TUELECTRIC

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November 16, 1992

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Group Vice President

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
ADVANCE FSAR SUBMITTAL
DELETION OF INPUTS TO STEAM GENERATOR WATER HAMMER CIRCUIT

Gentlemen:

The attachment to this letter provides an advance CPSES FSAR submittal to facilitate NRC Staff review of the subject area in support of licensing Unit 2. The attachment is organized as follows:

1. A description/justification of each change.

2. A draft copy of the revised FSAR pages (changes are indicated in the margin by the word "DRAFT").

The attached material will be incorporated in CPSES FSAR Amendment 87 which is currently scheduled for December, 1992. If you have any questions regarding this submittal, please contact Mr. Bob Dacko at (214) 812-8228.

Sincerely,

William J. Cahill, Jr.

by: D R Woodlan
D. R. Woodlan
Docket Licensing Manager

BSD
Attachment

c - Mr. J. L. Milhoan, Region IV
Resident Inspectors, CPSES (2)
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D029 1/1

CPSES - FINAL SAFTEY ANALYSIS REPORT (FSAR)

DETAILED DESCRIPTION

Prefix Page (as amended)	Group	Description
10.4-61	3	Corrects the FW temperature below which water hammer may be expected to occur, from 200 to 250 degrees. Correction : The Westinghouse tests described in this paragraph used 250 degrees which is consistent with the FW temperature setpoint described on FSAR page 10.4-67. Change Request Number : SA-92-800. Commitment Register Number : Related SER : 10.4.7 SSER : SER/SSER Impact : No
10.4-61	2	See Sheet No(s) :66 Deletes the SG low pressure and low level as inputs to the feedwater isolation valve water hammer interlock. Revision : The low S/G pressure and low S/G level inputs to the Feedwater Isolation Valve (FIV) interlock, along with low FW flow and low FW temperature inputs, are part of the non-safety water hammer minimization system. This system is designed to prevent bubble collapse water hammer in Westinghouse model D steam generators. The S/G pressure and S/G level inputs are believed to be the cause of two recent spurious FIV closure incidents resulting in reactor trips. These trips were documented in CPSES Licensee Event Reports (LER) 92-014 and 92-019. At TU Electric request, Westinghouse performed an analysis (SECL-92-336) in support of the removal of the suspect inputs to the water hammer circuit. Westinghouse concluded that the automatic feedwater isolation function on low S/G water level may be deleted from the water hammer minimization system concurrent with the deletion of the automatic isolation function on low S/G pressure since: 1. The main feedwater system supplies feedwater to the steam generators only in Mode 1 and it is highly unlikely that the SG pressure could drop as low as 605 psi (low pressure set point) during Mode 1. 2. Analyses of three bounding low level scenerios concluded that the feedwater system is isolated by procedure, or, an automatic reactor trip on low SG level coincident with low RCS temperature causes isolation of the feedwater system, before conditions occur which are conducive to water hammer. 3. The two remaining inputs, feedwater temperature and feedwater flow, are still operative. Change Request Number : SA-92-800. Commitment Register Number : Related SER : 10.4.7 SSER : SER/SSER Impact : No

DRAFT

Tests have shown (Ref 19) that pressure transients, due to steam void collapse, can occur in the steam generator and main feedwater piping if feedwater below 250°F is supplied through the main feedwater nozzle concurrent with low steam generator water level (at or below the level of the main feedwater nozzle in the preheater region) or low steam generator pressure. Although analysis of these test results has demonstrated (Ref 19) that the maximum pressure transients produce stresses below the allowable limits, a feedwater bypass system has been incorporated to minimize the possibility of steam generator preheater and feed water piping pressure transients. The feedwater bypass system consists of a connection between the auxiliary feedwater nozzle and the main feedwater line upstream of the feedwater isolation valve on each steam generator. This bypass line contains a feedwater preheater bypass valve. The feedwater bypass system also include a feedwater isolation bypass valve. 10

Q210.5

To minimize pressure transient potential, it is necessary to prevent the introduction of cold water to the steam generator through the main feedwater nozzle at any time when significant void may be present. Therefore, total feedwater flow is not aligned to the normal feedwater nozzle during a startup until the feedwater line temperature is above a set limit. Conversely, feedwater flow is diverted to the auxiliary feedwater nozzle from the main feedwater nozzle during a shutdown. 87

Q210.5

The feedwater split flow bypass line inside the containment, which connects the main feedwater line and the feedwater bypass line, is designed to minimize the thermal transients in the steam generator nozzles and to preclude the flow induced tube vibration in the pre-heater section of the steam generator (see reference 21) by maintaining a feedwater flow split during feedwater injection through the main feedwater line. The designed feedwater flow split is 90:10 between the main feedwater line and the split flow bypass line, respectively, at 100 percent rated power output. In addition, selected steam generator tubes in the preheater section have been expanded at two support plate locations to minimize vibration 66 41

59 | In order to preclude water hammer in the steam and feedwater systems, the following interlocks and controls are provided. These water hammer interlocks are non-safety grade controls. However, where the non-safety grade water hammer interlocks interface directly with safety class equipment electrical isolation devices preclude any adverse impact on the safety class equipment caused by potential failure of the non-safety equipment.

59 | 1. FEEDWATER ISOLATION VALVE (FIV)

Q210.5

59 | In order to minimize the potential for water hammer, interlocks are provided to prevent the FIVs from being opened (if they are closed) or, to close them if the FIVs are open, and route the feedwater through the auxiliary feedwater nozzle via the

85 | preheater bypass line. All of the listed interlocks must be present and the absence of a feedwater isolation signal to allow the FIVs to open.

DRAFT |

a. Feedwater Flow | 59

Feedwater flow must be above a low-flow set-point, as measured by a flow switch at the feedwater flow venturi meters. FS-2189, -2190, -2191, and -2192 are provided for loops 1, 2, 3 and 4 respectively. The set-point for these flow switches corresponds to approximately 12 to 15 percent of full feedwater flow. | 59 | 78

Once the flow permissives have been cleared allowing the FIV to open, the FIV can remain open irrespective of flow, providing the FW temperature remains high (above the set point as described in item (d) below). Interlocks are provided for this condition. | 79 | 10

b. Feedwater Temperature | 10

The feedwater temperature must be above approximately 250°F (as measured by resistance temperature detectors on the main feedwater lines). In addition, the difference in temperature between the RTDs installed outside containment, downstream of the FIVs and RTDs mounted at a piping low point on the feedwater lines inside containment, near the main feedwater nozzle must be within about 10°F of each other. This arrangement of temperature sensors is used to preclude pocketing of cold water at the piping low point during startups and, also, to avoid the possibility of a single RTD open circuit failure causing a false temperature permissive signal to open the FIVs. | 59 | 81 | 10

Once the temperature permissives have been cleared allowing the FIV to open, the FIV can remain open irrespective of temperature, providing the FW flow remains high (above the low flow set point as described in item (c) above). Interlocks are provided for this condition. | 10