A T T A C H M E N T A

Revise the Technical Specifications as follows:

Remove Page	Insert Page
3/4 2-6	3/4 2-6
3/4 2-7	3/4 2-7
3/4 2-10	3/4 2-10
3/4 3-45	3/4 3-45
B 3/4 2-4	B 3/4 2-4

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 F_{xy} shall be evaluated to determine if $F_Q(Z)$ is within its limit by:

a. Using the movable incore detectors to obtain a power distribution map at any THERMAL POWER greater than 5 percent of RATED THERMAL POWER.

b. Increasing the measured F_{xy} component of the power distribution map by 3 percent to account for manufacturing tolerances and further increasing the value by 5 percent to account for measurement uncertainties. ← INSERT A

c. Comparing the F_{xy} computed (F_{xy}^C) obtained in b, above to:

1. The F_{xy} limits for RATED THERMAL POWER (F_{xy}^{RTP}) for the appropriate measured core planes given in e and f below, and

2. The relationship:

$$F_{xy}^{L} = F_{xy}^{RTP} \quad [1+0.2(1-P)]$$

where F_{xy}^{L} is the limit for fractional THERMAL POWER operation expressed as a function of F_{xy}^{RTP} and P is the fraction of RATED THERMAL POWER at which F_{xy} was measured.

d. Remeasuring F_{xy} according to the following schedule:

1. When F_{xy}^{C} is greater than the F_{xy}^{RTP} limit for the appropriate measured core plane but less than the F_{xy}^{L} relationship, additional power distribution maps shall be taken and F_{xy}^{C} compared to F_{xy}^{RTP} and F_{xy}^{L}

a) Either within 24 hours after exceeding by 20 percent of RATED THERMAL POWER or greater, the THERMAL POWER at which F_{xy}^{C} was last determined, or

b) At least once per 31 EFPD, whichever occurs first.

* See page 3/4 3-45 footnote for limitation.

PROPOSED WORDING

INSERT A

When the number of available movable detector thimbles is less than 75%* of the total, the 5% measurement uncertainty shall be increased to 5% + [3-(T/12.5)] 2%, where T is the number of available thimbles.

SURVEILLANCE REQUIREMENTS (Continued)

2. When the F_{xy}^{C} is less than or equal to the F_{xy}^{RTP} limit for the appropriate measured core plane, additional power distribution maps shall be taken and F_{xy}^{C} compared to F_{xy}^{RTP} and F_{xy}^{L} at least once per 31 EFPD.

e. The F_{xy} limit for Rated Thermal Power (F_{xy}^{RTP}) shall be provided for all core planes containing bank "D" control rods and all unrodded core planes in a Radial Peaking Factor Limit Report per Specification 6.9.1.14.

f. The F_{xy} limits of e, above, are not applicable in the following core plane regions as measured in percent of core height from the bottom of the fuel:

1. Lower core region from 0 to 15 percent, inclusive.

2. Upper core region from 85 to 100 percent inclusive.

3. Grid plane regions of core height (± 2.88 inches) measured from grid centerline.

4. Core plane regions within ± 2 percent of core height (± 2.88 inches) about the bank demand position of the bank "D" control rods.

g. With F_{xy}^{C} exceeding F_{xy}^{L}, the effects of F_{xy} on $F_Q(Z)$ shall be evaluated to determine if $F_Q(Z)$ is within its limit.

4.2.2.3 When $F_Q(Z)$ is measured pursuant to Specification 4.10.2.2, an overall measured $F_Q(Z)$ shall be obtained from a power distribution map and increased by 3 percent to account for manufacturing tolerances and further increased by 5 percent to account for measurement uncertainty. INSERT A

* See page 3/4 3-45 footnote for limitation.

PROPOSED WORDING

SURVEILLANCE REQUIREMENTS

4.2.3.1 $F^N_{\Delta H}$ shall be determined to be within its limit by using movable incore detectors to obtain a power distribution map:

a. Prior to operation above 75 percent of RATED THERMAL POWER after each fuel loading, and

b. At least once per 31 Effective Full Power Days.

4.2.3.2 The measured $F^N_{\Delta H}$ of 4.2.3.1 above, shall be increased by 4% for measurement uncertainty. When the number of available moveable detector thimbles is less than 75%* of the total, the 4% measurement uncertainty shall be increased to 4% + [3 - (T/12.5)] 1%, where T is the number of available thimbles.

* See page 3/4 3-45 footnote for limitation.

PROPOSED WORDING

MOVABLE INCORE DETECTORS

LIMITING CONDITION FOR OPERATION

3.3.3.2 The movable incore detection system shall be OPERABLE with:

a. At least 75%* of the detector thimbles,

b. A minimum of 2 detector thimbles per core quadrant, and

c. Sufficient movable detectors, drive, and readout equipment to map these thimbles.

APPLICABILITY: When the movable incore detection system is used for:

A. Recalibration of the axial flux offset detection system,

B. Monitoring the QUADRANT POWER TILT RATIO, or

C. Measurement of $F_{\Delta H}^{N}$ and F_Q (Z).

ACTION:

With the movable incore detection system inoperable, do not use the system for the above applicable monitoring or calibration functions. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.2 The incore movable detection system shall be demonstrated OPERABLE by normalizing each detector output to be used within 24 hours prior to its use when required for:

a. Recalibration of the excore axial flux offset detection system, or

b. Monitoring the QUADRANT POWER TILT RATIO, or

c. Measurement of $F_{\Delta H}^{N}$ and F_Q (Z).

* During the remainder of Cycle 1 a minimum of 50% of the detector thimbles are required along with the increased uncertainty allowance applied to peaking factors. These temporary changes shall expire during plant shutdown for the first refueling outage.

PROPOSED WORDING

3/4.2.2 and 3/4 2.3 HEAT FLUX AND NUCLEAR ENTHALPY HOT CHANNEL FACTORS $F_Q(Z)$ AND $F^N_{\Delta H}$ (Continued)

c. The control rod insertion limits of Specifications 3.1.3.5 and 3.1.3.6 are maintained.

d. The axial power distribution, expressed in terms of AXIAL FLUX DIFFERENCE is maintained within the limits.

The relaxation in $F^N_{\Delta H}$ as a function of THERMAL POWER allows changes in the radial power shape for all permissible rod insertion limits. $F^N_{\Delta H}$ will be maintained within its limits provided conditions a thru d above, are maintained.

When an F_Q measurement is taken, both experimental error and manufacturing tolerance must be allowed for. 5% is the appropriate experimental error allowance for a full core map taken with the incore detector flux mapping system and 3% is the appropriate allowance for manufacturing tolerance. ← INSERT A

The specified limit of $F^N_{\Delta H}$ contains an 8% allowance for uncertainties which means that normal, full power, three loop operation will result in $F^N_{\Delta H} \leq 1.55/1.08$.

Fuel rod bowing reduces the value of the DNB ratio. Credit is available to offset this reduction in the generic margin. The generic design margins, totaling 9.1% DNBR, and completely offsets any rod bow penalties (< 3% for the worst case which occurs at a burnup of 33,000 MWD/MTU).

This margin includes the following:

1. Design Limit DNBR of 1.30 vs. 1.28
2. Grid Spacing (K_s) of 0.046 vs. 0.059
3. Thermal Diffusion Coefficient of 0.038 vs. 0.059
4. DNBR Multiplier of 0.865 vs. 0.88
5. Pitch reduction

The radial peaking factor F_{xy} (Z) is measured periodically to provide assurance that the hot channel factor, F_Q (Z), remains within its limit. The F_{xy} limit for Rated Thermal Power (F^{RTP}_{xy}) as provided in the Radial Peaking Factor Limit Report per Specification 6.9.1.14 was determined from expected power control maneuvers over the full range of burnup conditions in the core.

* See page 3/4 3-45 footnote for limitations

3/4.2.4 QUADRANT POWER TILT RATIO

The Quadrant Power Tilt Ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis.

PROPOSED WORDING

A T T A C H M E N T   B

Proposed Technical Specification Change No. 10
Safety Evaluation

Description of amendment request: The proposed amendment would incorporate a temporary change to specification 3.3.3.2 to relax the required number of incore detector thimbles from 75% to 50% for the remainder of cycle 1. In addition, for compensatory measures the peaking factor surveillance requirements have been revised to increase the uncertainty factors applied to the peaking factors when a flux map is performed with less than 75% of the thimbles. For F_q and F_{xy} the flux map measurement uncertainty will be increased above the 5% normally applied by the relationship 5%+ [3-(T/12.5)] 2% where T is the number of available thimbles. This relationship (see Table 1 attached) increases the uncertainty allowance to 7% when half of the thimbles are used. For FNΔH the flux map measurement uncertainty will be increased above the 4% normally applied by the relationship 4% + [3-(T/12.5)] 1%. This relationship (see Table 2 attached) increases the uncertainty allowance to 5% when half of the thimbles are used. These changes are similar to temporary Amendment No. 61 approved for Cycle 3 of the Beaver Valley Unit 1 plant dated January 19, 1983. As stated in the NRC safety evaluation for that amendment, relaxation of the 75% requirement has been permitted for the duration of affected reactor operating cycles and the appropriate allowances are similar to those made for other reactors.

Attachment 1, Table 3 and Figures 1, 2, 3, 4 and 5 provide the results of recent core flux maps to indicate the margin available between the measured peaking factors and the limits. As shown in the figures adequate margin is available between the measured peaking factors and the limits. Therefore, these available margins along with the proposed increases in measurement uncertainty provide sufficient compensatory measures to preclude concerns that required monitoring of the limits would fail to detect a problem for the remainder of the operating cycle.

A safety concern related to degradation of the incore flux mapping system is the ability to detect anomalous conditions in the core. One of these is inadvertent loading of a fuel assembly into an improper position. Since this is a loading problem, it is not a concern for the remainder of this operating cycle. Other anomalous conditions which could produce either axial or radial effects would be identified as changes in the quadrant power tilt ratio or axial offset ratio, however, those are monitored and would be detected by the excore detectors. The excore detectors and core exit thermocouples provide information sources available to supplement the incore detectors and detect potential problems.

Therefore, operation of the Beaver Valley Unit 2 reactor for the remainder of Cycle 1 will be safe with the number of incore thimble locations reduced to as few as 50% since adequate margin exists and an adequate increase in measurement uncertainty allowance provides assurance that peaking factor limits will be met. In addition, adequate supplemental indicators of anomalous conditions are available to preclude an unsafe condition from being undetected in the absence of full incore detector flux mapping capability.

The footnote * added to specification 3.3.3.2 and referenced in the applicable peaking factor surveillance requirements states that this is a temporary change and expires at the end of Cycle 1. This was clearly defined this way to eliminate the necessity for an expedient technical specification change to remove these temporary changes at the end of the cycle. This will not affect the safety of the plant even if left in place during subsequent cycles since these changes will only apply during the remainder of Cycle 1.

ATTACHMENT C

No Significant Hazards Evaluation
Proposed Technical Specification Change No. 10

Basis for proposed no significant hazards consideration determination: The commission has provided standards for determining whether a significant hazards consideration exists (10 CFR 50.92(c)). A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

The proposed changes do not involve a significant hazard consideration because:

(1) Specification 3.3.3.2 has been revised by adding a footnote which allows relaxation of the required number of incore detector thimbles from 75% to 50% for the remainder of Cycle 1. Compensatory measures have been incorporated to increase the uncertainty factors applied to the peaking factors when a flux map is performed with less than 75% of the thimbles. These changes are similar to temporary Amendment No. 61 approved for Beaver Valley Unit 1 for Cycle 3 operation. Relaxation of the 75% requirement has been permitted for the duration of other utility reactor operating cycles when required to allow continued plant operation and the appropriate allowances added are similar to those made for other reactors.

Available peaking factor margin to the limits along with the proposed increases in measurement uncertainty provide sufficient compensatory measures to preclude concerns that required monitoring of the limits would fail to detect a problem for the remainder of Cycle 1.

A reduction in the number of operable incore flux thimbles introduces a safety concern related to detection of anomalous conditions in the core, such as, inadvertent loading of a fuel assembly into an improper position. However, this is a loading problem and is not a concern for the remainder of this operating cycle. Other anomalous conditions that could occur would produce either axial or radial effects and would be identified in the quadrant power tilt ratio or axial offset ratio which are monitored by the excore detectors. The excore detectors and core exit thermocouples provide additional sources of information to supplement the incore detectors and detect potential problems.

Therefore, operation of the Beaver Valley Unit 2 reactor for the remainder of Cycle 1 will be safe with the number of incore thimble locations reduced to as few as 50% since adequate margin exists and increased measurement uncertainty provides assurance that peaking factor limits will be met. Supplemental indicators of anomalous core conditions are also available to preclude unsafe operating conditions from being undetected in the absence of full incore detector flux mapping capability. Therefore, the probability of occurrence or the consequences of accidents previously evaluated will not be increased.

2. The proposed change is a temporary amendment, which allows operation with a reduced number of incore detector thimbles, however, adequate margin to the peaking factor limits is available and increased uncertainty allowance ensures the peaking factor limits will be met. In addition, other means are available to determine core conditions related to axial and radial effects which affect the quadrant power tilt ratio or axial offset ratio monitored by the excore detectors. The core exit thermocouples provide information relative to core conditions and also supplement the incore detectors for detecting potential problems. None of the accident analyses will be affected and the proposed changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed changes do not affect any plant setpoints, therefore, safe operation of the plant will not be affected. The increased uncertainties applied to the peaking factors when operating with less than 75% of the detector thimbles are imposed as a compensatory measure to ensure the peaking factors adequately reflect the core conditions. Therefore, anomalous conditions in the core can be detected by using the incore detectors without significantly reducing the margin of safety of the plant.

Therefore, based on the above considerations, it is proposed to characterize the change as involving no significant hazards consideration.

