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 50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251  
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 RECIP.NAME RECIPIENT AFFILIATION  
 EISENHUT,D.G. Division of Licensing

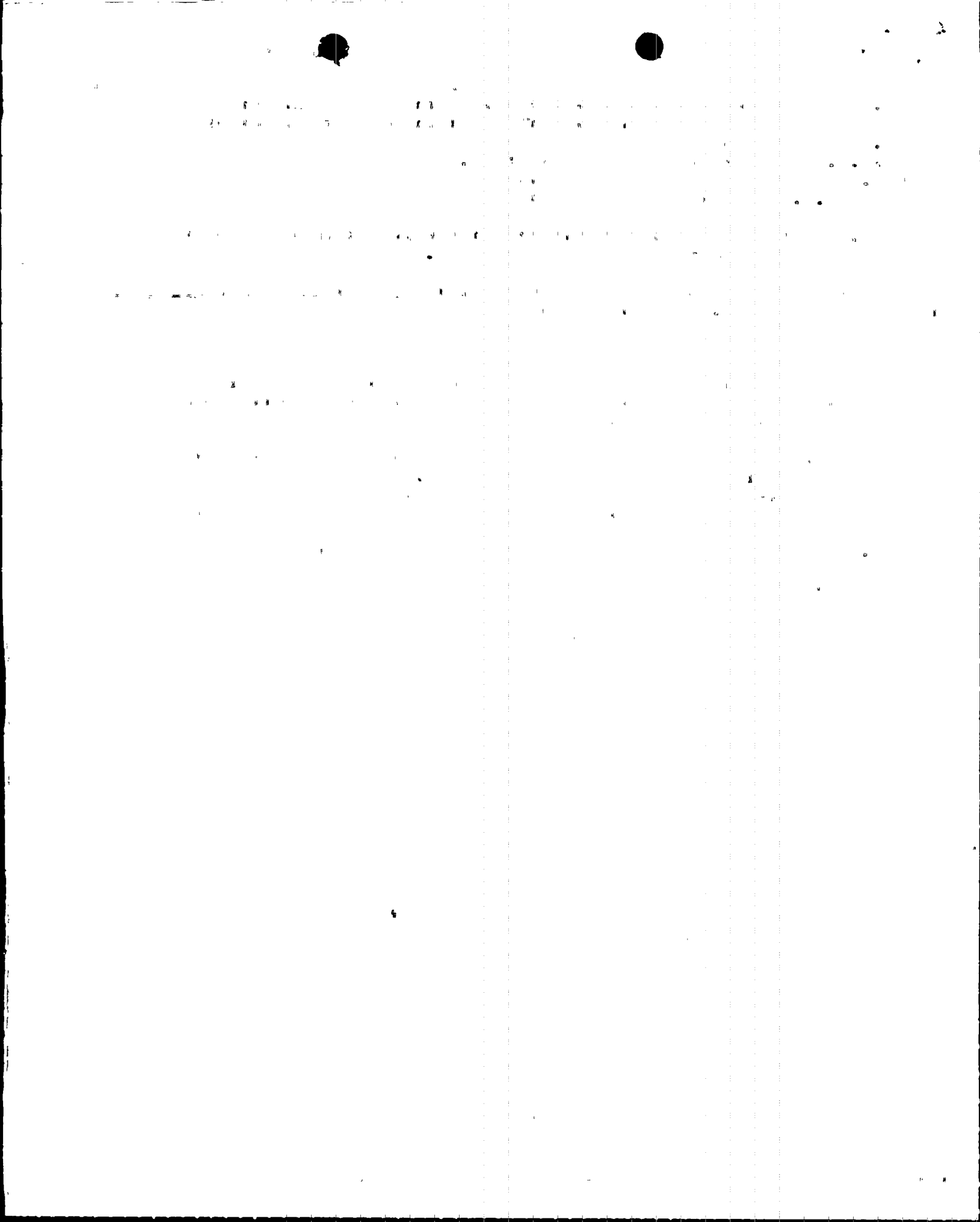
SUBJECT: Significant hazards evaluation for FH/FQ proposed amend to  
 Licenses DPR-31 & DPR-41 dtd 830819.

