Omaha Public Power District

1623 HARNEY ■ OMAHA, NEBRASKA 68102 ■ TELEPHONE 536-4000 AREA CODE 402

August 3, 1981

Mr. Robert A. Clark, Chief
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Licensing
Operating Reactors Branch No. 3
Washington, D.C. 20555

Reference: Docket No. 50-285

Dear Mr. Clark:

This letter is in regard to our application for a Facility License change dated March 27, 1981, to increase the required shutdown margin during cold shutdown conditions. Enclosed please find a revised discussion which demonstrates that the proposed change does not involve significant safety hazards.

Sincerely,

W. C. Jones
Division Manager
Production Operations

WCJ/KJM/TLP/RWS:jmm

Enclosure

cc: LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Avenue, N.W.
Washington, D.C. 20036

A001
S1/1

Attachment

REVISED DISCUSSION

The previous cold shutdown margin of 2.0% Δk/k (which allowed a dilution time to criticality of 31.4 minutes) was calculated assuming the reactor coolant system (RCS) remained full (5506 ft^3). The boron dilution incident analysis corresponding to these conditions was performed in conjunction with the Cycle 6 core reload. Discussion of this analysis can be found on pages C-6 through C-10 in the October 1979 "Cycle 6 Core Reload Application", which was sent to Mr. Harold Denton of the NRC on October 31, 1979.

A change in the cold shutdown margin from 2.0% Δk/k to 3.0% Δk/k is necessary to remain above the recommended 15 minute dilution time to criticality when the RCS is not completely full. This can occur under certain conditions such as replacing a reactor coolant pump seal which could allow the RCS to be drained to a level which is less than one-half the normal volume.

To incorporate a conservative analysis, the boron dilution incident was reanalyzed using the minimum coolant volume (2036 ft^3) allowed, shutdown banks A and B withdrawn, and all regulating rods inserted except for the most reactive regulating rod which was left stuck out. Assuming the above rod configuration and coolant volume (which will yield the minimum dilution time to criticality), a 3.0% Δk/k yields a time to criticality of 16.53 minutes. Normally, all regulating rods and shutdown groups would be inserted in the cold shutdown mode, resulting in a time to criticality greater than 16.53 minutes.

Operator recognition of boron dilution is achieved through the audio response of the wide range logarithmic channels measuring neutron flux. Four independent logarithmic channels continuously monitor the neutron flux during the cold shutdown mode, with a single channel selection providing the audible counts/sec. in the control room. Upon the start of boron dilution, the logarithmic flux monitor would announce an increasing count rate to the operator who would then take appropriate action to stop dilution.

Therefore, it is the District's belief that raising the cold shutdown margin to 3.0% Δk/k (which allows 16.53 minutes for corrective action) provides adequate protection to avoid criticality even when the RCS is partially full. Prompt operator recognition of boron dilution is provided by the wide range logarithmic channels which allow an operator the time to perform corrective actions to prevent reactor criticality.

The Fort Calhoun Station will operate in a conservative mode ($\geq$ 3.0% Δk/k) in cold shutdown, pending approval of this amendment application.