UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION IN SUPPORT OF

CHANGES TO THE INTERIM TECHNICAL SPECIFICATION 3/4.1.7 BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

DOCKET NO. 50-267

1.0 INTRODUCTION

By letter dated April 8, 1987 (P-87056), the licensee requested certain changes to the Interim Technical Specification 3/4.1.7, Reactivity Change with Temperature. Specifically, the licensee requested that value for the maximum reactivity change with temperature be increased from 0.056 delta K to 0.065 delta K. This higher value would be justified in terms of the revised worth of the Reserve Shutdown System (RSS). The RSS worth was found to be at least 0.010 delta K higher than originally calculated. By letter dated July 20, 1987, the staff requested additional information from the licensee concerning certain aspects of the proposed change. The licensee provided this information by letter dated November 12, 1987 (P-87396). In conducting this review the staff also referred to Section 3.5 of the Fort St. Vrain (FSV) FSAR and Section 4.3 of the Standard Review Plan (NUREG-0800).

2.0 EVALUATION

An upper limit is placed on the maximum reactivity change with temperature in order to insure proper reactivity control. FSV has two independent means of reactivity control, the control rods and the RSS. The control rods have a reactivity worth in the equilibrium cycle of 0.210 delta K at refueling temperature (220°F). If the highest worth rod is considered stuck out, then the worth of the control rods is reduced, but is still 0.141 delta K.

By contrast, the worth of the PSS is calculated to 0.130 delta K, under essentially the same conditions, i.e., all control rods are withdrawn. If the highest worth hopper fails to operate, then the worth of the RSS is reduced to 0.110 delta K. Thus, it is seen that the RSS represents the most limiting system. The acceptance criteria for the proposed higher upper limit on the maximum reactivity change with temperature is the continued ability of the RSS to shut down the reactor.

The licensee performed these calculations in the submittal dated November 12, 1987. We have summarized these calculations below.

Reactivity Factors	WORTH (Delta K)
Maximum temperature defect (from proposed interim LCO 3.1.7)	0.065
Full Xenon decay (FSAR Table 3.5-4)	0.032
Pa decay & Sm buildup (2 weeks) (Basis for interim LCO 3.1.8/SR 4.1.8)	0.007
	0.104
RSS Worth	-0.130
Maximum worth RSS hopper inoperable (FSAR 3.5.3.3)	0.020
	-0.110

We note the following factors about this calculation. First, it does not meet the normal shutdown margin requirement of interim LCO 3.1.4 of 0.01 delta K. Second, it does not include the 0.007 delta K uncertainty that must be added to the proposed maximum. However, the net worth of these factors is offset by the conservative assumption that the maximum worth RSS hopper is inoperable, which is a positive reactivity of 0.020 delta K.

The RSS would potentially be activated should there be a significant failure of the control rod system. The licensee's calculations show that the RSS has the ability to shutdown the reactor and maintain it shutdown for two weeks. Although, the assumptions are not as conservative as could be potentially postulated, the staff believes they are adequately conservative to assure the function of the RSS. The actual reactivity change with temperature is much closer to its calculated equilibrium value of 0.044 delta K. Under these conditions, the RSS provides an adequate shutdown margin, even if two RSS hoppers are assumed inoperable.

Hence, the staff concludes that the proposed change to the maximum reactivity change with temperature is acceptable.

However, the staff specifically notes that this change only applies to the Technical Specification limit and does not constitute approval for any deliberate changes to the reactor design or operation. The licensee shall make no changes to the reactor design or operation that would cause a deliberate increase in the reactivity change with temperature towards this Technical Specification limit without NRC review or approval. Furthermore, the licensee should report to the NRC any measured changes in this parameter that would indicate this Technical Specification limit is being approached.

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Dated: