Figure 2.2-1 Trip Setpoint for Flux -- ΔFlux/Flow

Curve shows trip setpoint for ~~a 25%~~ an approximately 25% flow reduction for three pump operation (~~290,100~~ 283,940 gpm). The actual setpoint will be directly proportional to the actual flow with three pumps.

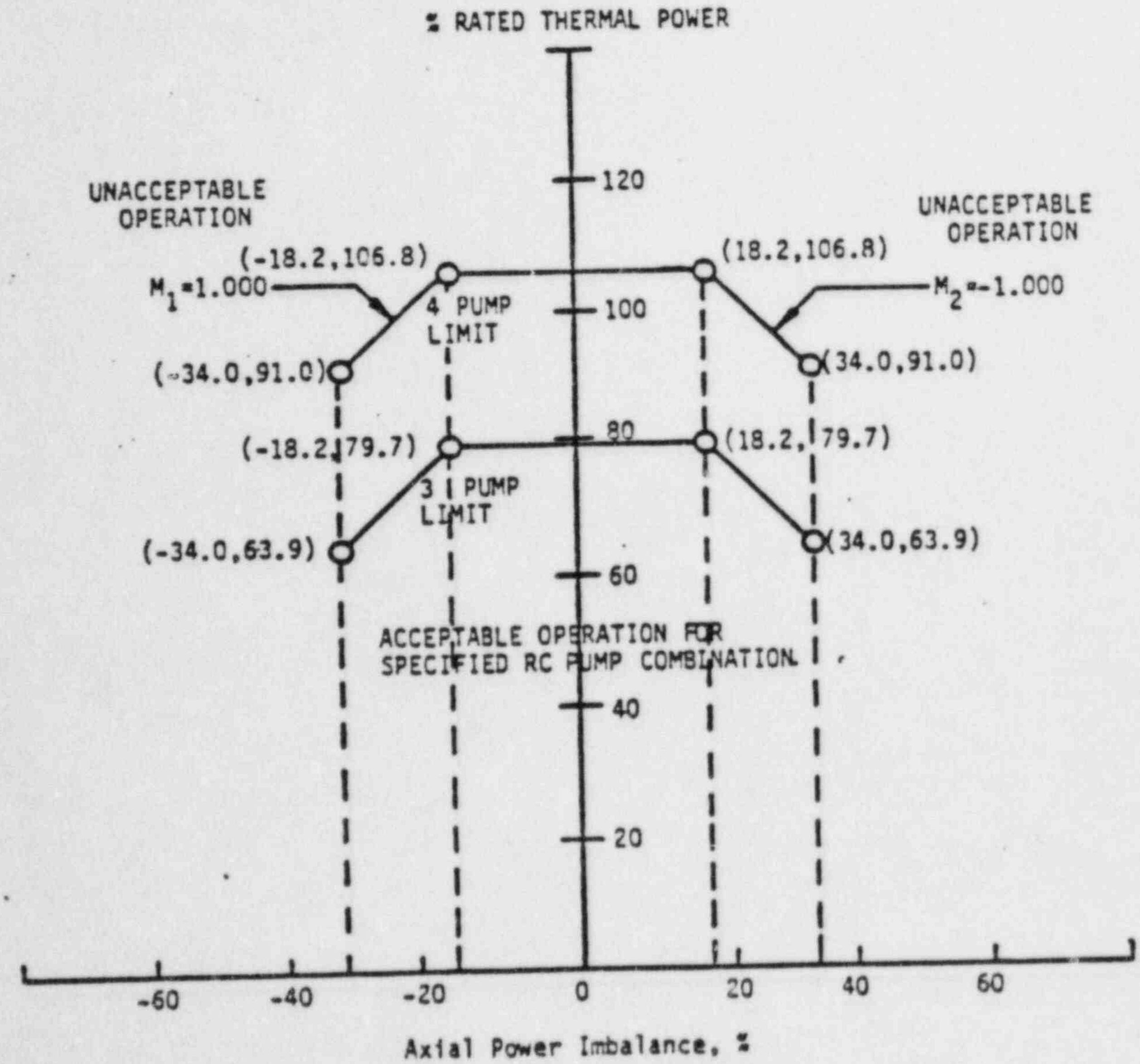
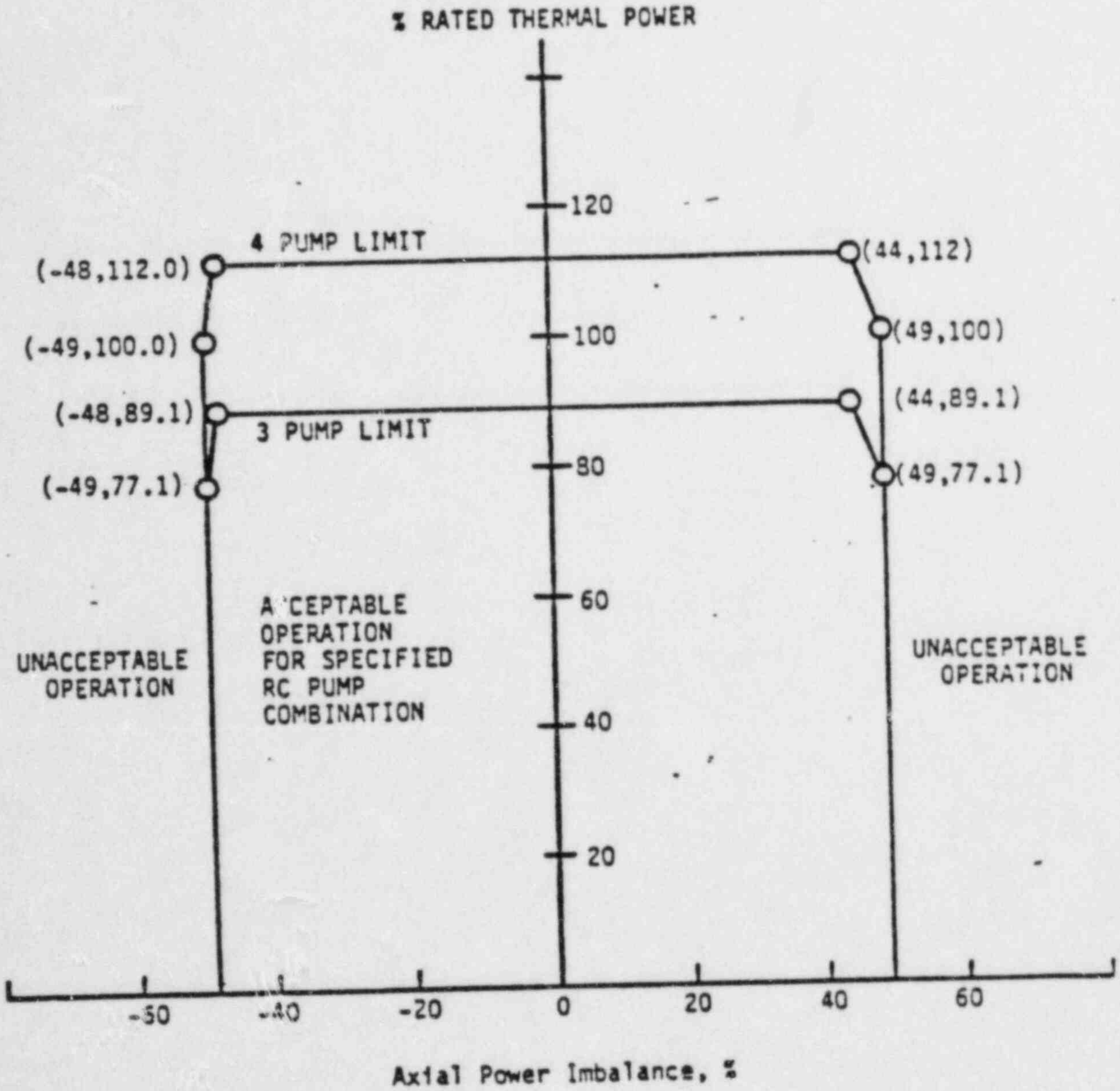