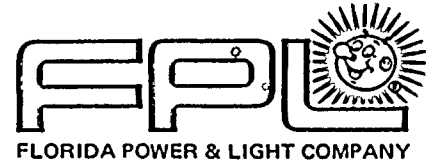
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September 9, 1983  
L-83-477

Office of Nuclear Reactor Regulation  
Attention: Mr. Darrell G. Eisenhut, Director  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Mr. Eisenhut:

Re: Turkey Point Units 3 & 4  
Docket Nos. 50-250 & 50-251  
Proposed License Amendment  
F<sub>Δ</sub>H/F<sub>Q</sub>

Attached is the Significant Hazards Evaluation for the F<sub>Δ</sub>H/F<sub>Q</sub> Proposed License Amendment dated August 19, 1983 (L-83-455).

Also attached is a list of corrections and corrected pages to Attachment A and B of the above referenced letter. Please replace the corrected pages in that submittal.

Very truly yours,

Robert E. Uhrig  
Vice President  
Advanced Systems & Technology

REU/SAV/cab

Attachment

cc: J. P. O'Reilly, Region II  
Harold F. Reis, Esquire  
Ulray Clark, Administrator  
Radiation Health Services  
Tallahassee, Florida 32301

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## Significant Hazards Evaluation

$$F_{\Delta H} / F_Q$$

### Technical Specification Changes

#### Turkey Point Units 3 & 4

Three primary changes are proposed:

1. The hot channel factor  $F_{\Delta H}$  limit is increased from 1.55 to 1.62.
2. The total peaking factor  $F_Q$  limit is increased from 2.30 to 2.32.
3. The Overpower  $\Delta T$  setpoints and thermal-hydraulic limit curves are made more conservative.

#### 1. $F_{\Delta H}$ Limit Increase

10 CFR 50.92 (c)(1): The increase in  $F_{\Delta H}$  limit from 1.55 to 1.62 does not significantly increase the probability or consequences of accidents previously analyzed for the following reasons:

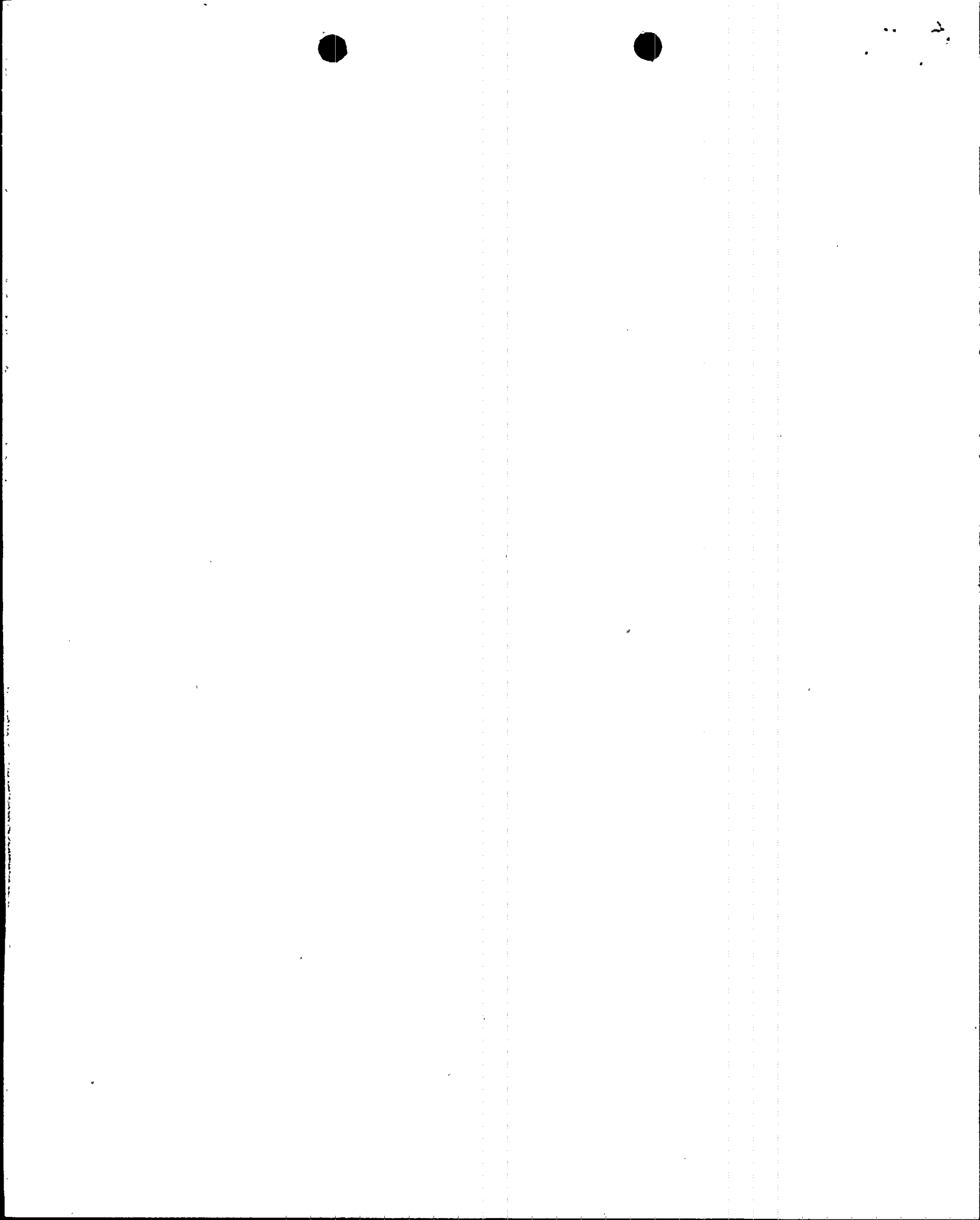
- a) The increase in the hot channel  $F_{\Delta H}$  limit entails no physical changes in plant equipment or operating procedure and therefore will not increase the probability of design basis accidents analyzed in the FSAR.
- b) The concern with higher  $F_{\Delta H}$  limit is the possible occurrence of fuel failure. The safety analysis shows that the proposed increase in the  $F_{\Delta H}$  limit does not lead to departure from nucleate boiling (DNB) in the core and that, therefore, there would not be significant fuel failure. The consequences of previously analyzed accidents are, therefore, not significantly increased.

