

ATTACHMENT 4

PROPOSED TECHNICAL SPECIFICATION CHANGES
FOR QUAD-CITIES 2

QUAD-CITIES
DPR-30

1.1/2.1 FUEL CLADDING INTEGRITY

SAFETY LIMIT

Applicability:

The safety limits established to preserve the fuel cladding integrity apply to those variables which monitor the fuel thermal behavior.

Objective:

The objective of the safety limits is to establish limits below which the integrity of the fuel cladding is preserved.

LIMITING SAFETY SYSTEM SETTING

Applicability:

The limiting safety system settings apply to trip settings of the instruments and devices which are provided to prevent the fuel cladding integrity safety limits from being exceeded.

Objective:

The objective of the limiting safety system settings is to define the level of the process variables at which automatic protective action is initiated to prevent the fuel cladding integrity safety limits from being exceeded.

SPECIFICATIONS

A. Reactor Pressure > 800 psia and Core Flow > 10% of Rated

The existence of a minimum critical power ratio (MCPR) less than 1.06 shall constitute violation of the fuel cladding integrity safety limit.

B. Core Thermal Power Limit (Reactor Pressure ≤ 800 psig)

When the reactor pressure is ≤ 800 psig or core flow is less than 10% of rated, the core thermal power shall not exceed 25% of rated thermal power.

C. Power Transient

1. The neutron flux shall not exceed the scram setting established in Specification 2.1.A for longer than 1.5 seconds as indicated by the process computer.
2. When the process computer is out of service, this safety limit shall be assumed to be exceeded if the neutron flux exceeds the scram setting established by Specification 2.1.A and a control rod scram does not occur.

A. Neutron Flux Trip Settings

The limiting safety system trip settings shall be as specified below:

1. APRM Flux Scram Trip Setting (Run Mode)

When the reactor mode switch is in the Run position, the APRM flux scram setting shall be as shown in Figure 2.1-1 and shall be:

$$S \leq (0.58W_D + 62) \quad (LTPF/TPF)$$

with a maximum setpoint of 120% for core flow equal to 98×10^6 lb/hr and greater.

where:

S = setting in percent of rated power

W_D = percent of drive flow required to produce a rated core flow of 98 million lb/hr.

TPF = LTPF unless the combination of power and peak LHGR is above the

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D. Reactor Water Level (Shutdown Condition)

Whenever the reactor is in the shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be less than that corresponding to 12 inches above the top of the active fuel when it is seated in the core.

curve in Figure 2.1-2, at which point the actual peaking factor value shall be used.

$$\text{LTPF} = \begin{matrix} 3.06 & (7 \times 7 \text{ fuel assemblies}) \\ 3.03 & (8 \times 8 \text{ fuel assemblies}) \end{matrix}$$

2. APRM Flux Scram Trip Setting (Refueling or Startup and Hot Standby Mode)

When the reactor mode switch is in the Refuel or Startup Hot Standby position, the APRM scram shall be set at less than or equal to 15% of rated neutron flux.

3. IRM Flux Scram Trip Setting

The IRM flux scram setting shall be set at less than or equal to 120/125 of full scale.

4. When the reactor mode switch is in the startup or run position, the reactor shall not be operated in the natural circulation flow mode.

B. APRM Rod Block Setting

The APRM rod block setting shall be as shown in Figure 2.1-1 and shall be:

$$S \leq (0.58W_D + 50) \quad (\text{LTPF/TPF})$$

The definitions used above for the APRM scram trip apply.

C. Reactor low water level scram setting shall be ≥ 143 inches above the top of the active fuel at normal operating conditions.

D. Reactor low water level ECCS initiation shall be 83 inches (+4 inches/-0 inch) above the top of the active fuel at normal operating conditions.

E. Turbine stop valve scram shall be $\leq 10\%$ valve closure from full open.

F. Turbine control valve fast closure scram shall initiate upon actuation of the fast closure solenoid valves which trip the turbine control valves.

