2.1 SAFETY LIMITS

BASES

2.1.1 REACTOR CORE

The restrictions of this Safety Limit prevent overheating of the fuel 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 could 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 WRB-1 correlation. The WRB-1 DNB correlation has been developed to predict the DNB flux and the location of DNB for axially uniform and nonuniform 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. (BASED UPON W-3 CORRELATION) This value corresponds to a 95% probability at a 95% confidence level that DNB will not occur and is chosen as an appropriate margin to DNB for all operating conditions.

The curves of Figures 2.1-1 and 2.1-2 show the loci of points of THERMAL POWER, Reactor Coolant System pressure and average temperature for which the minimum DNBR is no less than 1.30, or the average enthalpy at the vessel exit is equal to the enthalpy of saturated liquid.

Unit 2

These curves are based on an enthalpy hot channel factor, $F^N_{\Delta H}$, of 1.55 and a reference cosine with a peak of 1.55 for axial power shape. An allowance is included for an increase in $F^N_{\Delta H}$ at reduced power based on the expression:

$$F^N_{\Delta H} = 1.55\ [1+ 0.2\ (1-P)]$$

Where P is the fraction of RATED THERMAL POWER.

These limiting heat flux conditions are higher than those calculated for the range of all control rods fully withdrawn to the maximum allowable control rod insertion assuming the axial power imbalance is within the limits of the f_1 (delta I) function of the Overtemperature trip. When the axial power imbalance is not within the tolerance, the axial power imbalance effect on the Overtemperature Delta T trips will reduce the Setpoints to provide protection consistent with core Safety Limits.

~~Attachment 2~~

Insert X

Fuel rod bowing reduces the value of DNB ratio. Credit is available to partially offset this reduction. This credit comes from generic or plant specific design margin. For McGuire Unit~~s 1 and~~ 2, the margin used to partially offset rod bow penalties is 9.1 percent. This margin breaks down as follows:

1)	Design limit DNBR	1.6%
2)	Grid spacing K_s	2.9%
3)	Thermal Diffusion Coefficient	1.2%
4)	DNBR Multiplier	1.7%
5)	Pitch Reduction	1.7%

However ~~For McGuire Unit 2~~, the margin used to partially offset rod bow penalties is 5.9 percent with the remaining 3.2 percent used to trade off against measured flow being as much as 2 percent lower than thermal design flow plus uncertainties. The penalties applied to $F^N_{\Delta H}$ to account for rod bow (Figure~~s~~ 3.2-4~~) Unit 1 and Unit 2)~~ as a function of burnup are consistent with those described in Mr. John F. Stolz's (NRC) letter to T. M. Anderson (Westinghouse) dated April 5, 1979 with the difference being due to the amount of margin each unit uses to partially offset rod bow penalties.

For McGuire Unit 1, [redacted] margin between the safety analysis limit DNBRs (1.47 and 1.49 for thimble and typical cells, respectively) and the design limit DNBRs (1.32 and 1.34 for thimble and typical cells, respectively) is maintained. [redacted] A fraction of this margin is utilized to accomodate the transition core DNBR penalty (2%) and the appropriate Fuel rod bow DNBR penalty (WCAP 8691, Rev. 1).

THIRTY DAY WRITTEN REPORTS (Continued)

c. Observed inadequacies in the implementation of Administrative or Procedural Controls which threaten to cause reduction of degree of redundancy provided in Reactor Trip Systems or Engineered Safety Features Systems;

d. Abnormal degradation of systems other than those specified in Specification 6.9.1.10c. above designed to contain radioactive material resulting from the fission process;

e. An unplanned offsite release of: (1) more than 1 Curie of radioactive material in liquid effluents, (2) more than 150 Curies of noble gas in gaseous effluents, or (3) more than 0.05 Curie of radiciodine in gaseous effluents. The report of an unplanned offsite release of radioactive material shall include the following information:

1) A description of the event and equipment involved,

2) Cause(s) for the unplanned release,

3) Actions taken to prevent recurrence, and

4) Consequences of the unplanned release.

f. Measured levels of radioactivity in an environmental sampling medium determined to exceed the reporting level values of Table 3.12-2 when averaged over any calendar quarter sampling period.

RADIAL PEAKING FACTOR LIMIT REPORT

UNIT 1

6.9.1.12 The F_{xy} limit for RATED THERMAL POWER (F_{xy}^{RTP}) shall be provided to the Regional Administrator of the NRC Regional Office, with a copy to the Director, Nuclear Reactor Regulation, Attention: Chief, Core Performance Branch, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555 for all core planes containing Bank "D" control rods and all unrodded core planes at least 60 days prior to cycle initial criticality. In the event that the limit would be submitted at some other time during core life, it shall be submitted 60 days prior to the date the limit would become effective unless otherwise exempted by the Commission.

Any information needed to support F_{xy}^{RTP} will be by request from the NRC and need not be included in this report.

INSERT 2

SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the Regional Administrator of the NRC Regional Office within the time period specified for each report.

INSERT Z

UNIT 1

~~6.9.1.1[illegible]~~ The W(z) function for normal operation shall be provided to the Director, Nuclear Reactor Regulations, Attention Chief of the Core Performance Branch, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555 at least 60 days prior to cycle initial criticality. In the event that these values would be submitted at some other time during core life, it will be submitted 60 days prior to the date the values would become effective unless otherwise exempted by the Commission.

Any information needed to support W(z) will be by request from the NRC and need not be included in this report.

ENCLOSURE 1