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FROM: Duke Power Company Charlotte, NC Mr Parker	DATE OF DOC 8-26-75	DATE REC'D 8-28-75	LTR XX	TWX	RPT	OTHER
TO: Mr Boyd	ORIG none signed	CC	OTHER	SENT NRC PDR XX SENT LOCAL PDR XX		
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DESCRIPTION:

Ltr trans the following:

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PLANT NAME: Oconee 2 & 3

ENCLOSURES:

Proposed amdt to OL/change to tech specs: consisting of revisions to tech specs with regard to safety limits for reactor thermal power and power imbalance conbinaticn and to flux-flow and power-imbalance trip set-points...(40 cys encl rec'd)

FOR ACTION/INFORMATION 8-29-75 ehf APP-S-2

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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

August 26, 1975

Mr. Roger S. Boyd, Acting Director
Division of Reactor Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Oconee Nuclear Station
Docket Nos. 50-270, -287

Dear Mr. Boyd:

This letter constitutes Duke Power Company's application for revision of the Oconee Nuclear Station Technical Specifications, pursuant to 10CFR50, §50.90. The proposed revision pertains to Oconee Units 2 and 3 and modifies (i) the safety limits for the reactor thermal power and power imbalance combination and (ii) the Reactor Protection System (RPS) flux-flow and power-imbalance trip setpoints.

The existing core safety limits and RPS envelopes were developed using core offset limits established by the "worst case peaking" that may occur throughout core life, including beginning-of-life power peaking. The beginning-of-life power peaks, however, decrease with fuel burnup. Because both Unit 2 and Unit 3 have attained core burnups beyond 100 EFPD, the core offset limits have been reevaluated taking into account the reduction in the beginning-of-life power peaks. The proposed power-imbalance core safety limits take into account a burnup of 100 EFPD for each of the units, and the proposed RPS power-imbalance trip setpoints are based on a more restrictive out-of-core to incore offset correlation than the one used in generating the existing RPS power-imbalance trip setpoints.

Maximum thermal power for three-pump operation has been changed from 86.0% FP to 86.5% FP in order that application of error adjustment factors be consistent with other B&W units.

The proposed revision in imbalance limits necessitates a reduction of the flux/flow ratio from 1.07 to 0.961 for single loop operation in order to provide adequate margin from the revised imbalance safety limits.

Attached are replacement pages 2.1-3b, 2.1-8, 2.1-9, 2.3-1, 2.3-2, 2.3-3, 2.3-4, 2.3-9, 2.3-10, 2.3-12, and 2.3-13 of the Oconee Nuclear

Station Technical Specifications. Proposed changes are identified by vertical lines in the margin of the replacement pages.

Timely approval of this proposed revision is requested.

Forty copies of this request, including three signed originals, are enclosed.

Very truly yours,

s/William O. Parker, Jr.
William O. Parker, Jr.

PMA:vr

Enclosures

WILLIAM O. PARKER, JR., being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this request for amendment of the Oconee Nuclear Station Technical Specifications, Appendix A to Facility Operating Licenses DPR-38, DPR-47 and DPR-55; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

s/William O. Parker, Jr.
William O. Parker, Jr., Vice President

ATTEST:

s/John C. Goodman, Jr.
John C. Goodman, Jr.
Assistant Secretary

Subscribed and sworn to before me this 26th day of August, 1975.

s/Edna B. Farmer
Notary Public

My Commission Expires:

October 24, 1977

Power peaking is not a directly observable quantity and therefore limits have been established on the bases of the reactor power imbalance produced by the power peaking.

The specified flow rates for Curves 1, 2, 3, and 4 of Figure 2.1-2B
2.1-2C correspond to the expected minimum flow rates with four pumps, three pumps, one pump in each loop and two pumps in one loop, respectively.

The curve of Figure 2.1-1B
2.1-1C is the most restrictive of all possible reactor coolant pump-maximum thermal power combinations shown in Figure 2.1-3B.
2.1-3C

The curves of Figure 2.1-3B
2.1-3C represent the conditions at which a minimum DNBR of 1.3 is predicted at the maximum possible thermal power for the number of reactor coolant pumps in operation or the local quality at the point of minimum DNBR is equal to 15%,(3) whichever condition is more restrictive.