G. Main steamline isolation valve closure scram shall be $\leq 10\%$ valve closure from full open.

H. Main steamline low-pressure initiation of main steamline isolation valve closure shall be ≥ 850 psig.

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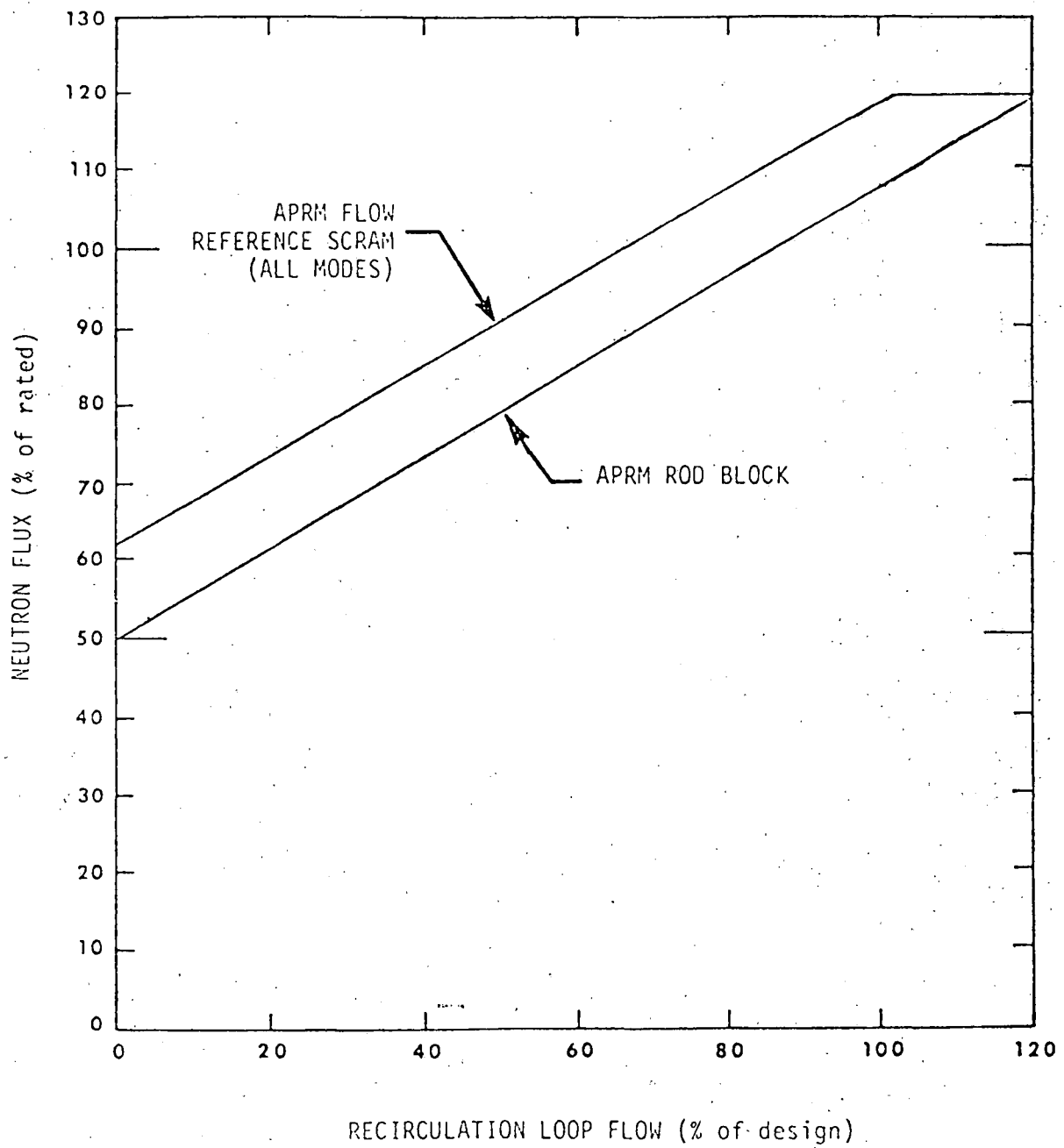


FIGURE 2.1-1

APRM FLOW REFERENCE SCRAM

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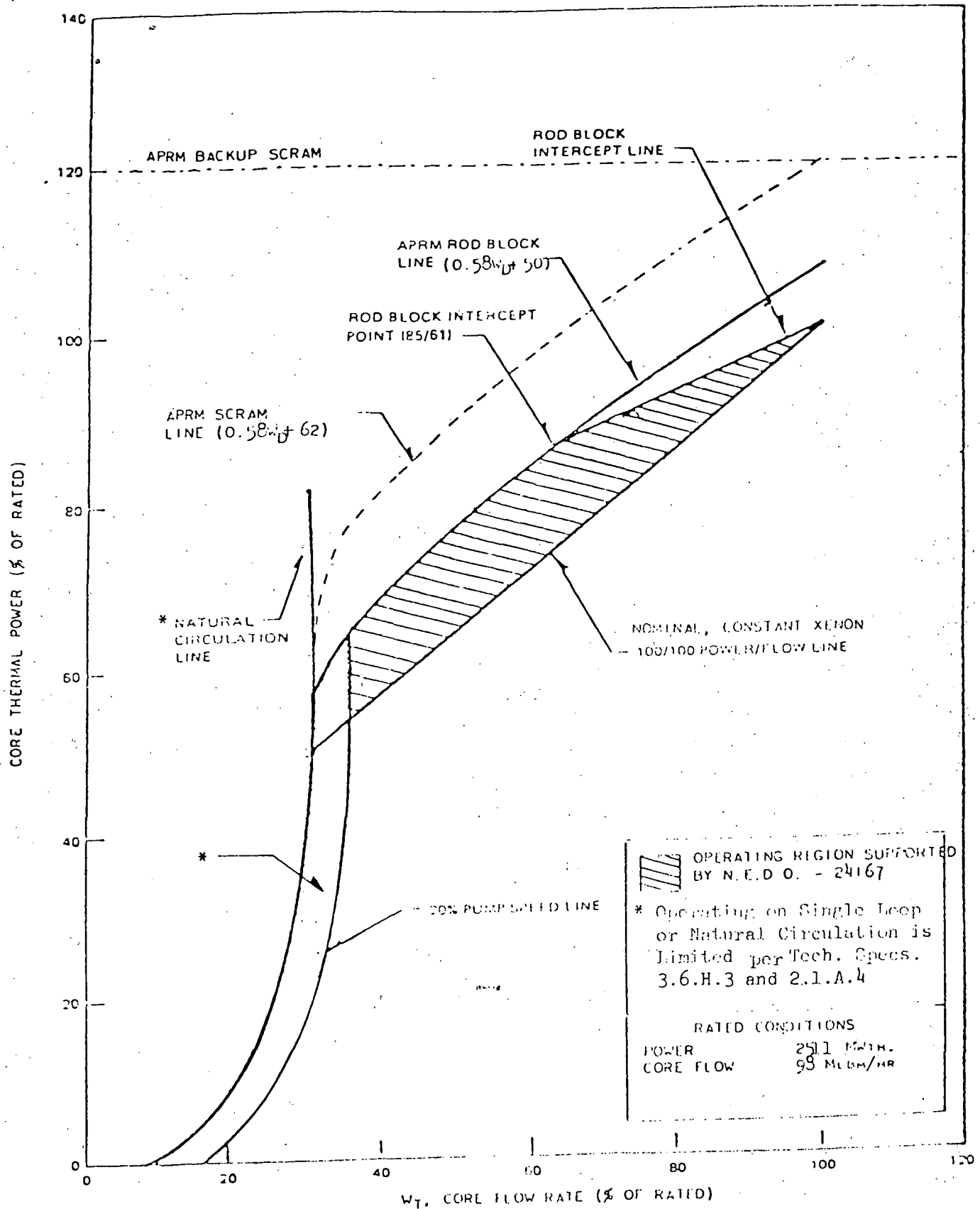


FIGURE 2.1-3
(SCHEMATIC)

APRM FLOW BIAS SCRAM RELATIONSHIP
TO NORMAL OPERATING CONDITIONS

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TABLE 3.23

INSTRUMENTATION THAT INITIATES ROD BLOCK

Minimum Number of Operable or Tripped Instrument Channels per Trip System ⁽¹⁾	Instrument	Trip Level Setting
2	APRM upscale (flow bias) ⁽⁷⁾	$\left[0.58W_D + 50 \right] \frac{LTPF}{TPF} \quad (2)$
2	APRM upscale (Refuel and Startup/Hot Standby mode)	$\leq 12/125$ full scale
2	APRM downscale ⁽⁷⁾	$\geq 3/125$ full scale
1	Rod block monitor upscale (flow bias) ⁽⁷⁾	$0.65W_D + 42 \quad (2)$
1	Rod block monitor downscale ⁽⁷⁾	$\geq 3/125$ full scale
3	IRM downscale ^{(3) (8)}	$\geq 3/125$ full scale
3	IRM upscale ⁽⁸⁾	$\leq 108/125$ full scale
2 ⁽⁵⁾	SRM detector not in Startup position ⁽⁴⁾	≥ 2 feet below core center-line
3	IRM detector not in Startup position ⁽⁸⁾	≥ 2 feet below core center-line
2 ^{(5) (6)}	SRM upscale	$\leq 10^5$ counts/sec
2 ⁽⁵⁾	SRM downscale ⁽⁹⁾	$\geq 10^2$ counts/sec
1	High water level in scram discharge volume	≤ 25 gallons

Notes

- For the Startup/Hot Standby and Run positions of the reactor mode selector switch, there shall be two operable or tripped trip systems for each function except the SRM rod blocks. IRM upscale and IRM downscale need not be operable in the Run position, APRM downscale, APRM upscale (flow biased), RBM upscale, and RBM downscale need not be operable in the Startup/Hot Standby mode. If the first column cannot be met for one of the two trip systems, this condition may exist for up to 7 days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than 7 days the system shall be tripped. If the first column cannot be met for both trip systems, the systems shall be tripped.
- W_D is the reactor recirculation loop flow in percent. Trip level setting is in percent of rated power (2511 MWt).
- IRM downscale may be bypassed when it is on its lowest range.
- This function is bypassed when the count rate is ≥ 100 CPS.
- One of the four SRM inputs may be bypassed.
- This SRM function may be bypassed in the higher IRM ranges (ranges 8, 9, and 10) when the IRM upscale rod block is operable.
- Not required to be operable while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MWt.
- This IRM function occurs when the reactor mode switch is in the Refuel or Startup/Hot Standby position.
- This trip is bypassed when the SRM is fully inserted.