TABLE 1

HEAT FLUX HOT CHANNEL FACTOR

# of Thimbles used	%	Uncertainty without Tech Spec revision	With Tech Spec revision
5C	100%	5%	5%
40	80%	5%	5%
35	70%	N/A	5.4%
30	60%	N/A	6.2%
25	50%	N/A	7.0%

Measured Fq, Fxy component of the power distribution map

Measurement uncertainty increased: 5% +[3-(T/12.5)] 2% where T is the # of thimbles used

TABLE 2

NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

# of thimbles used	%	Uncertainty without Tech Spec revision	With Tech Spec revision
50	100%	4%	4%
40	80%	4%	4%
35	70%	N/A	4.2%
30	60%	N/A	4.6%
25	50%	N/A	5.0%

Measurement uncertainty increased: 4% + [3-(T/12.5)] 1% where T is # of thimbles used

ATTACHMENT 1

UNIT 2, CYCLE 1 INTERIM THIMBLE REDUCTION TECHNICAL SPECIFICATION PROPOSED CHANGE

Attached is a summary of the peaking factor results for the first eight full-core flux maps that have been taken to date during BVPS Unit 2, Cycle 1 operation. The attached graphs represent the peaking factors including the appropriate engineering and uncertainty factors. The percent margin graphs (Figures 2, 3, and 5) are the difference between the Technical Specification Limit and measured peaking factor values. Note in Table 3 that the last three maps were taken at 100% reactor power while the first five flux maps were at HZP, 30%, 50%, 75%, and 90% power levels respectively. Peaking factors are power dependent and the 100%, HFP data represent the highest measured values.

Figure 1 shows that the measured Fxy values are trending slightly above predicted based on the Westinghouse Nuclear Design Report (NDR). The initial Fxy increase is due to the burn-out of part-length WABA's (Wet Annular Burnable Absorber Rods) used in Cycle 1 for reactivity control. The WABA's are offset toward the top of core and as they burn-out, a radial and axial redistribution occurs. Presently the core is at the peak of this redistribution as reflected in Figure 1. Thus, the peaking factors are at the highest values expected for the cycle based on the design data. After approximately 4 GWD/MTU, the peaking factors will decrease, providing increased operating margin as the cycle progresses. Figure 4, representing the measured F delta H, also follows the predicted NDR trend of an initial increase, then leveling-off of the peaking factors.

The proposed Technical Specification Change would increase the uncertainty penalty applied to the measured peaking factors. This would tend to decrease the numerical value of the safety margin by up to two percent for FQ and Fxy, and up to one percent for F delta H. As indicated on Figures 2, 3, and 5 there is sufficient margin to incorporate the added penalty. In addition to the added uncertainties, the trending of incore thermocouple exit temperatures collected during flux mapping will be used to further confirm the reliability of core analysis performed using a reduced number of thimbles.

Therefore, based on the attached peaking factor summary data and graphs showing that the core is trending the predicted values with sufficient margin at the cycle peak, and additional incore thermocouple monitoring, it is concluded there is reasonable assurance that the public health and safety will not be endangered by operation in the proposed manner.