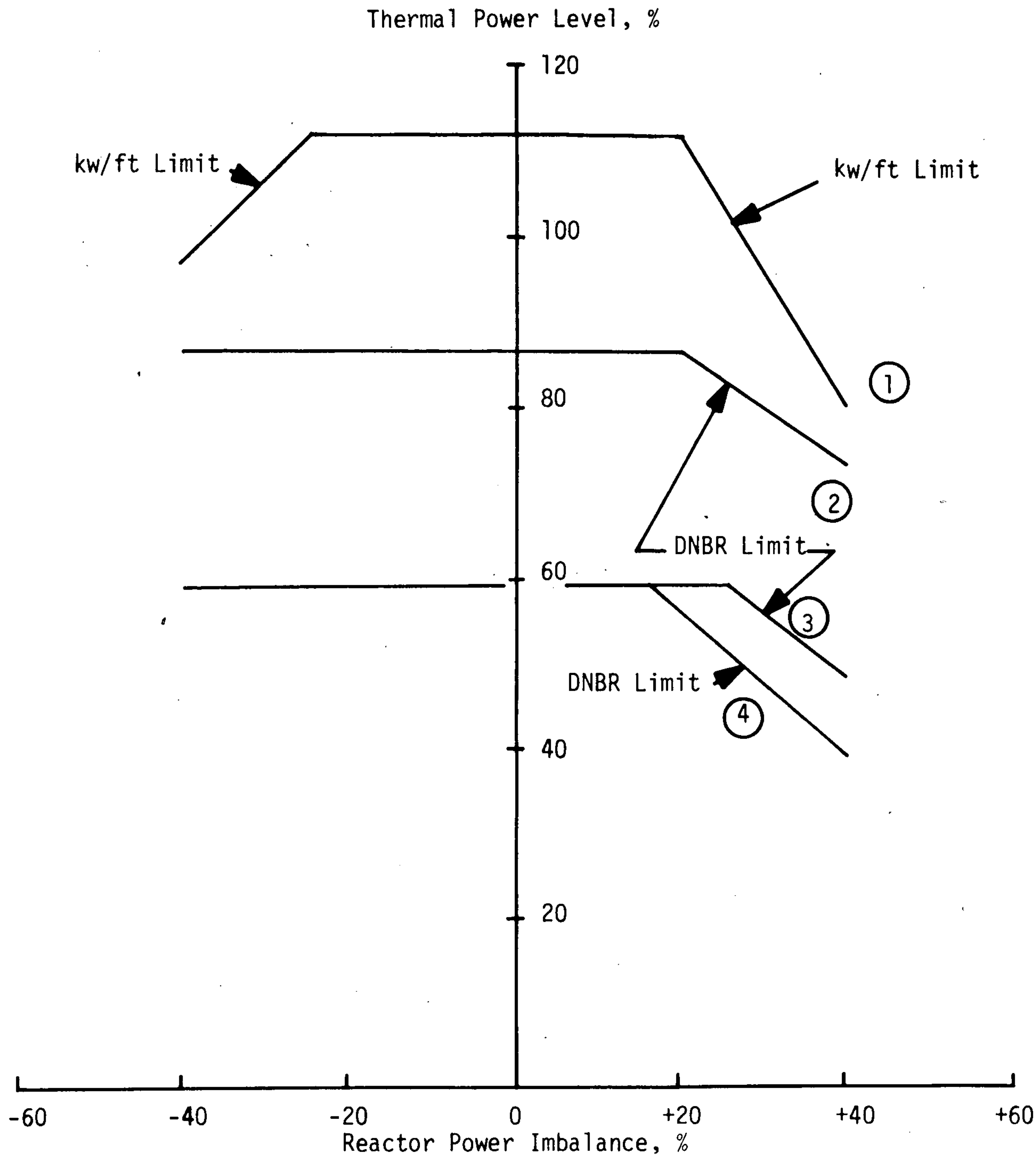
Using a local quality limit of 15 percent at the point of minimum DNBR as a basis for Curves 2 and 4 of Figure 2.1-3B
2.1-3C is a conservative criterion even though the quality of the exit is higher than the quality at the point of minimum DNBR.

The DNBR as calculated by the W-3 correlation continually increases from point of minimum DNBR, so that the exit DNBR is 1.7 or higher, depending on the pressure. Extrapolation of the W-3 correlation beyond its published quality range of +15 percent is justified on the basis of experimental data.(4)

The maximum thermal power for three pump operation is 86.5% - Unit 2
86.5% - Unit 3
due to a power level trip produced by the flux-flow ratio 75% flow x 1.07 = 80%
1.07 = 80%
power
plus the maximum calibration and instrument error. The maximum thermal power for other coolant pump conditions are produced in a similar manner. A flux-flow ratio of 0.961 is used for single loop conditions.
For each curve of Figure 2.1-3B
2.1-3C, a pressure-temperature point above and to the left of the curve would result in a DNBR greater than 1.3 or a local quality at the point of minimum DNBR less than 15 percent for that particular reactor coolant pump situation. The 1.3 DNBR curve for four-pump operation is more restrictive than any other reactor coolant pump situation because any pressure/temperature point above and to the left of the four-pump curve will be above and to the left of the other curves.