Figure 2.1-2 Reactor Core Safety Limit



PUMPS OPERATING	REACTOR COOLANT FLOW, GPM
4	380,160 → ~~387,200~~
3	283,980 → ~~290,100~~

TABLE 3.2-1

DNB MARGIN

Parameter	LIMITS: Four Reactor Coolant Pumps Operating	LIMITS: Three Reactor Coolant Pumps Operating
Reactor Coolant Hot Leg Temperature T_H °F	$\leq$ 610	$\leq$ 610(1)
Reactor Coolant Pressure, psig.(2)	$\geq$ 2062.7	$\geq$ 2058.7(1)
Reactor Coolant Flow Rate, gpm(3)	$\geq$ ~~396,000~~ 389,664	$\geq$ ~~297,240~~ 291,080

(1) Applicable to the loop with 2 Reactor Coolant Pumps Operating.

(2) Limit not applicable during either a THERMAL POWER ramp increase in excess of 5% of RATED THERMAL POWER per minute or a THERMAL POWER step increase of greater than 10% of RATED THERMAL POWER.

(3) These flows include a flow rate uncertainty of 2.5%.

2.1 SAFETY LIMITS

BASES

2.1.1 and 2.1.2 REACTOR CORE

The restrictions of this safety limit prevent overheating of the fuel cladding and possible cladding perforation which would result in the release of fission products to the reactor coolant. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime where the heat transfer coefficient is large and the cladding surface temperature is slightly above the coolant saturation temperature.

Operation above the upper boundary of the nucleate boiling regime would result in excessive cladding temperatures because of the onset of departure from nucleate boiling (DNB) and the resultant sharp reduction in heat transfer coefficient. DNB is not a directly measurable parameter during operation and therefore THERMAL POWER and Reactor Coolant Temperature and Pressure have been related to DNB through the B&W-2 DNB correlation. The DNB correlation has been developed to predict the DNB flux and the location of DNB for axially uniform and non-uniform heat flux distributions. The local DNB heat flux ratio, DNBR, defined as the ratio of the heat flux that would cause DNB at a particular core location to the local heat flux, is indicative of the margin to DNB.