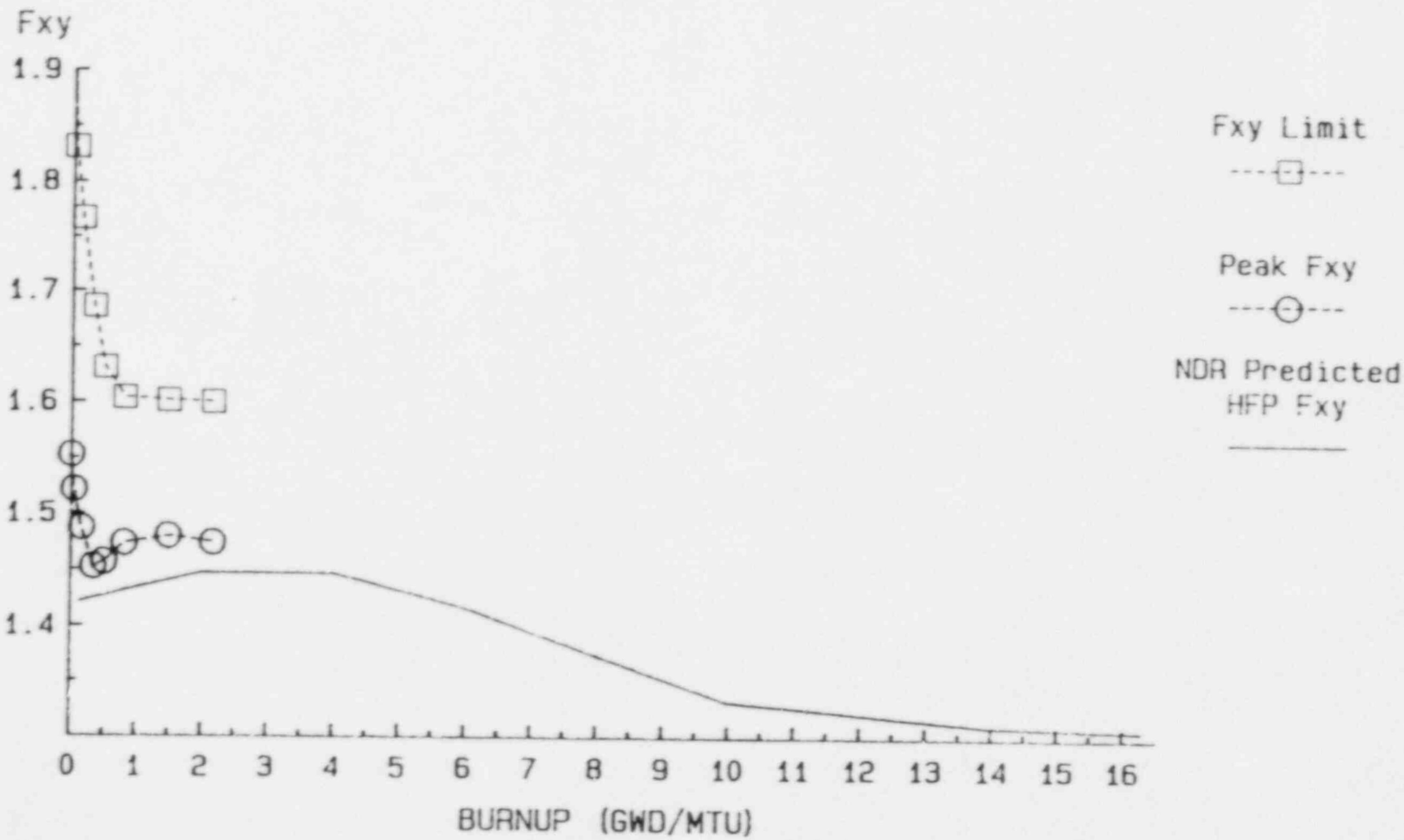
TABLE 3

SUMMARY OF FLUX MAP

PEAKING FACTORS

Flux Map Number	Burnup (MWD/MTU)	Percent Power	Fxy Margin to Limit (%)	F Delta H Margin to Limit (%)	FQ Margin to Limit (%)
1	0	HZP	19.1	28.2	57.3
2	47.5	27.5	17.0	26.5	45.6
3	165.8	47.6	16.0	22.8	61.8
10	348.4	72.9	13.9	17.6	45.0
11	515.1	90.1	10.7	12.7	32.4
13	817.3	98.6	7.9	9.7	22.8
14	1487.5	99.3	7.5	9.1	24.1
22	2143.9	99.7	8.2	9.1	22.9

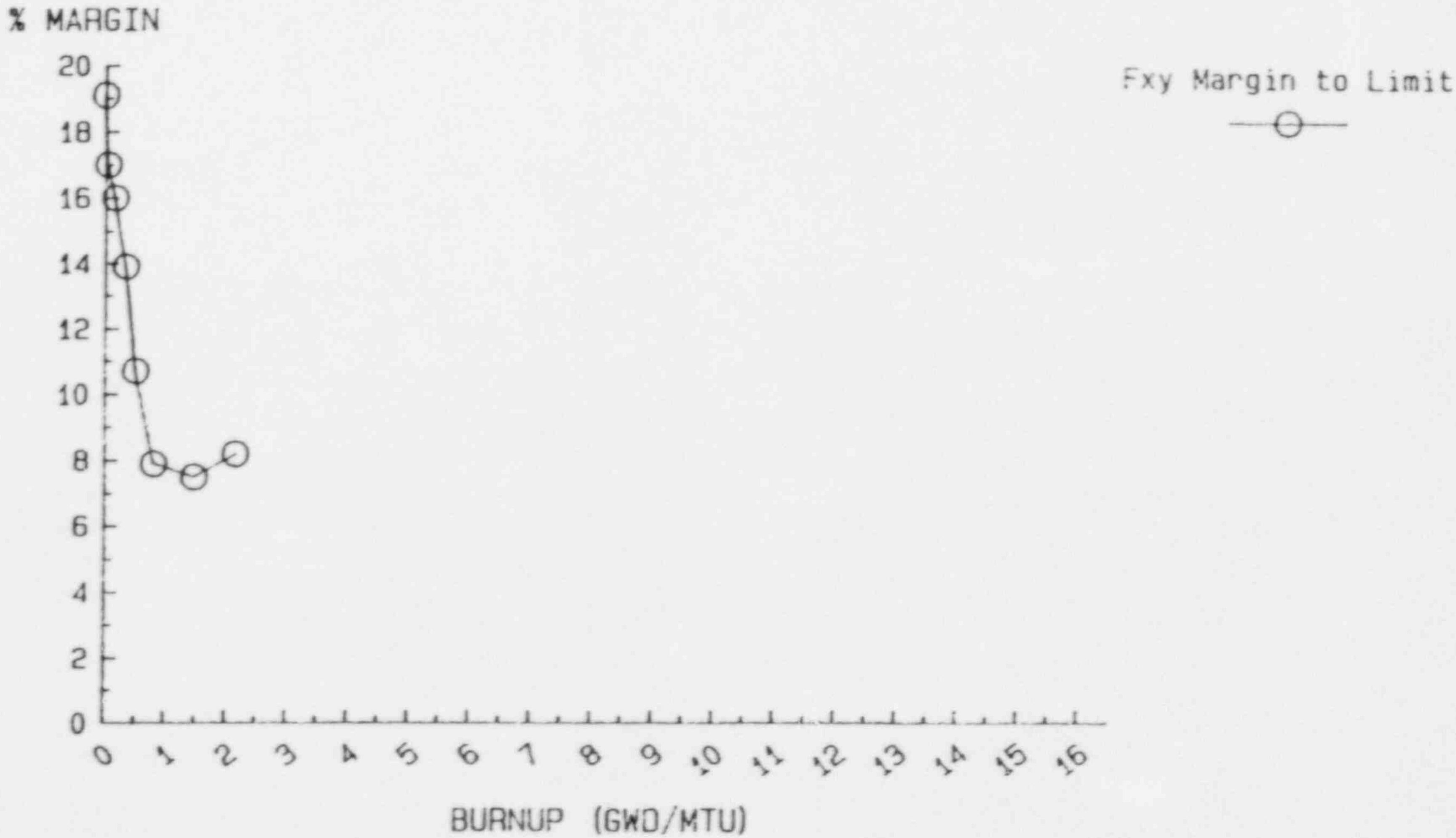
FIGURE 1
Fxy MEASURED VALUE VS TECH. SPEC. LIMIT
AND NDR PREDICTIONS