REFERENCES

(1) FSAR, Section 3.2.3.1.1
(2) FSAR, Section 3.2.3.1.1.c
(3) FSAR, Section 3.2.3.1.1.k



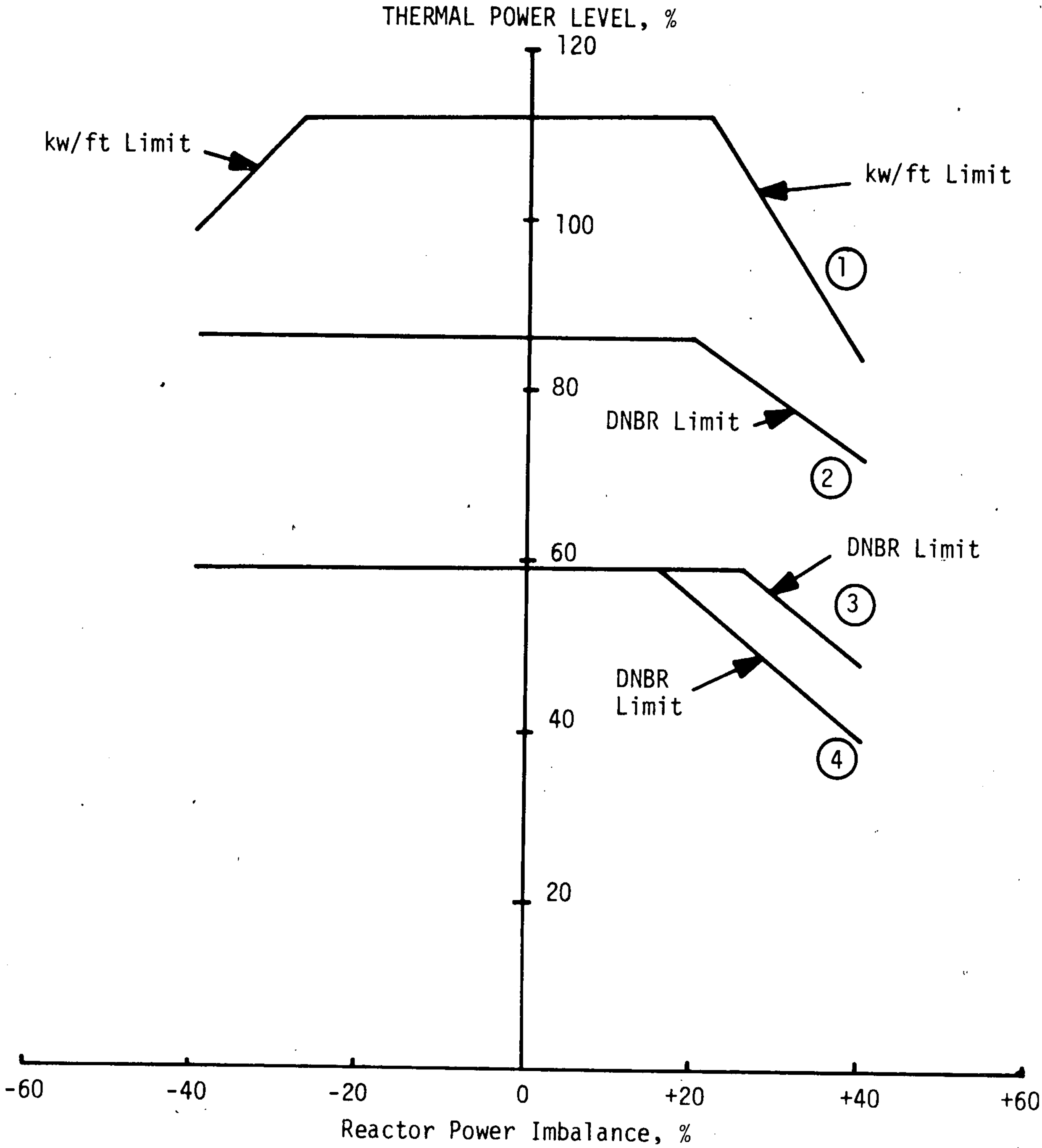
CURVE	REACTOR COOLANT FLOW (LB/HR)
1	131.3×10^6
2	98.1×10^6
3	64.4×10^6
4	60.1×10^6

PROTECTIVE SYSTEM MAXIMUM ALLOWABLE SETPOINTS

UNIT 2

OCONEE NUCLEAR STATION

Figure 2.3-2B



CURVE	REACTOR COOLANT FLOW (LB/HR)
1	131.3×10^6
2	98.1×10^6
3	64.4×10^6
4	60.1×10^6

CORE PROTECTION SAFETY LIMITS

UNIT 3

OCONEE NUCLEAR STATION

Figure 2.1-2C

2.3 LIMITING SAFETY SYSTEM SETTINGS, PROTECTIVE INSTRUMENTATION

Applicability

Applies to instruments monitoring reactor power, reactor power imbalance, reactor coolant system pressure, reactor coolant outlet temperature, flow, number of pumps in operation, and high reactor building pressure.

Objective

To provide automatic protective action to prevent any combination of process variables from exceeding a safety limit.

Specification

The reactor protective system trip setting limits and the permissible bypasses for the instrument channels shall be as stated in Table 2.3-1A - Unit 1 and
2.3-1B - Unit 2
2.3-1C - Unit 3

Figure 2.3-2A1 } Unit 1
2.3-2A2
2.3-2B - Unit 2
2.3-2C - Unit 3

The pump monitors shall produce a reactor trip for the following conditions:

a. Loss of two pumps and reactor power level is greater than 55% (0.0% for Unit 1) of rated power.

b. Loss of two pumps in one reactor coolant loop and reactor power level is greater than 0.0% of rated power. (Power/RC pump trip setpoint is reset to 55% of rated power for single loop operation and for Units 2 and 3, the flux-flow setpoint must be set at 0.961 prior to single loop operation. Power/RC pump trip setpoint is reset to 55% for all modes of 2 pump operation for Unit 1.)

c. Loss of one or two pumps during two-pump operation.

Bases

The reactor protective system consists of four instrument channels to monitor each of several selected plant conditions which will cause a reactor trip if any one of these conditions deviates from a pre-selected operating range to the degree that a safety limit may be reached.

The trip setting limits for protective system instrumentation are listed in Table 2.3-1A - Unit 1. The safety analysis has been based upon these protective
2.3-1B - Unit 2
2.3-1C - Unit 3
system instrumentation trip set points plus calibration and instrumentation errors.

Nuclear Overpower

A reactor trip at high power level (neutron flux) is provided to prevent damage to the fuel cladding from reactivity excursions too rapid to be detected by pressure and temperature measurements.

During normal plant operation with all reactor coolant pumps operating, reactor trip is initiated when the reactor power level reaches 105.5% of rated power. Adding to this the possible variation in trip setpoints due to calibration and instrument errors, the maximum actual power at which a trip would be actuated could be 112%, which is more conservative than the value used in the safety analysis.(4)

Overpower Trip Based on Flow and Imbalance

The power level trip set point produced by the reactor coolant system flow is based on a power-to-flow ratio which has been established to accommodate the most severe thermal transient considered in the design, the loss-of-coolant flow accident from high power. Analysis has demonstrated that the specified power-to-flow ratio is adequate to prevent a DNBR of less than 1.3 should a low flow condition exist due to any electrical malfunction.

The power level trip set point produced by the power-to-flow ratio provides both high power level and low flow protection in the event the reactor power level increases or the reactor coolant flow rate decreases. The power level trip set point produced by the power-to-flow ratio provides overpower DNB protection for all modes of pump operation. For every flow rate there is a maximum permissible power level, and for every power level there is a minimum permissible low flow rate. Typical power level and low flow rate combinations for the pump situations of Table 2.3-1A are as follows:

1. Trip would occur when four reactor coolant pumps are operating if power is 108% and reactor flow rate is 100%, or flow rate is 93% and power level is 100%.

2. Trip would occur when three reactor coolant pumps are operating if power is 81.0% and reactor flow rate is 74.7% or flow rate is 69% and power level is 75%.

3. Trip would occur when two reactor coolant pumps are operating in a single loop if power is 59% and the operating loop flow rate is 54.5% or flow rate is 43% and power level is 46%. (For Tables 2.3-1B and 2.3-1C the values are 52% power if the operating loop flow rate is 54.5% or flow rate is 48% and power level is 46%.)