10 CFR 50.92 (c)(2): The increase in  $F_{\Delta H}$  limit from 1.55 to 1.62 does not create the possibility of a new or different kind of accident from any accident previously evaluated for the following reasons:

The change involves no plant equipment or operating procedure changes; therefore there is no possibility of a new accident not previously analyzed.

10 CFR 50.92 (c)(3): The increase in  $F_{\Delta H}$  limit from 1.55 to 1.62 does not cause significant reduction in margin of safety explained as follows:

The safety evaluations show the fuel to be within the bounds of the same fuel failure criteria as before. Therefore, the proposed change does not cause a significant reduction in margin of safety.



This proposed amendment compares closely to example (vi) as listed in the "Examples of Amendments that are not considered likely to involve Significant Hazards Considerations," 48FR14870 (4/16/83) as shown below.

Identification of additional DNBR margin to accommodate the reduction in margin resulting from the increased  $F_{\Delta H}$  limit meets the FSAR design basis therefore it is:

- (vi) A change which either may result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan: for example, a change resulting from the application of a small refinement of a previously used calculational model or design method.

## 2. F<sub>Q</sub> Limit Increase

10 CFR 50.92 (c)(1): The increase in  $F_Q$  limit from 2.30 to 2.32 does not significantly increase the probability or consequences of accidents previously analyzed for the following reasons:

