

Industry/TSTF Standard Technical Specification Editorial Change Traveler

WOG-ED-29

Created on 3/28/2001

Proposed by WOG

TSTF-339, Rev. 2, "Relocate TS Parameters to COLR," proposed changes to the $f_1(\Delta)$ equation in Table 3.3.1-1 of NUREG-1431, Rev. 1, based on NRC approval of WCAP-14483, "Generic Methodology for Expanded Core Operating Limits Report."

On March 20, 2001, the chairman of the WOG MERITS Working Group (S. Wideman) received a phone call from the NRC Technical Specification Branch (C. Schulten) concerning the correct presentation of the $f_1(\Delta)$ equation with the relocation of the values to the COLR. This information was shared with Westinghouse (licensing contact and author of WCAP-14483) and review of NUREG-1431, Rev. 1, WCAP-14483, and TSTF-339, Rev. 2 was conducted to determine the appropriateness of the revised equation.

Based on this review and how the $f_1(\Delta)$ values would be specified in the COLR, it was determined that some editorial changes to the presentation of the equation are appropriate. This information was discussed in a telecon on March 27, 2001 (participants: C. Schulten, B. Tjader, S. Wideman, J. Andrachek). Based on this discussion, it was concluded that an editorial change to the $f_1(\Delta)$ equation was appropriate and that it could probably be handled as a WOG editorial change and be incorporated into Rev. 2 of NUREG-1431.

Provided below is a presentation of the $f_1(\Delta)$ equation in the various referenced documents and the suggested revision.

$f_1(\Delta)$ formula presentation based on NUREG-1431, Rev. 1:

$$f_1(\Delta) = \begin{cases} 1.26 \{35 + (q_t - q_b)\} & \text{when } q_t - q_b \leq - [35]\% \text{ RTP} \\ 0\% \text{ of RTP} & \text{when } - [35]\% \text{ RTP} \leq q_t - q_b \leq [7]\% \text{ RTP} \\ -1.05 \{(q_t - q_b) - 7\} & \text{when } q_t - q_b > [7]\% \text{ RTP} \end{cases}$$

Where q_t and q_b are percent RTP in the upper and lower halves of the core, respectively, and $q_t + q_b$ is the total THERMAL POWER in percent RTP.

NOTE: TSTF-310 (not yet approved by NRC) modifies the above by:
replaces 1.26 with $-[0.0126]$
replaces -1.05 with $[0.0105]$

Based on incorporation of TSTF-339, Rev. 2 and editorial changes, TSTF-310 will need to be revised to delete the above proposed changes - this will be done at a later date.

$f_1(\Delta)$ formula presentation based on TSTF-339, Rev. 2:

$$f_1(\Delta) = \begin{cases} [*] \{[*]\% + (q_t - q_b)\} & \text{when } q_t - q_b \leq - [*]\% \text{ RTP} \\ 0\% \text{ of RTP} & \text{when } - [*]\% \text{ RTP} \leq q_t - q_b \leq [*]\% \text{ RTP} \\ -[*] \{(q_t - q_b) - [*]\} & \text{when } q_t - q_b > [*]\% \text{ RTP} \end{cases}$$

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Revised Formula:

$$f_1(\Delta) = \begin{array}{ll} [*] \{[*]\% - (q_t - q_b)\} & \text{when } q_t - q_b < [*]\% \text{ RTP} \\ 0\% \text{ of RTP} & \text{when } [*]\% \text{ RTP} \leq q_t - q_b \leq [*]\% \text{ RTP} \\ [*] \{(q_t - q_b) - [*]\} & \text{when } q_t - q_b > [*]\% \text{ RTP} \end{array}$$

Where q_t and q_b are percent RTP in the upper and lower halves of the core, respectively, and $q_t + q_b$ is the total THERMAL POWER in percent RTP.

The values denoted with [*] are specified in the COLR.

Affected Pages

3.3-21

Affected NUREGs

NUREG-1431

Owner's Group Review

Owner's Group Action: Approved on 3/20/2001

Date Sent to NRC: 3/28/2001

NRC Review

NRC Action: No Action Taken

NRC Comments: None

3/28/2001

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Table 3.3.1-1 (page 7 of 8)
Reactor Trip System Instrumentation

Note 1: Overtemperature ΔT

The Overtemperature ΔT Function Allowable Value shall not exceed the following Trip Setpoint by more than [3.8]% of ΔT span.

$$\Delta T \frac{(1+\tau_1 s)}{(1+\tau_2 s)} \left(\frac{1}{1+\tau_3 s} \right) \leq \Delta T_0 \left\{ K_1 - K_2 \frac{(1+\tau_4 s)}{(1+\tau_5 s)} \left[T \frac{1}{(1+\tau_6 s)} - T' \right] + K_3 (P - P') - f_1(\Delta I) \right\}$$

Where: ΔT is measured RCS ΔT , °F.
 ΔT_0 is the indicated ΔT at RTP, °F.
 s is the Laplace transform operator, sec^{-1} .
 T is the measured RCS average temperature, °F.
 T' is the nominal T_{avg} at RTP, $\leq [588]^\circ\text{F}$.

P is the measured pressurizer pressure, psig
 P' is the nominal RCS operating pressure, $\leq [2235]$ psig

$K_1 \leq [1.09]$ $K_2 \geq [0.0138]/^\circ\text{F}$ $K_3 = [0.000671]/\text{psig}$
 $\tau_1 \geq [8]$ sec $\tau_2 \leq [3]$ sec $\tau_3 \leq [2]$ sec
 $\tau_4 \geq [33]$ sec $\tau_5 \leq [4]$ sec $\tau_6 \leq [2]$ sec

$$f_1(\Delta I) = \begin{cases} 1.26\{35 + (q_t - q_b)\} & \text{when } q_t - q_b \leq -[35]\% \text{ RTP} \\ 0\% \text{ of RTP} & \text{when } -[35]\% \text{ RTP} < q_t - q_b \leq [7]\% \text{ RTP} \\ -1.05\{(q_t - q_b) - 7\} & \text{when } q_t - q_b > [7]\% \text{ RTP} \end{cases}$$

Where q_t and q_b are percent RTP in the upper and lower halves of the core, respectively, and $q_t + q_b$ is the total THERMAL POWER in percent RTP.

$$f_1(\Delta I) = \begin{cases} [*] \{[*]\% - (q_t - q_b)\} & \text{when } q_t - q_b < [*]\% \text{ RTP} \\ 0\% \text{ of RTP} & \text{when } [*]\% \text{ RTP} \leq q_t - q_b \leq [*]\% \text{ RTP} \\ [*] \{(q_t - q_b) - [*]\} & \text{when } q_t - q_b > [*]\% \text{ RTP} \end{cases}$$

Where q_t and q_b are percent RTP in the upper and lower halves of the core, respectively, and $q_t + q_b$ is the total THERMAL POWER in percent RTP.

The values denoted with [*] are specified in the COLR.