4. Trip would occur when one reactor coolant pump is operating in each loop (total of two pumps operating) if the power is 53% and reactor flow rate is 49.0% or flow rate is 45% and the power level is 49%.

For safety calculations the maximum calibration and instrumentation errors for the power level trip were used.

The power-imbalance boundaries are established in order to prevent reactor thermal limits from being exceeded. These thermal limits are either power peaking kw/ft limits or DNBR limits. The reactor power imbalance (power in the top half of core minus power in the bottom half of core) reduces the power level trip produced by the power-to-flow ratio such that the boundaries of Figure 2.3-2A1 }Unit 1 are produced. The power-to-flow ratio reduces the power
2.3-2A2
2.3-2B - Unit 2
2.3-2C - Unit 3

level trip and associated reactor power/reactor power-imbalance boundaries by
1.08% - Unit 1 for a 1% flow reduction.
1.07% - Unit 2
1.07% - Unit 3
For Units 2 and 3, the power-to-flow reduction factor is 0.961 during single loop operation.

Pump Monitors

The pump monitors prevent the minimum core DNBR from decreasing below 1.3 by tripping the reactor due to the loss of reactor coolant pump(s). The circuitry monitoring pump operational status provides redundant trip protection for DNB by tripping the reactor on a signal diverse from that of the power-to-flow ratio. The pump monitors also restrict the power level for the number of pumps in operation.

Reactor Coolant System Pressure

During a startup accident from low power or a slow rod withdrawal from high power, the system high pressure set point is reached before the nuclear overpower trip set point. The trip setting limit shown in Figure 2.3-1A - Unit 1
2.3-1B - Unit 2
2.3-1C - Unit 3
for high reactor coolant system pressure (2355 psig) has been established to maintain the system pressure below the safety limit (2750 psig) for any design transient.(1)

The low pressure (1985) psig and variable low pressure ($13.77\ T_{out} - 6181$) trip
(1800) psig ($16.25\ T_{out} - 7756$)
(1800) psig ($16.25\ T_{out} - 7756$)
setpoints shown in Figure 2.3-1A have been established to maintain the DNB
2.3-1B
2.3-1C
ratio greater than or equal to 1.3 for those design accidents that result in a pressure reduction.(2,3)

Due to the calibration and instrumentation errors the safety analysis used a variable low reactor coolant system pressure trip value of ($13.77\ T_{out} - 6221$)
($16.25\ T_{out} - 7796$)
($16.25\ T_{out} - 7796$)

Coolant Outlet Temperature

The high reactor coolant outlet temperature trip setting limit (619 F) shown in Figure 2.3-1A has been established to prevent excessive core coolant
2.3-1B
2.3-1C
temperatures in the operating range. Due to calibration and instrumentation errors, the safety analysis used a trip set point of 620°F.

Reactor Building Pressure

The high reactor building pressure trip setting limit (4 psig) provides positive assurance that a reactor trip will occur in the unlikely event of a loss-of-coolant accident, even in the absence of a low reactor coolant system pressure trip.

Shutdown Bypass

In order to provide for control rod drive tests, zero power physics testing, and startup procedures, there is provision for bypassing certain segments of the reactor protection system. The reactor protection system segments which can be bypassed are shown in Table 2.3-1A. Two conditions are imposed when
2.3-1B
2.3-1C
the bypass is used:

1. By administrative control the nuclear overpower trip set point must be reduced to a value $\leq$ 5.0% of rated power during reactor shutdown.

2. A high reactor coolant system pressure trip setpoint of 1720 psig is automatically imposed.

The purpose of the 1720 psig high pressure trip set point is to prevent normal operation with part of the reactor protection system bypassed. This high pressure trip set point is lower than the normal low pressure trip set point so that the reactor must be tripped before the bypass is initiated. The over power trip set point of $\leq$ 5.0% prevents any significant reactor power from being produced when performing the physics tests. Sufficient natural circulation (5) would be available to remove 5.0% of rated power if none of the reactor coolant pumps were operating.

Two Pump Operation

A. Two Loop Operation

Operation with one pump in each loop will be allowed only following reactor shutdown. After shutdown has occurred, the following actions will permit operation with one pump in each loop:

1. Reset the pump contact monitor power level trip setpoint to 55.0%.
2. (Unit 1) Reset the protective system maximum allowable setpoint as shown in Figure 2.3-2A2.

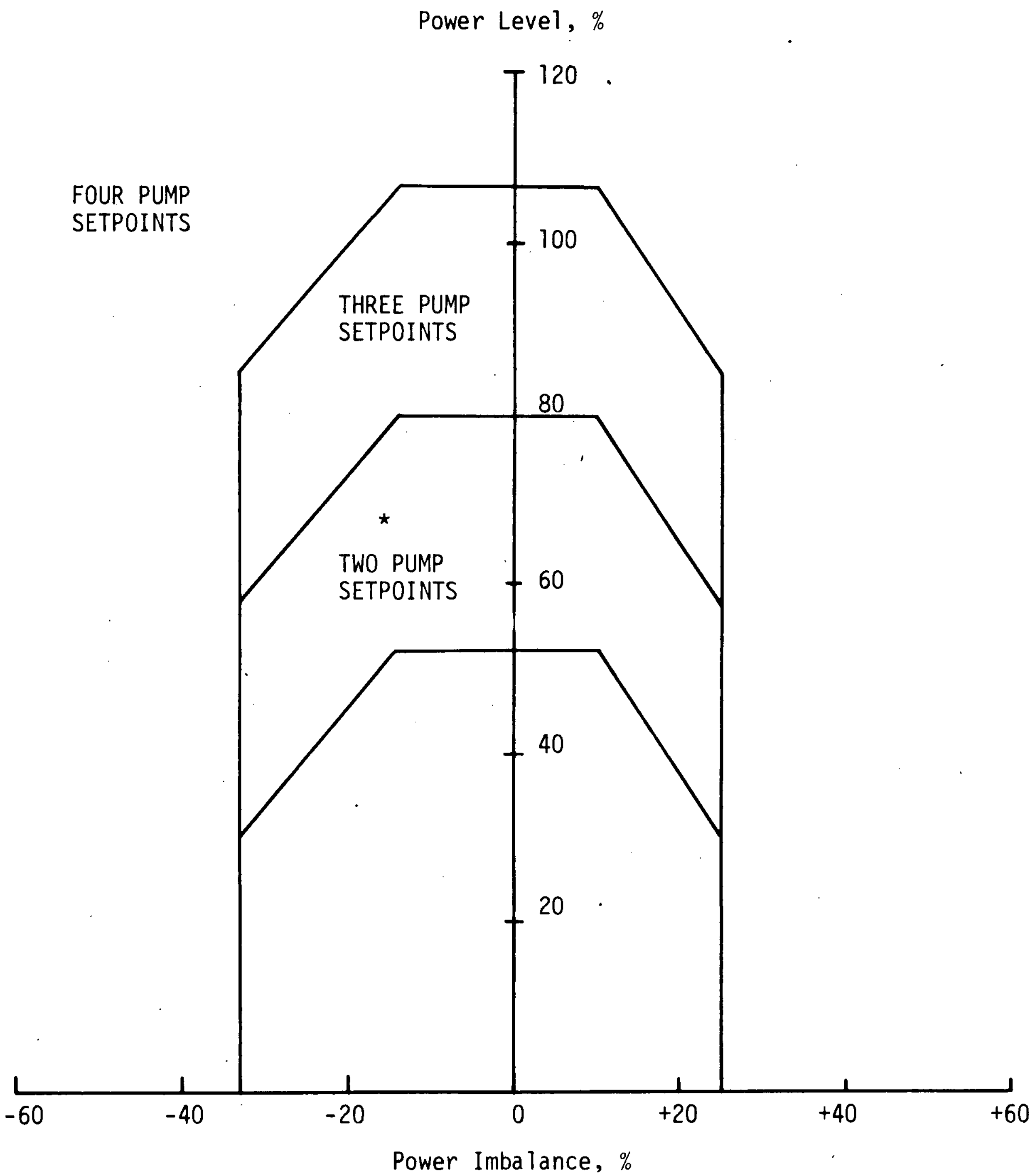
B. Single Loop Operation

Single loop operation is permitted only after the reactor has been tripped. After the pump contact monitor trip has occurred, the following actions will permit single loop operation:

1. Reset the pump contact monitor power level trip setpoint to 55.0%.
2. Trip one of the two protective channels receiving outlet temperature information from sensors in the Idle Loop.
3. (Unit 1) Reset the protective system maximum allowable setpoints as shown in Figure 2.3-2A2. Tripping one of the two protective channels receiving outlet temperature information from the idle loop assures a protective system trip logic of one out of two.
4. (Units 2 and 3) Reset flux-flow setpoint to 0.961.

REFERENCES

(1) FSAR, Section 14.1.2.2
(2) FSAR, Section 14.1.2.7
(3) FSAR, Section 14.1.2.8
(4) FSAR, Section 14.1.2.3
(5) FSAR, Section 14.1.2.6



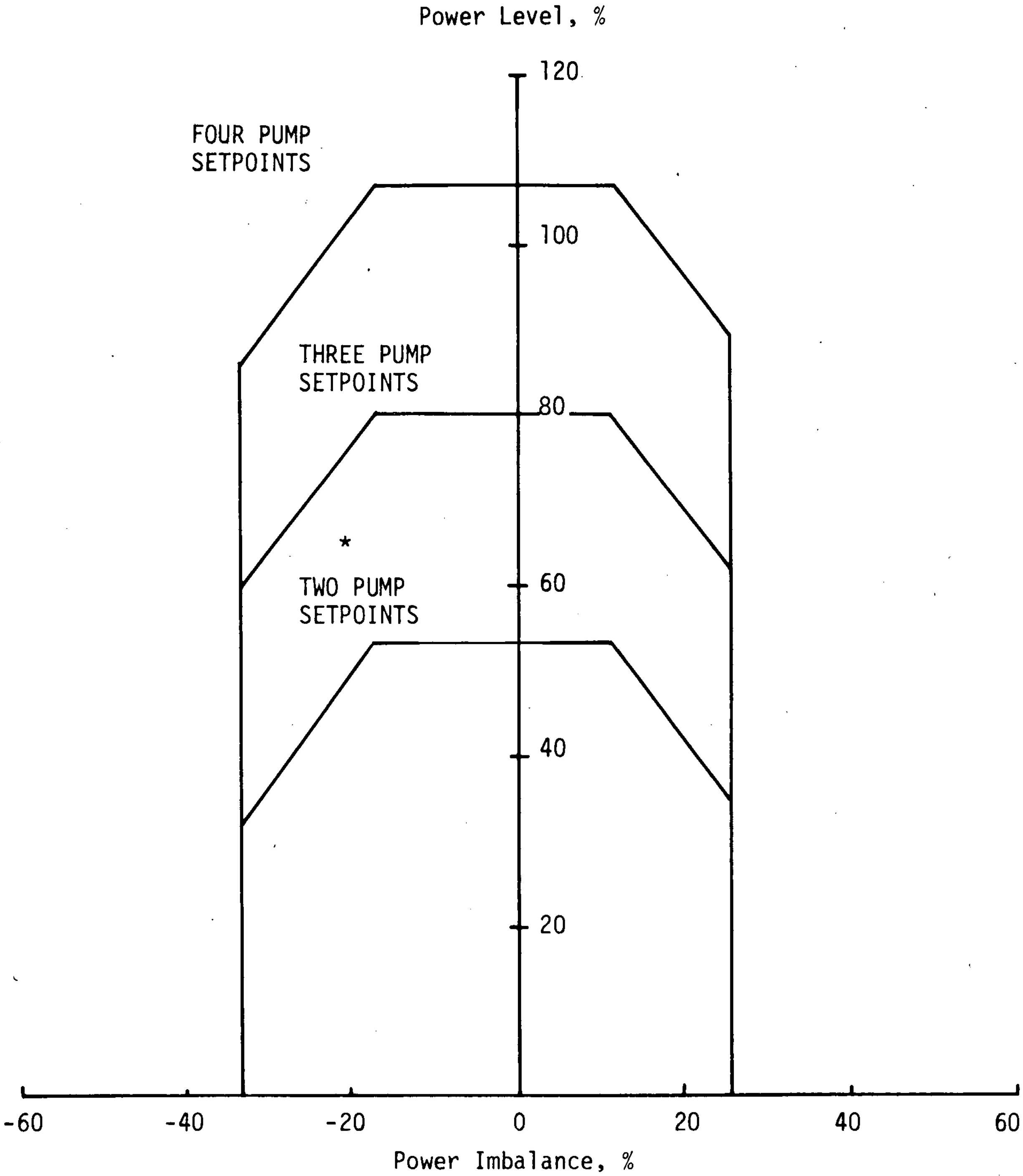
*For two pumps in one loop, the
flux-flow setpoint must be 0.961.