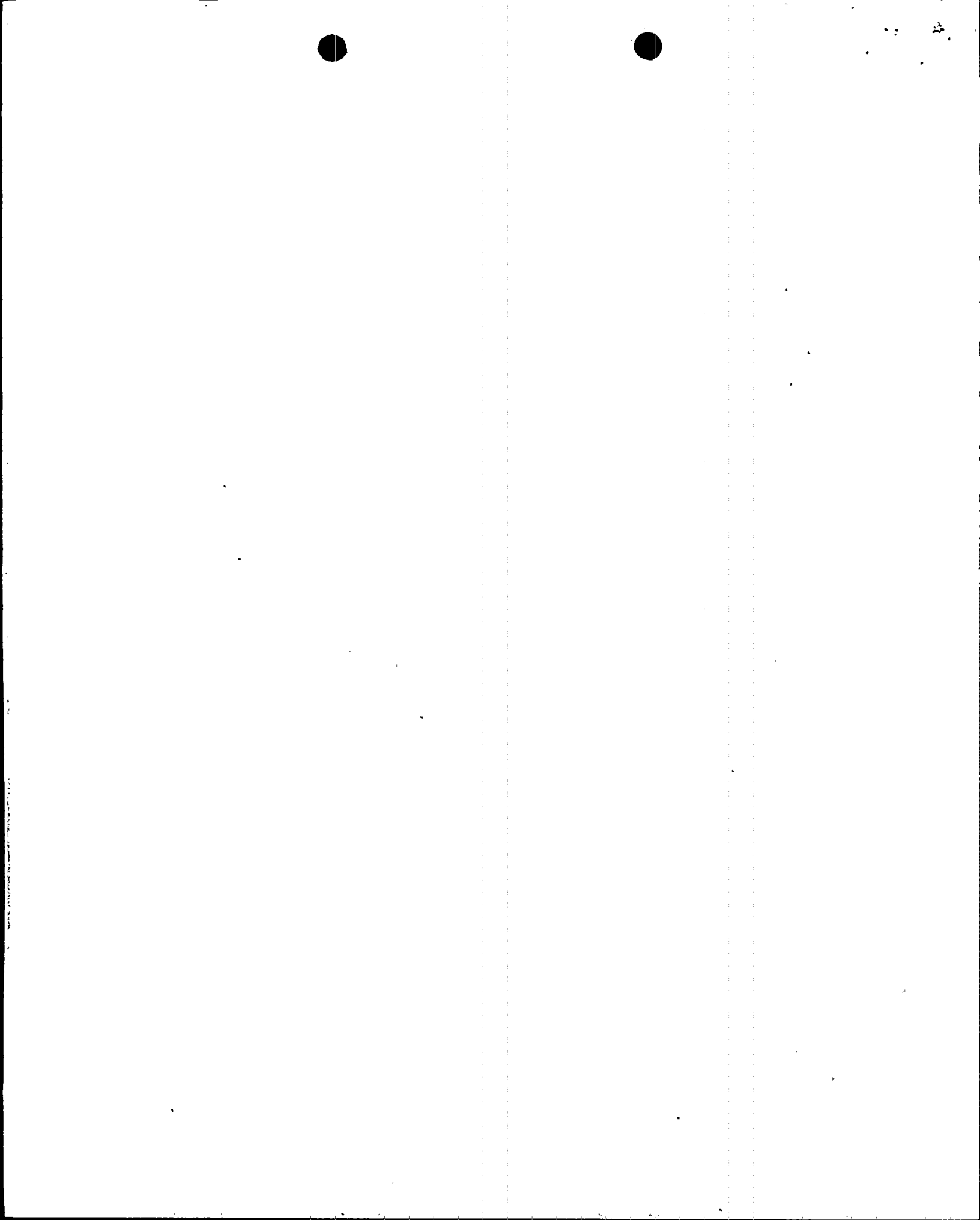
- a) The limiting accidents for total peaking factor  $F_Q$  are the small and large break loss of coolant accidents (LOCA). The increase in the  $F_Q$  limit involves no changes in plant equipment or operating procedure and therefore will not affect the probability of a LOCA; therefore the probability of design basis accidents analyzed in the FSAR is not increased.
- b) The consequences of a LOCA would be fuel failure and associated fission gas releases. Analyses of small and large break loss of coolant events for 2.32  $F_Q$  show peak clad temperatures and other core parameters indicative of fuel failure well below the acceptable limits of 10 CFR 50.46. Therefore, it is concluded that the proposed change will not significantly increase consequences of the previously analyzed accidents.

10 CFR 50.91 (c)(2): The increase in  $F_Q$  limit from 2.30 to 2.32 does not create the possibility of a new or different kind of accident from any accident previously evaluated because it does not involve equipment or procedure changes that could cause a new accident.

10 CFR 50.91 (c)(3): The increase in  $F_Q$  limit from 2.30 to 2.32 does not cause significant reduction in margin of safety.

The acceptance criteria of 10 CFR 50.46 include adequate safety margins. The LOCA analyses for 2.32  $F_Q$  predict results well below the acceptance limits. It is therefore concluded that there is no significant reduction in margin of safety.

This proposed amendment compares closely to example (vi) as listed in the "Examples of Amendments that are not considered likely to involve Significant Hazards Considerations", 48FR14870 (4/16/83) as shown below.





The proposed change to increase  $F_Q$  is shown in the ECCS analysis to remain in compliance with 10 CFR 50.46 therefore it is:

- (vi) A change which either may result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan; for example, a change resulting from the application of a small refinement of a previously used calculational model or design method.

