

ATTACHMENT I TO IPN-97-119

**PROPOSED TECHNICAL SPECIFICATION CHANGES  
ASSOCIATED WITH THE F( $\Delta$ I) FUNCTION**

NEW YORK POWER AUTHORITY  
INDIAN POINT 3 NUCLEAR POWER PLANT  
DOCKET NO. 50-286  
DPR-64

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- $\Delta T_o$   $\leq$  Measured full power  $\Delta T$  for the channel being calibrated, °F
- $T_{avg}$  = Average Temperature for the channel being calibrated, °F (input from instrument racks)
- $T'$  = Measured full power  $T_{avg}$  for the channel being calibrated, °F
- $P$  = Pressurizer pressure, psig (input from instrument racks)
- $P'$  = 2235 psig (i.e., nominal pressurizer pressure at rated power)
- $K_1$   $\leq$  1.20
- $K_2$  = 0.0273
- $K_3$  = 0.0013
- $K_1$  is a constant which defines the overtemperature  $\Delta T$  trip margin during steady state operation if the temperature, pressure, and  $f(\Delta I)$  terms are zero.
- $K_2$  is a constant which defines the dependence of the overtemperature  $\Delta T$  setpoint to  $T_{avg}$ .
- $K_3$  is a constant which defines the dependence of the overtemperature  $\Delta T$  setpoint to pressurizer pressure.
- $\Delta I$  =  $q_t - q_b$ , where  $q_t$  and  $q_b$  are the percent power in the top and bottom halves of the core respectively, and  $q_t + q_b$  is total core power in percent of rated power.
- $f(\Delta I)$  = a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests, where  $q_t$  and  $q_b$  are defined above such that:
- (a) for  $q_t - q_b$  between -15.75 percent and +6.9 percent,  $f(\Delta I) = 0$ .
  - (b) for each percent that the magnitude of  $q_t - q_b$  exceeds +6.9 percent, the  $\Delta T$  trip setpoint shall be automatically reduced by an equivalent of 3.333 percent of rated power.
  - (c) for each percent that the magnitude of  $q_t - q_b$  is more negative than -15.75 percent, the  $\Delta T$  trip setpoint shall be automatically reduced by an equivalent of 4.000 percent of rated power.

ATTACHMENT II TO IPN-97-119

**SAFETY EVALUATION OF THE  
PROPOSED TECHNICAL SPECIFICATION CHANGES ASSOCIATED  
WITH THE F( $\Delta$ I) FUNCTION**

NEW YORK POWER AUTHORITY  
INDIAN POINT 3 NUCLEAR POWER PLANT  
DOCKET NO. 50-286  
DPR-64

SAFETY EVALUATION OF THE  
PROPOSED TECHNICAL SPECIFICATION CHANGES ASSOCIATED  
WITH THE F( $\Delta I$ ) FUNCTION

**Section I - Description of Changes**

This application for amendment seeks to revise section 2.3 of Appendix A of the Indian Point 3 Technical Specifications. Specifically, this application revises the f( $\Delta I$ ) function. In References 1 and 2, Indian Point 3 received approval to use VANTAGE + fuel during Cycle 10. As part of the transition to this new fuel type, a new f( $\Delta I$ ) function was approved. Since approval of Amendment 175, Westinghouse has calculated new f( $\Delta I$ ) parameters. This new value has been analyzed by Westinghouse and has no adverse effects on plant accident analyses. However, it does provide additional operating margin and decreases the likelihood of a plant trip on turbine load rejection.

**Section II - Evaluation of Changes**

This application seeks to revise the parameters associated with the f( $\Delta I$ ) function. The f( $\Delta I$ ) function is defined in the Technical Specifications (Reference 3) as a function of the indicated difference between the top and bottom detectors of the power-range nuclear ion chambers. This function is related to overtemperature delta T (OT $\Delta T$ ) in the following manner:

$$\Delta T \leq \Delta T_0 [K_1 - K_2 (T_{avg} - T') + K_3 (P - P') - f(\Delta I)].$$

References 1 and 2 approved the use of VANTAGE + fuel for Indian Point 3 during Cycle 10. As part of this amendment approval, the f( $\Delta I$ ) function was revised such that when the percent power difference between the top and bottom halves of the core was between -6.75 percent and +6.9 percent, f( $\Delta I$ ) is zero. If the percent power difference between the top and bottom halves of the core differed by more than this allowable span, a penalty on the  $\Delta T$  trip setpoint was imposed.

After approval of Amendment 175 (References 1 and 2), Westinghouse reanalyzed the f( $\Delta I$ ) parameters. This reanalysis was based upon a revised dilution rate used to analyze the boron dilution transient. The original dilution rate was based upon the capacity of both primary water makeup pumps (PW pumps). Indian Point 3 procedures require the placement of one PW pump control switch in the pull-out position, thus ensuring that only one PW pump is operating. Therefore, the dilution rate used to analyze the boron dilution transient was revised to correspond with the maximum flow of one PW pump (plus pump uncertainties). This change in the boron dilution accident assumption reduced the magnitude of the calculated kw/ft for this transient, and allowed the f( $\Delta I$ ) penalty to be revised. It was determined that the allowable span for a zero f( $\Delta I$ ) penalty can be expanded to -15.75 percent through +6.9 percent. The penalties imposed for a percent power difference between the top and bottom of the core which are larger than this span remain unchanged. These revised f( $\Delta I$ ) parameters provide for greater operating margin and thereby reduce the possibility of a reactor trip on turbine load rejection. The decrease in the potential for an unnecessary reactor trip is beneficial as it reduces the

potential for stress on the reactor vessel and plant systems caused by unnecessary heatups and cooldowns. As stated in Attachment IV, this  $f(\Delta I)$  revision does not adversely affect the safe operation of the plant, does not represent an unreviewed safety question, and does not pose a significant hazard consideration.