CORE PROTECTION SAFETY LIMITS

UNIT 2

OCONEE NUCLEAR STATION

Figure 2.1-2B



*For two pumps in one loop, the flux-flow setpoint must be 0.961

PROTECTIVE SYSTEM MAXIMUM ALLOWABLE SETPOINTS

UNIT 3

OCONEE NUCLEAR STATION

Figure 2.3-2C

Table 2.3-1B
Unit 2

Reactor Protective System Trip Setting Limits

	RPS Segment	Four Reactor Coolant Pumps Operating (Operating Power -100% Rated)	Three Reactor Coolant Pumps Operating (Operating Power -75% Rated)	Two Reactor Coolant Pumps Operating in A Single Loop (Operating Power -46% Rated)	One Reactor Coolant Pump Operating in Each Loop (Operating Power -49% Rated)	Shutdown Bypass
1.	Nuclear Power Max. (% Rated)	105.5	105.5	105.5	105.5	5.0 (3)
2.	Nuclear Power Max. Based on Flow (2) and Imbalance, (% Rated)	1.07 times flow minus reduction due to imbalance	1.07 times flow minus reduction due to imbalance	0.961 times flow minus reduction due to imbalance	1.07 times flow minus reduction due to imbalance	Bypassed
3.	Nuclear Power Max. Based on Pump Monitors, (%, Rated)	NA	NA	55% (5)(6)	55%	Bypassed
4.	High Reactor Coolant System Pressure, psig, Max.	2355	2355	2355	2355	1720 (4)
5.	Low Reactor Coolant System Pressure, psig, Min.	1800	1800	1800	1800	Bypassed
6.	Variable Low Reactor Coolant System Pressure psig, Min.	$(16.25\ T_{out}-7756)$ (1)	$(16.25\ T_{out}-7756)$ (1)	$(16.25\ T_{out}-7756)$ (1)	$(16.25\ T_{out}-7756)$ (1)	Bypassed
7.	Reactor Coolant Temp. F., Max.	619	619	619 (6)	619	619
8.	High Reactor Building Pressure, psig, Max.	4	4	4	4	4

---

(1) T_{out} is in degrees Fahrenheit (°F).

(2) Reactor Coolant System Flow, %.

(3) Administratively controlled reduction set only during reactor shutdown.

(4) Automatically set when other segments of the RPS are bypassed.

(5) Reactor power level trip set point produced by pump contact monitor reset to 55.0%.

(6) Specification 3.1.8 applies. Trip one of the two protection channels receiving outlet temperature information from sensors in the idle loop.

Table 2.3-1C

Unit 3

Reactor Protective System Trip Setting Limits

	RPS Segment	Four Reactor Coolant Pumps Operating (Operating Power -100% Rated)	Three Reactor Coolant Pumps Operating (Operating Power -75% Rated)	Two Reactor Coolant Pumps Operating in A Single Loop (Operating Power -46% Rated)	One Reactor Coolant Pump Operating in Each Loop (Operating Power -49% Rated)	Shutdown Bypass
1.	Nuclear Power Max. (% Rated)	105.5	105.5	105.5	105.5	5.0(3)
2.	Nuclear Power Max. Based on Flow (2) and Imbalance, (% Rated)	1.07 times flow minus reduction due to imbalance	1.07 times flow minus reduction due to imbalance	0.961 times flow minus reduction due to imbalance	1.07 times flow minus reduction due to imbalance	Bypassed
3.	Nuclear Power Max. Based on Pump Monitors, (%, Rated)	NA	NA	55% (5)(6)	55%	Bypassed
4.	High Reactor Coolant System Pressure, psig, Max.	2355	2355	2355	2355	1720(4)
5.	Low Reactor Coolant System Pressure, psig, Min.	1800	1800	1800	1800	Bypassed
6.	Variable Low Reactor Coolant System Pressure psig, Min.	$(16.25\ T_{out}-7756)$(1)	$(16.25\ T_{out}-7756)$(1)	$(16.25\ T_{out}-7756)$(1)	$(16.25\ T_{out}-7756)$(1)	Bypassed
7.	Reactor Coolant Temp. F., Max.	619	619	619 (6)	619	619
8.	High Reactor Building Pressure, psig, Max.	4	4	4	4	4

(1) T_{out} is in degrees Fahrenheit (^{o}F).

(2) Reactor Coolant System Flow, %.

(3) Administratively controlled reduction set only during reactor shutdown.

(4) Automatically set when other segments of the RPS are bypassed.

(5) Reactor power level trip set point produced by pump contact monitor reset to 55.0%.

(6) Specification 3.1.8 applies. Trip one of the two protection channels receiving outlet temperature information from sensors in the idle loop.