) is suitable to meet the objectives of this specification.

As described, the proposed surveillance program is appropriate and acceptable.

B. Change associated with the minimum temperature requirement for hydrostatic and leak testing of the reactor pressure vessel.

The proposed change completes the pressure versus minimum temperature boundary curve for the reactor pressure vessel regions remote from the core beltline region during inservice hydrostatic and leak testing by establishing a 100°F minimum temperature over the pressure range from 0 psig to 800 psig. This change assures that the minimum temperature for inservice hydrostatic and leak testing is required to be greater than or equal to 100°F for all test pressures. A minimum temperature requirement of 100°F for inservice hydrostatic and leak testing is consistent with the requirements of the ASME Boiler and Pressure Vessel Code, Section XI.

C. Change associated with the minimum temperature requirement for mechanical heatup or cooldown following nuclear shutdown.

The proposed change completes the pressure versus minimum temperature boundary curve for the reactor pressure vessel regions remote from the core beltline during mechanical heatup and cooldown following nuclear shutdown by establishing a 100°F minimum temperature over the pressure range from 0 psig to 500 psig. Using the evaluation techniques presented in NRC Standard Review Plan, Section 5.3.2, "Pressure-Temperature Limits", it can be shown that mechanical heatup or cooldown following nuclear shutdown can be safely conducted at temperatures lower than 100°F if the pressure is appropriately reduced. Therefore, establishment of a minimum temperature requirement of 100°F is clearly conservative.

D. Changes associated with the bases for the limiting condition for operation and surveillance requirements for the Primary System Boundary.

These changes include: (1) clarification of the terminology associated with the methods used in determining pressure temperature limits for the reactor pressure vessel, (2) correction of an erroneous reference to 10 CFR Part 50 Appendix G as the source of the 100°F minimum temperature requirement for inservice hydrostatic and leak testing, (3) revision of the required inservice hydrostatic test pressure to reflect the current requirements of the ASME Boiler and Pressure Vessel Code, Section XI, (4) correction of erroneous information related to the experimental determination of neutron fluence on the reactor vessel wall.

Since these changes improve the clarity and accuracy of the bases, they are acceptable.

Summary

Based upon our evaluation, we have concluded that the proposed Technical Specification changes are acceptable.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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: SEP 1 7 1975

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-321

GEORGIA POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY

OPERATING LICENSE

Notice is hereby given that the U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 15 to Facility Operating License No. DPR-57 issued to Georgia Power Company and Oglethorpe Electric Membership Corporation which revised Technical Specifications for operation of the Edwin I. Hatch Nuclear Power Plant Unit 1, located in Appling County, Georgia. The amendment is effective as of its date of issuance.

The amendment modifies the Technical Specifications to (1) revise the surveillance requirements for temperature monitoring during reactor coolant heatup and cooldown, and (2) complete the pressure versus minimum temperature curves for the reactor pressure vessel regions remote from the core beltline.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment is not required since the amendment does not involve a significant hazards consideration.

For further details with respect to this action, see (1) the application for amendment dated March 25, 1975, (2) Amendment No. 15 to License No. DPR-57, with Change No. 15 and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Appling County Public Library, Parker Street, Baxley, Georgia 31513.

A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this 17th day of September, 1975.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Reactor Licensing