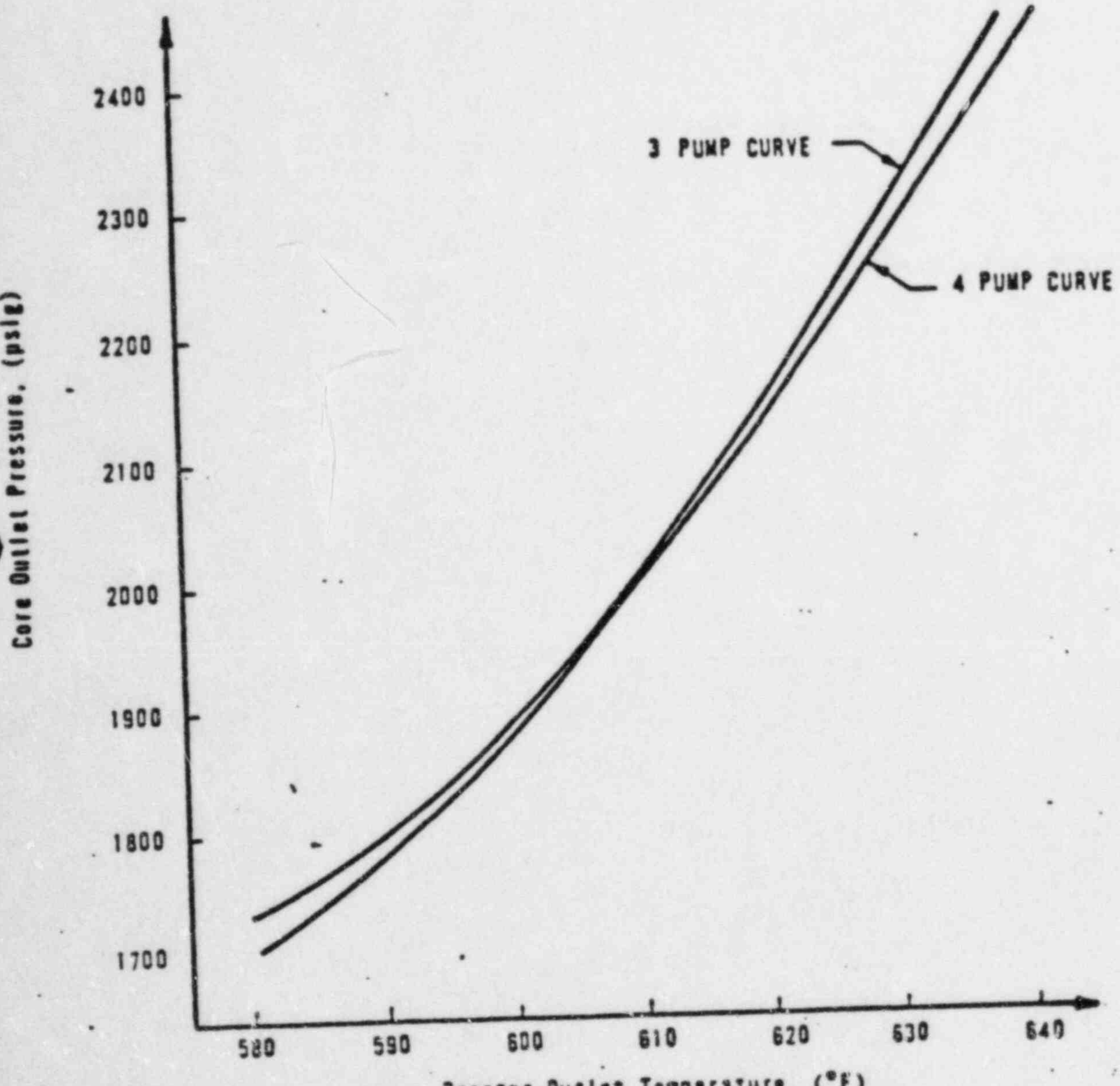
The minimum value of the DNBR during steady state operation, normal operational transients, and anticipated transients is limited to 1.30. This value corresponds to a 95 percent probability at a 95 percent confidence level that DNB will not occur and is chosen as an appropriate margin to DNB for all operating conditions.

The curve presented in Figure 2.1-1 represents the conditions at which a minimum DNBR of 1.30 is predicted for the maximum possible thermal power 112% when the reactor coolant flow is ~~387,200~~ 380,160 GPM, which is ~~110%~~ 108% of design flow rate for four operating reactor coolant pumps. This curve is based on the following hot channel factors with potential fuel densification and fuel rod bowing effects:

$$F_Q = 2.56; \quad F^N_{\Delta H} = 1.71; \quad F^N_Z = 1.50$$

The design limit power peaking factors are the most restrictive calculated at full power for the range from all control rods fully withdrawn to minimum allowable control rod withdrawal, and form the core DNBR design basis.

Bases Figure 2.1 Pressure/Temperature Limits at Maximum Allowable Power for Minimum DNBR



PUMPS	FLOW (GPM)	POWER
4	~~387,200~~ 380,160	112%
3	~~290,100~~ 283,980	~~88.3%~~ 89.1%