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% of RATED THERMAL POWER.

b. Increasing the measured F_{xy} component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% to account for measurement uncertanties. When the number of available moveable 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.

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:

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

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% 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.

PROPOSED WORDING

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 6.9.1.10.

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%, inclusive.
2. Upper core region from 85 to 100% inclusive.
3. Grid plane regions at 17.8 $\pm$ 2%, 32.1 $\pm$ 2%, 46.4 $\pm$ 2%, 60.6 $\pm$ 2% and 74.9 $\pm$ 2%, inclusive
4. Core plane regions within $\pm$ 2% of core height ($\pm$ 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% to account for manufacturing tolerances and further increased by 5% to account for measurement uncertainty. When the number of available moveable 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)

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

a. Prior to operation above 75% 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 then 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.

MOVABLE INCORE DETECTORS

LIMITING CONDITION FOR OPERATION

3.3.3.2 The movable incore detection system shall be OPERABLE with:

a. At least 50% 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).

3/4.2.2 and 3/4.2.3 HEAT FLUX AND NUCLEAR ENTHALPY HOT CHANNEL FACTORS- $F_Q(Z)$ and $F^N_{\Delta H}$

The limits on heat flux and nuclear enthalpy hot channel factors ensure that 1) the design limits on peak local power density and minimum DNBR are not exceeded and 2) in the event of a LOCA the peak fuel clad temperature will not exceed the ECCS acceptance criteria limit of 2200°F.

Each of these hot channel factors are measurable but will normally only be determined periodically as specified in Specifications 4.2.2 and 4.2.3. This periodic surveillance is sufficient to insure that the hot channel factor limits are maintained provided:

a. Control rod in a single group move together with no individual rod insertion differing by more than ± 12 steps from the group demand position.

b. Control rod groups are sequenced with overlapping groups as described in Specification 3.1.3.5.

c. The control rod insertion limits of Specifications 3.1.3.4 and 3.1.3.5 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. When the number of available moveable 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.

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 $F^N_{\Delta H}$ 1.55/1.08.

ATTACHMENT B

Proposed Change Request No. 75 revises the Beaver Valley Power Station, Unit No. 1 Technical Specifications Appendix A to reduce the required minimum number of operable flux detector thimbles to fifty percent (50%) when problems of flux detector path blockage exists.

Westinghouse Nuclear Fuel Division has performed a plant specific Thimble Deletion Study to assess the effects of using a minimum of 50% of the incore moveable detector thimbles for measurement of $F^N\Delta H$, FQ(Z), monitoring the Quadrant Power Tilt Ratio and recalibration of the axial flux offset detection system. This study concluded that the quadrant power tilt and axial offset ratios were not affected appreciably. FQ, the heat flux hot channel factor and its integral $F^N\Delta H$, the nuclear enthalpy rise hot channel factor uncertainties were shown to increase to 7% and 5% respectively. Tables 1 and 2 illustrate the results of the study.

The required changes to the technical specification to allow for the proposed reduction in the minimum number of operable flux detector thimbles are:

(a) 4.2.2.2b Increasing the measured Fxy component of the power distribution map by 7% when half of the thimbles (25) are used.

(b) 4.2.2.3 Overall measured F(q) shall be increased by 7% when 50% thimbles (25) are used (currently 5%)

(c) 4.2.3.2 The measured $F^N\Delta H$ shall be increased by 5% (currently 4% when (25) thimbles are used.

(d) LCO 3.3.3.2 The moveable incore detector system shall be operable with: a) 50% of the detector thimbles.

(e) Bases for 3/4.2.2 When the number of detector thimbles $\geq$ 50% and $\leq$75%, the equation 5% + [3-(T/12.5)] 2% shall be used to determine measurement uncertainties. 3/4.2.3 ($F^N\Delta H$) the integral of hot channel (nuclear enthalpy) is not changed since the specified limit contains an 8% allowance.

UFSAR UPDATE

The Updated Final Safety Analysis Report (UFSAR) was reviewed and it was determined that NRC reporting in accordance with 10 CFR 50.59 and revision of the UFSAR are required as a result of the proposed technical specification changes. Section 7.7.1.9.3 should be revised to reflect the increase in the measured nuclear peaking factor due to the reduction in available moveable detectors (when less than 75% of the thimbles are used).

SAFETY ANALYSIS

The change in the minimum requirement for flux detector thimbles will result in a statistical change to measurement uncertainties of parameters in computer codes using neutron kinetics (INCORE) and as such does not modify the equipment of the incore instrumentation system. Therefore, an increase in probability or consequence of a malfunction of safety related equipment is not involved, nor is the possibility of a new malfunction created.

The incore detector system is necessary to provide data and analysis of the following postulated accidents previously evaluated in Chapter 14 of the Updated Final Safety Analysis Report:

1. Section 14.1.3 and 14.2.10 RCCA Misalignment and Withdrawal: the incore detector system confirms core exit thermocouple indication of assembly misalignment and determines the value of ($F^N\Delta H$).

II. Section 14.2.6 Rupture of CRDM: enthalpy and temperature transients are analyzed using the hot channel factor to perform a fuel rod transient heat transfer calculation.

III. Section 14.2.8 Inadvertant Loading of a Fuel Assembly Into An Improper Position: the incore detector system is capable of revealing any error in fuel loading which causes power shapes to be peaked in excess of the design value.

The probability or consequence of the above accidents involving the incore moveable detector system are not increased because only a conservative increase to the measurement uncertainties is involved in these technical specification changes. Compensation is given for a flux map of less than 38 thimbles by applying a greater multiplication factor for determining the heat flux hot channel factor F(q) computer kinetics codes. No such revision to the nuclear enthalpy hot channel factor is needed since this computer integrated factor is given an 8% allowance.

The possibility of an accident not previously evaluated in the UFSAR is not created because the Westinghouse BVPS Unit 1 study states:

> "thimble deletion to the 50% level does not significantly degrade the ability of the moveable detector system to measure off normal core power distributions. The measured peaking factors for the thimble deletion cases are quite comparable to the reference case.
>
> Thimble deletion has negligible impact on the quadrant tilt and core average axial power shape measurement (.34% and .08% respectively). Changes of this magnitude are not significant and will not adversely affect excore detector calibration."

The margin of safety of the technical specification is not reduced because this change is of a statistical nature only and is to be implemented in special cases.

Westinghouse summarizes in their specific study:

> "With the inclusion of the additional peaking factor uncertainties in the plant tech. specs., it is concluded that operation of the moveable detector system with 25 or more thimbles is acceptable provided that the appropriate uncertainties described above are applied to the incore measured peaking factors."

The OSC and ORC have reviewed this proposed change and based on the above safety evaluation, it is concluded there is reasonable assurance that the public health and safety will not be endangered by operation in the proposed manner.

TABLE #1

HEAT FLUX HOT CHANNEL FACTOR

# of Thimbles used	%	Uncertainty without Tech Spec revision	With Tech Spec revision
50	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