Data includes engineering uncertainty.
First four maps were performed at HZP, 30%, 50%,
and 75% power levels.

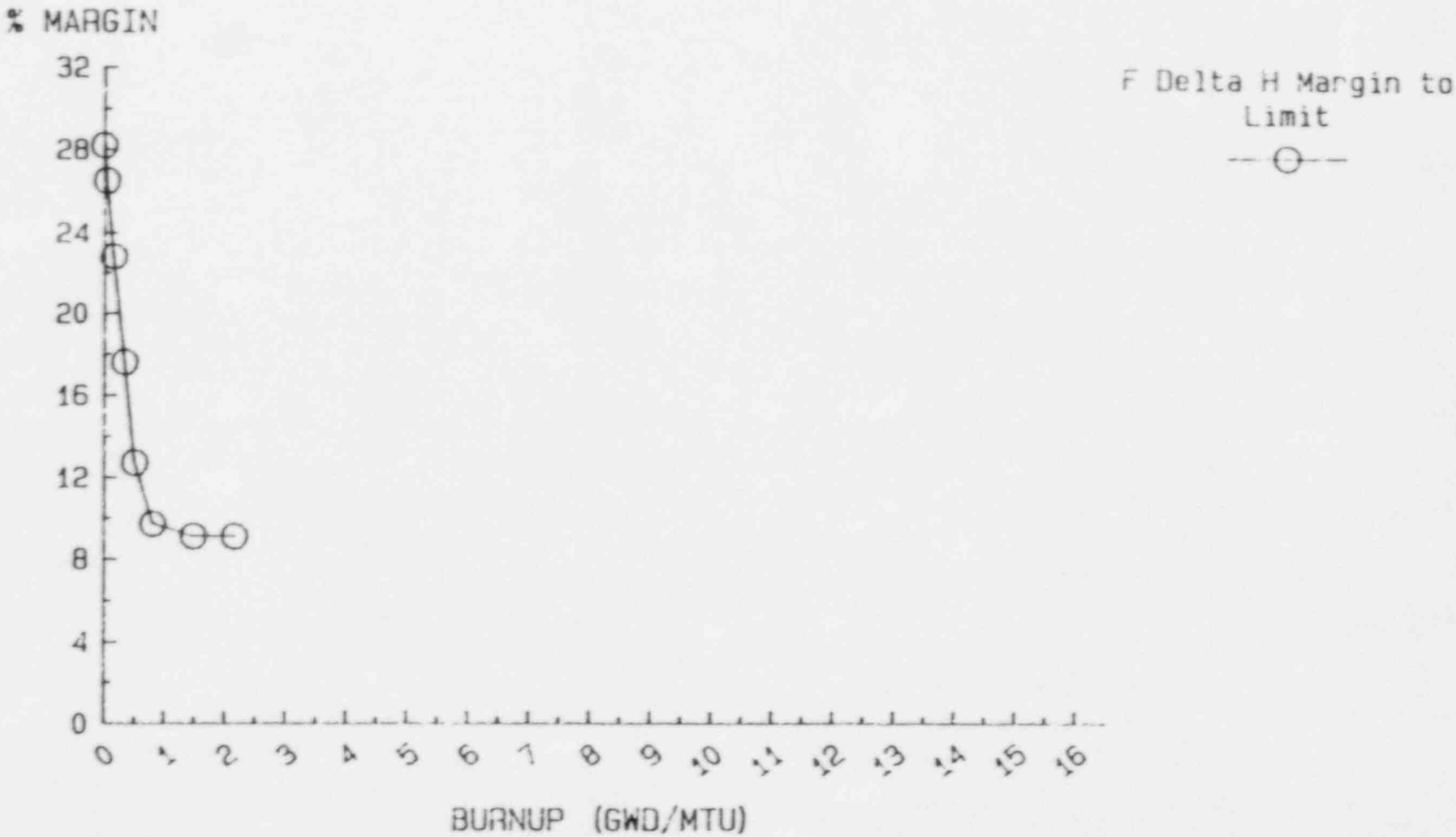
FIGURE 2

Fxy MARGIN TO LIMIT



Data includes engineering uncertainty.
First four maps were performed at HZP, 30%, 50%,
and 75% power levels.

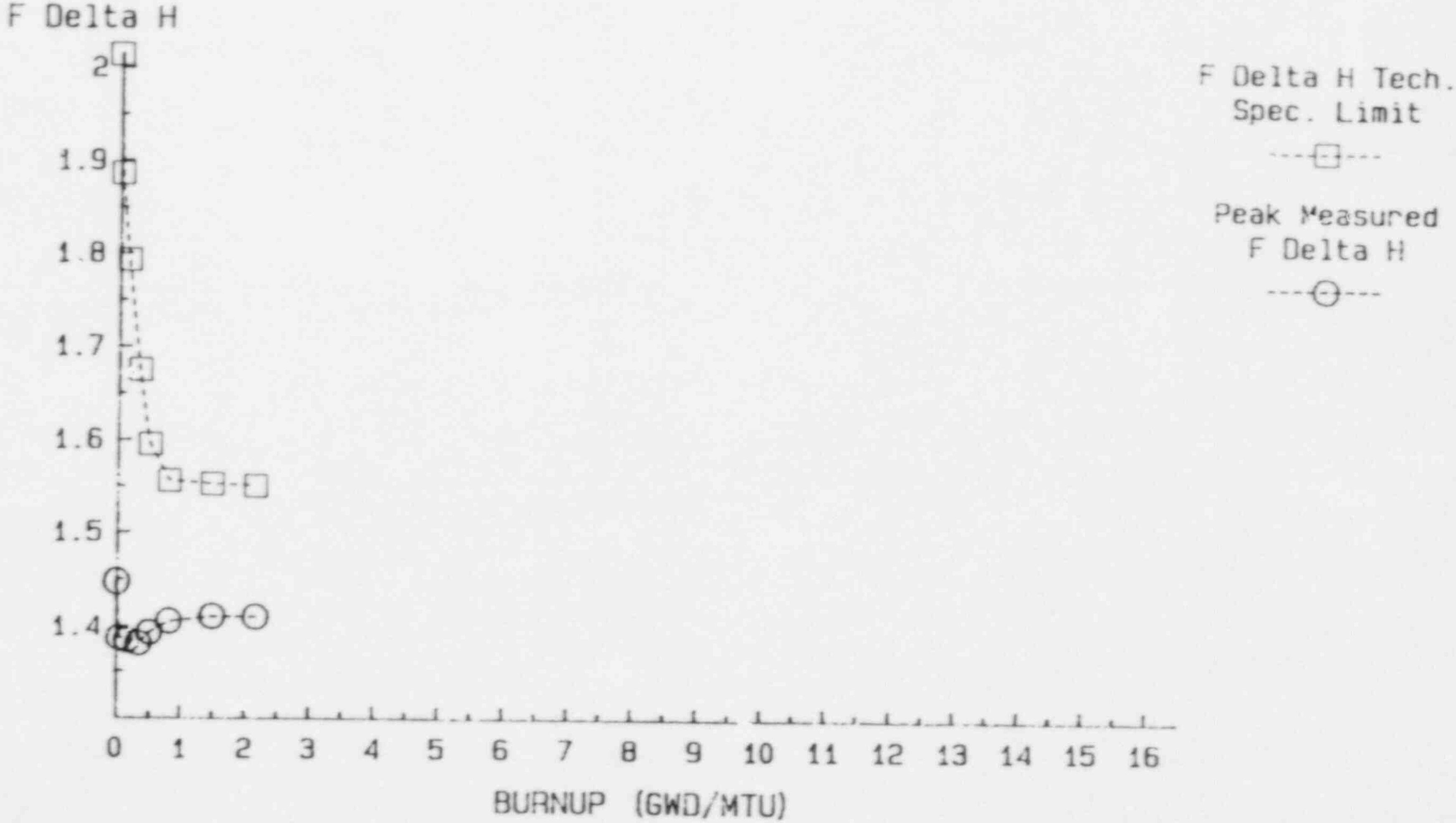
FIGURE 3
F DELTA H MARGIN TO LIMIT



Values include engineering uncertainty.
First four maps were performed at HZP. 30%. 50%.
and 75% power levels.

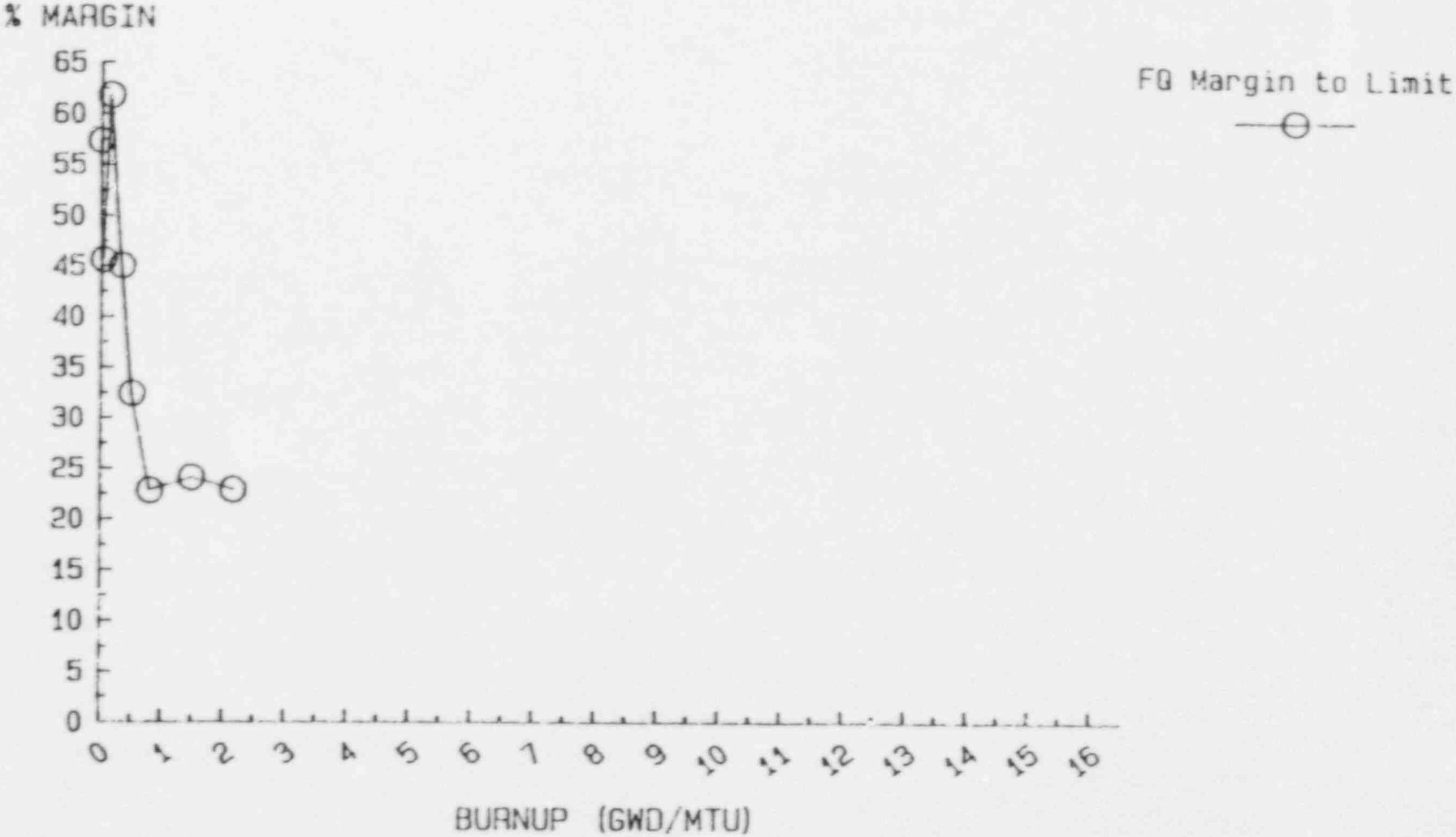
FIGURE 4

F DELTA H MEASURED VALUE VS TECH. SPEC. LIMIT



Values include engineering uncertainty.
First four maps were performed at HZP, 30%, 50%, and 75% power levels.

FIGURE 5
FQ MARGIN TO LIMIT



Values include engineering uncertainty.
First four maps were performed at HZP, 30%, 50%, and 75% power levels.