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VICE PRESIDENT

July 11, 1985
Fort St. Vrain
Unit No. 1
P-85238

Regional Administrator
Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

RECEIVED
JUL 16 1985

Attn: Mr. Eric H. Johnson

Docket No. 50-267

SUBJECT: Reactor Power Level Limitations-Resolution of EQ Technical Issues

REFERENCE: Qualification of Fort St. Vrain Safe Shutdown Equipment for Steam Environment Resulting from Pipe Ruptures Gulf GA-A12045, May 30, 1972

Dear Mr. Johnson:

As a followup to the PSC/NRC meeting of July 2, 1985 on the Fort St. Vrain (FSV) Environmental Qualification Program, PSC has the understanding that the technical issues of "Aging" and "Operability Times" require resolution prior to the facility being allowed to go to full power operation. As an initial limitation, PSC is proposing a hold on reactor power such that boilout in the economizer - evaporator - superheater (EES) section of the steam generators (i.e. reactor power level approximately 15%) is not achieved.

At 15% power, feedwater and main steam pressures are between 2400 psig and 2500 psig and main and hot reheat steam temperatures are between 600 degrees F and 650 degrees F. At 2400 psig, saturated conditions occur when the temperature reaches 663 degrees F. The main steam piping and the hot reheat steam piping both consist of 2 1/4 Cr. - 1 Mo. A335, Gr P22 material. In accordance with Table A-2 Appendix A of ANSI B31.1 - 1983 the allowable stress for this material at temperatures between 600 degrees F and 700 degrees F is 15 ksi. At 100% power main steam and hot reheat steam temperatures are at 1000 degrees F. The allowable stress for this material at 1000 degrees F is 7.8 ksi. Therefore, by limiting operation of the plant to steam temperatures below 650 degrees F, the safety margin of the piping is increased by nearly a factor of 2 from the standpoint of allowable stresses. This increase in the allowable stress levels

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significantly reduces the probability of the occurrence of a steam leak.

The cold reheat steam piping consists of carbon steel A106, Gr B piping. At 100% power, cold reheat steam conditions are 737 degrees F and 857 psig. At 15% power, cold reheat steam conditions will not exceed 375 degrees F and 180 psig. However at lower power levels (up to about 8%) the cold reheat steam temperature and pressure can be as high as 600 degrees F and 150 psig due to the use of the auxiliary boiler to supply steam to the cold reheat steam header. Since the cold reheat steam piping will therefore experience the 600 degrees F temperature during startup to the 15% power level, although it never experiences this temperature at the 15% power level, the 600 degrees F temperature was used to calculate the material stresses. The allowable stresses for this material specified in ANSI B31.1 are 15 ksi at 600 degrees F and 13 ksi at 737 degrees F, which results in a factor of 1.15 increase in the allowable stress margin between 15% and 100% power.

The reduced power level results in lower peak equipment temperatures due to the lower energy release rate. Attachment 1 shows a comparison of the peak atmospheric temperatures, for the 100% and 15% power conditions at varying distances from the steam line rupture for hot reheat piping in the turbine building and the cold reheat line in the reactor building. The 100% condition peak temperatures were obtained from the reference above. The 15% condition peak temperatures were calculated using the CONTEMPT-G computer code which is the same code that was utilized to generate the 100% results in the reference. The 375 degrees F and 180 psig steam conditions were used for the cold reheat steam pipe rupture case at 15% since these result in the highest environmental temperatures in the reactor building for all power levels up to 15%.

A 15% power level will allow the initiation of moisture dry out in the PCRV. Realistically, complete core dry out can not be achieved until higher power levels are allowed. An explicit time frame schedule to achieve this level of operation can not be predicted since the rate of core dry out is a function of moisture content and core temperatures (i.e. reactor power levels). Historically, several weeks are required to dry out the core. PSC is continuing to evaluate the Environmental Qualification profiles and plant operating conditions and, if found appropriate, justification will be submitted in a followup letter for allowing higher power levels of operation.

A followup letter will also be submitted with the predicted completion schedules for the "Aging" and "Operability Time" programs.

Should you have any questions concerning this matter, please contact Mr. M. H. Holmes at (303) 571-8409.

Very truly yours,

O. R. Lee, Vice President
Electric Production

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ATTACHMENT 1

TABLE 1: Peak Temperature As A Function Of Distance From The Hot Reheat Steam Line Rupture (Turbine Building)

POWER LEVEL / DISTANCE	PEAK TEMPERATURE 100%	15%
20 ft	470 degrees F	241 degrees F
30 ft	425 degrees F	234 degrees F
50 ft	385 degrees F	221 degrees F
70 ft	375 degrees F	194 degrees F

TABLE 2: Peak Temperature As A Function Of Distance From The Cold Reheat Steam Line Rupture (Reactor Building)

POWER LEVEL / DISTANCE	PEAK TEMPERATURE 100%	15%
20 ft	400 degrees F	236 degrees F
30 ft	320 degrees F	226 degrees F
Around PCRV	275 degrees F	191 degrees F