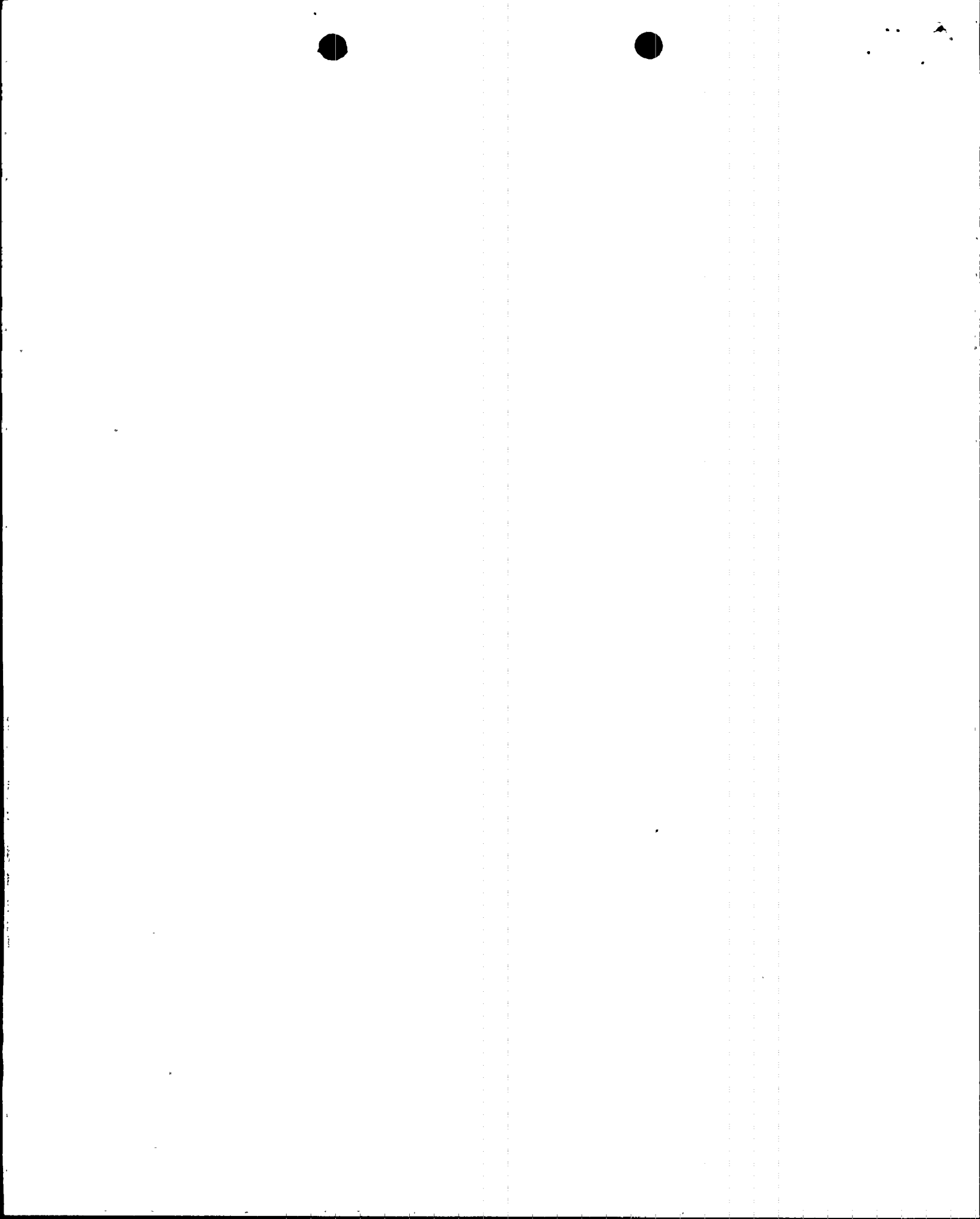
3. Change in Overpower  $\Delta T$  Setpoints and Thermal-Hydraulic Limit Curves

The change in the Overpower  $\Delta T$  setpoints and thermal-hydraulic limit curves is in the conservative direction. Therefore 10 CFR 50.92 (c)(1), (2) and (3) are negative.

This proposed amendment compares closely to example (ii) as listed in the "Examples of Amendments that are not considered likely to involve Significant Hazards Considerations," 48FR14870 (4/16/83) as shown below.

The Overpower  $\Delta T$  setpoints and thermal-hydraulic limit curves changes are in the conservative direction therefore they are:

- (ii) A change that constitutes an additional limitation, or control not presently included in the technical specifications: for example, a more stringent surveillance requirement.



List of Corrections of L-87-455

Attachment A

Instructions

List of Figures  
Page 2.3-3  
Figure 3.2-3  
Page B2.1-2

Replace page  
Replace page  
Replace page  
Replace page

Attachment B

Page 10

Section 4.2,  
2nd paragraph,  
delete third sentence  
"An evaluation has ..."



2

## LIST OF FIGURES

<u>Figure</u>	<u>Title</u>
2.1-1	Reactor Core Thermal and Hydraulic Safety Limits, Three Loop Operation
2.1-1a	Deleted
2.1-1b	Deleted
2.1-2	Reactor Core Thermal and Hydraulic Safety Limits, Two Loop Operation
3.1-1	DOSE EQUIVALENT I-131 Primary Coolant Specific Activity Limit Versus Percent of RATED POWER with the Primary Coolant Specific Activity 1.0 Ci/gram Dose Equivalent I-131
3.1-1a	Reactor Coolant System Heatup and Cooldown Pressure Limits
3.1-1b	Reactor Coolant System Heatup and Cooldown Pressure Limits
3.1-1c	Reactor Coolant System Heatup and Cooldown Pressure Limits
3.1-1d	Reactor Coolant System Heatup and Cooldown Pressure Limits
3.1-2	Radiation Induced Increase in Transition Temperature for A302-B Steel
3.1-2c	Radiation Induced Increase in Transition Temperature for A302-B Steel
3.1-2d	Radiation Induced Increase in Transition Temperature for A302-B Steel
3.2-1	Control Group Insertion Limits for Unit 4, Three Loop Operation
3.2-1a	Control Group Insertion Limits for Unit 4, Two Loop Operation
3.2-1b	Control Group Insertion Limits for Unit 3, Three Looper Operation
3.2-1c	Control Group Insertion Limits for Unit 3, Two Loop Operation
3.2-2	Required Shutdown Margin
3.2-3	K(Z) vs. Core Height
3.2-3a	Deleted
3.2-4	Maximum Allowable Local KW/FT
4.12-1	Sampling Locations
6.2-1	Offsite Organization Chart
6.2-2	Plant Organization Chart
B3.1-1	Effect of Fluence and Copper Content on Shift on RT <sub>NDT</sub> for Reactor Vessel Steel Exposed to 550 F Temperature
B3.1-2	Fast Neutron Fluence (E > 1 MEV) as a function of Effective Full Power Years
B3.2-1	Target Band on Indicated Flux Difference as a Function of Operating Power Level
B.3.2-2	Permissible Operating Band on Indicated Flux Difference as a Function of Burnup (Typical)

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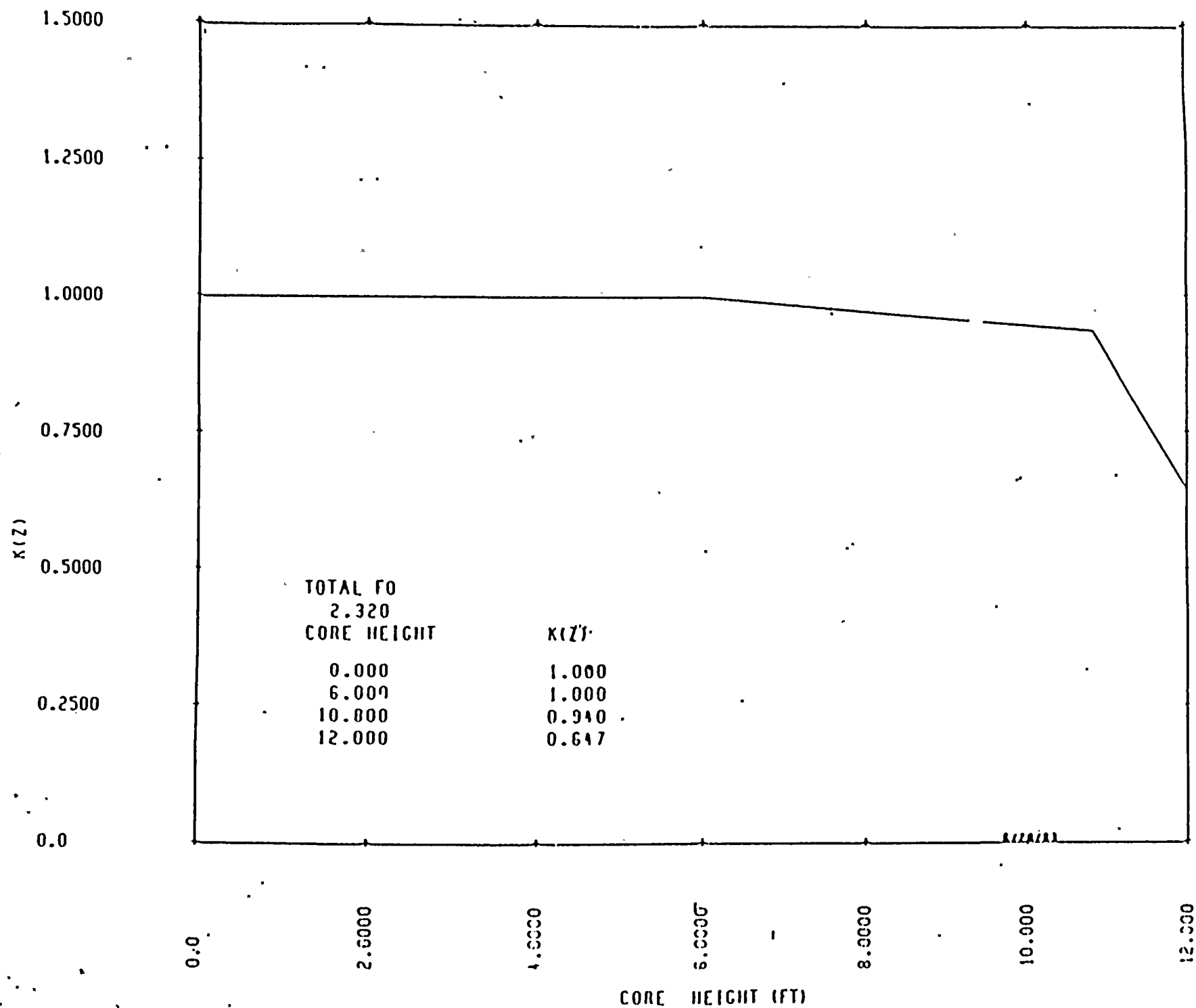
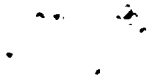


Figure 3.2-3





$$\text{Overpower } \Delta T \leq T_0 \left[ 1.09 - K_1 \frac{dT}{dt} - K_2 (T - T') - f(\Delta q) \right]$$

$\Delta T_0$  = Indicated T at rated power, F

T = Average temperature, F

T' = Indicated average temperature at nominal conditions and rated power, F

K<sub>1</sub> = 0 for decreasing average temperature; 0.2 sec./F for increasing average temperature

K<sub>2</sub> = 0.00068 for T equal to or more than T'; 0 for T less than T'

$\frac{dT}{dt}$  = Rate of change of temperature, F/sec

f(Δq) = As defined above.

#### Pressurizer

Low Pressurizer pressure - equal to or greater than 1835 psig.

High Pressurizer pressure - equal to or less than 2385 psig.

High Pressurizer water level - equal to or less than 92% of full scale.