### **Section III - No Significant Hazards Evaluation**

Consistent with the criteria of 10 CFR 50.92, the enclosed application is judged to involve no significant hazards based on the following information:

- (1) Does the proposed license amendment involve a significant increase in the probability or consequences of an accident previously analyzed?

Response:

No. The revision to the negative  $f(\Delta I)$  penalty does not significantly increase the probability or consequences of an accident previously evaluated in the FSAR. This revision does not directly initiate an accident. The consequences of accidents previously evaluated in the FSAR are unaffected by this proposed change because no change to any equipment response or accident mitigation scenario has resulted. There are no additional challenges to fission product barrier integrity.

- (2) Does the proposed license amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response:

No. The revision to the negative  $f(\Delta I)$  penalty does not create the possibility of a new or different kind of accident than any accident already evaluated in the FSAR. No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of this proposed change. The proposed Technical Specification revision does not challenge the performance or integrity of any safety related systems. Therefore, the possibility of a new or different kind of accident is not created.

- (3) Does the proposed amendment involve a significant reduction in a margin of safety?

Response:

No. The proposed change to the Technical Specification does not involve a significant reduction in a margin of safety. The margin of safety associated with the acceptance criteria for any accident is unchanged.

The revision to the negative  $f(\Delta I)$  penalty will have no affect on the availability, operability or performance of the safety related systems and components and does not affect the plant Technical Specification requirements. The revision to the negative  $f(\Delta I)$

penalty does require a change to the Technical Specifications but does not prevent inspections or surveillances required by the Technical Specifications.

In addition, the revision to the  $f(\Delta I)$  parameters is based upon the revised boron dilution rate used to analyze the boron dilution transient. Indian Point 3 procedures require the placement of one PW pump control switch in the pull-out position, thus ensuring that only one PW pump is operating.

The Bases of the Technical Specifications are founded in part on the ability of the regulatory criteria being satisfied assuming the limiting conditions for operation for various systems. Conformance to the regulatory criteria for operation with the revision to the negative  $f(\Delta I)$  penalty is demonstrated and the regulatory limits are not exceeded. Therefore, the margin of safety as defined in the Technical Specifications is not reduced.

#### **Section IV - Impact of Changes**

These changes will not adversely affect the following:

ALARA Program  
Security and Fire Protection Programs  
Emergency Plan  
FSAR or SER Conclusions  
Overall Plant Operations and the Environment

#### **Section V - Conclusions**

The incorporation of these changes: a) will not increase the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report; b) will not increase the possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report; c) will not reduce the margin of safety as defined in the bases for any technical specification; d) does not constitute an unreviewed safety question; and e) involves no significant hazards considerations as defined in 10 CFR 50.92.

#### **Section VI - References**

1. NRC letter, G. F. Wunder to J. Knubel (Amendment 175), "Issuance of Amendment for Indian Point Nuclear Generating Unit No. 3," dated July 15, 1997.
2. NRC letter, G. F. Wunder to J. Knubel, "Correction to Safety Evaluation Related to Amendment 175 - Use of VANTAGE + Fuel - Indian Point Nuclear Generating Unit No. 3 (TAC No. M97482)," dated July 17, 1997.
3. Indian Point 3 Technical Specifications, Section 2.3.

ATTACHMENT III TO IPN-97-119

**MARKUP OF TECHNICAL SPECIFICATION CHANGES  
ASSOCIATED WITH THE F( $\Delta$ ) FUNCTION**

NOTE 1: Deletions are shown in ~~strikeout~~, and additions are shown in **bold**.

NOTE 2: Previous amendment revision bars are not shown.

- $\Delta T_{c_r} \leq$  Measured full power  $\Delta T$  for the channel being calibrated, °F
- $T_{avg} =$  Average Temperature for the channel being calibrated, °F (input from instrument racks)
- $T' =$  Measured full power  $T_{avg}$  for the channel being calibrated, °F
- $P =$  Pressurizer pressure, psig (input from instrument racks)
- $P' =$  2235 psig (i.e., nominal pressurizer pressure at rated power)
- $K_1 \leq$  1.20
- $K_2 =$  0.0273
- $K_3 =$  0.0013
- $K_1$  is a constant which defines the overtemperature  $\Delta T$  trip margin during steady state operation if the temperature, pressure, and  $f(\Delta I)$  terms are zero.
- $K_2$  is a constant which defines the dependence of the overtemperature  $\Delta T$  setpoint to  $T_{avg}$ .
- $K_3$  is a constant which defines the dependence of the overtemperature  $\Delta T$  setpoint to pressurizer pressure.
- $\Delta I =$   $q_t - q_b$ , where  $q_t$  and  $q_b$  are the percent power in the top and bottom halves of the core respectively, and  $q_t + q_b$  is total core power in percent of rated power.
- $f(\Delta I) =$  a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests, where  $q_t$  and  $q_b$  are defined above such that:
- (a) for  $q_t - q_b$  between ~~-6.75~~ **-15.75** percent and +6.9 percent,  $f(\Delta I) = 0$ .
  - (b) for each percent that the magnitude of  $q_t - q_b$  exceeds +6.9 percent, the  $\Delta T$  trip setpoint shall be automatically reduced by an equivalent of 3.333 percent of rated power.
  - (c) for each percent that the magnitude of  $q_t - q_b$  is more negative than ~~-6.75~~ **-15.75** percent, the  $\Delta T$  trip setpoint shall be automatically reduced by an equivalent of 4.000 percent of rated power.