#### Reactor Coolant Flow

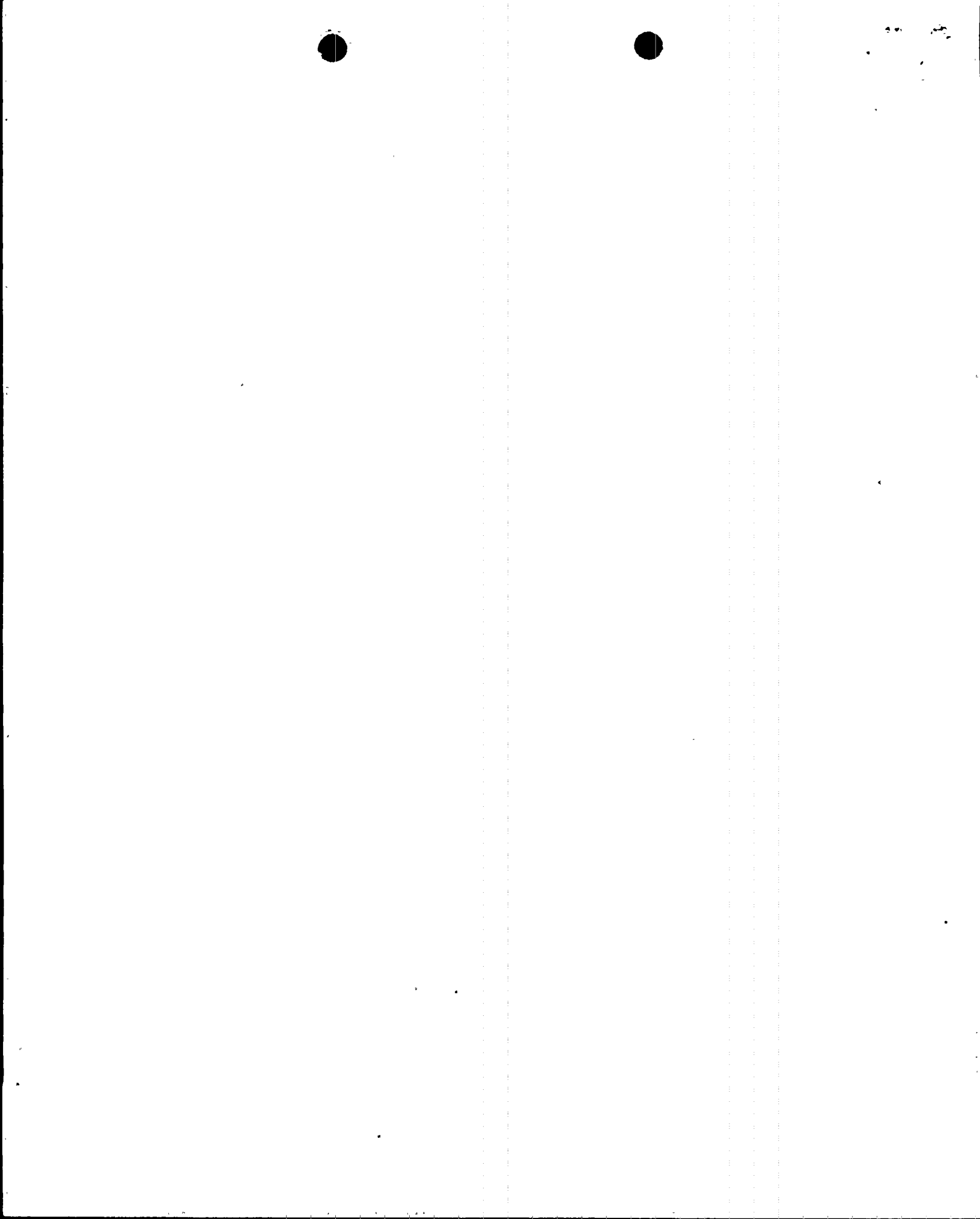
Low reactor coolant flow - equal to or greater than 90% of normal indicated flow.

Low reactor coolant pump motor frequency equal to or greater than 56.1 Hz.

Undervoltage on reactor coolant pump motor bus - equal to or greater than 60% of normal voltage.

#### Steam Generators

Low-low steam generator water level - equal to or greater than 15% of narrow range instrument scale.



The curves of Figure 2.1-1 show the loci of points of THERMAL POWER, Reactor Coolant System pressure and average temperature for which the calculated DNBR is no less than the design DNBR value or the average enthalpy at the vessel exit is less than the enthalpy of saturated liquid.

The curves are conservative for an enthalpy not channel factor,  $F_{\Delta H}^N$ , of 1.62 and a reference cosine with a peak of 1.55 for axial power shape. An allowance is included for an increase in  $F_{\Delta H}^N$  at reduced power based on the expression:

$$F_{\Delta H}^N \leq 1.62 [1 + 0.3 (1-P)]$$

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 limit assuming the axial power imbalance is within the limits of the  $f(\Delta q)$  function of the Overtemperature  $\Delta T$  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.

Fuel rod bowing reduces the values of DNBR ratio (DNBR). The amount of the DNBR reduction is 4.7% for LOPAR fuel with the L-grid DNBR correlation and 5.5% for the OFA fuel with the WRB-1 DNBR correlation. The penalties are calculated pursuant to "Fuel Rod Bow Evaluation," WCAP-8691-P-A, Rev. 1 (proprietary) and WCAP-8692 Rev. 1 (non-proprietary). The restrictions of the Core Thermal Hydraulic Safety Limits assure that an amount of DNBR margin greater than or equal to the above penalties is retained to offset the rod bow DNBR penalty.

