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October 8, 1986
Fort St. Vrain
Unit No. 1
P-86406

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. H. N. Berkow, Director
Standardization and Special
Projects Directorate

Docket No. 50-267

SUBJECT: Use of Non-Safety Grade
Equipment for DBA-2
Cooling

REFERENCE: 1) NRC letter, Hunter to Lee,
dated 8/22/85 (G-85354)

2) Safety Evaluation by the
Division of Reactor
Licensing, dated June 21,
1968

3) Safety Evaluation by the
Division of Reactor
Licensing, dated January
20, 1972

4) Safety Evaluation by the
Office of Nuclear Reactor
Regulation, Supporting
Amendment No. 9, Attached
to NRC letter, Clarke to
Walker, dated 12/29/75
(G-76001)

Dear Mr. Berkow:

This letter provides PSC's response to NRC Technical Specification Upgrade Program (TSUP) questions regarding the use of non-safety grade equipment for decay heat removal and helium circulator drive at Fort St. Vrain (FSV). The NRC concerns are based on FSV's use of the non-safety grade boiler feed pumps to assure forced circulation in the highly unlikely event of a rapid depressurization of the Prestressed Concrete Reactor Vessel (PCRV). This event is Design Basis Accident No. 2 (DBA-2).

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The specific questions which were asked by the NRC in Reference 1 are as follows:

- Action Item 29: "PSC will provide documentation verifying that the NRC has approved FSV for operation with a non-safety grade means for decay heat removal (feedwater drive of the helium circulators) when the plant is depressurized."
- Action Item 38: "PSC is to provide documentation that NRC approved the use of non-safety grade equipment (boiler feed pumps) to supply water to drive the circulators during a depressurized cooldown accident."

The most limiting condition addressed by these questions is the depressurized cooldown accident, DBA-2. The cooldown following DBA-2 uses feedwater to drive the helium circulator water turbines. Analyses demonstrate that fuel temperatures stay well below 2900 degrees F, a temperature well below that at which fuel damage would occur.

The discussion below summarizes documentation supporting the use of non-safety grade boiler feed pumps for DBA-2:

1. In order to fully describe why the use of non-safety grade boiler feed pumps was accepted by the NRC, it is important to discuss the historical development of DBA-2. In the initial design of Fort St. Vrain, a large failure in the primary coolant system envelope resulting in a rapid depressurization of the primary coolant system was not considered to be a credible accident by either PSC or General Atomic. A rapid depressurization would require two or more independent passive failures to occur coincidentally and, therefore, this accident was not analyzed in the PSAR. Recent information in FSAR Section 14.11.1.4 indicates the likelihood of DBA-2 is approximately $1 \text{ E-}09$ per year, with an uncertainty factor much less than 90.

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2. During the review of the PSAR for the construction permit application, the AEC postulated a sudden total failure of both the inner and outer closures of the bottom access head PCRVR penetration. This represented a specific and conservative upper limit to the spectrum of hypothetical failures that might conceivably occur in the primary coolant system envelope. The AEC reviewed PSC's analysis and concluded that the maximum pressure differentials produced by a rapid depressurization would not cause failure of any PCRVR internals and that one or more of the helium circulators would remain operable (Section 4.7 of the Safety Evaluation, Reference 2, in support of the FSV Construction Permit). The AEC also indicated that the helium circulators driven by various sources including feedwater, provide sufficient primary coolant flow, even when depressurized (Section 3.3 of Reference 2). The AEC did not associate depressurization accidents with earthquakes or tornados, since the primary coolant system pressure boundary is designed to preclude rupture due to either the Design Basis Earthquake or the Maximum Tornado.
3. In the Safety Evaluation (Reference 3) for the FSV Operating License, the rapid depressurization of the PCRVR was reviewed as DBA-2. The AEC concluded that PSC's analysis of the ability to continue primary coolant circulation was based on conservative assumptions and the consequences were found to be acceptable (Section 4.4 of Reference 3). This evaluation was made with the understanding that the helium circulator water turbines are normally driven by feedwater (Section 3.3.1 of Reference 3). In addition, the AEC stated that PSC's classification of structures, systems, and equipment, including non-safety grade boiler feed pumps, is appropriate and acceptable (Section 3.4.2 of Reference 3, based on the FSAR and on PSC's response to Question 5.9). The Operating License included a Technical Specification requiring boiler feed pump operability for shutdown cooling purposes.
4. In Amendment 9 to the Facility Operating License, the issue of depressurized cooldown using the helium circulator water turbines was again reviewed by the NRC. This change to the FSV Technical Specification lowered the operating speeds of the helium circulators on water turbine drive, and the supporting analysis considered the effects on DBA-2 accident conditions and consequences. In its Safety Evaluation (Reference 4), the NRC took into consideration the very low probability that the postulated accident (DBA-2) will occur, as well as the relatively long time period available that can be used to start additional circulators to mitigate or preclude the consequences of this transient.

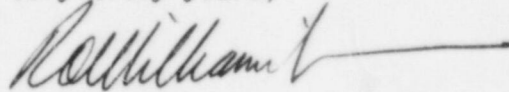
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5. In addition to the above evidence that the NRC approved the use of non-safety grade boiler feed pumps at FSV, there are numerous FSAR discussions that make it clear that the boiler feed pumps are not safety related and that they are relied upon to assure forced circulation in the event of DBA-2, as follows:
 - a. FSAR Tables 1.4-1 and 1.4-2 list Class I and Safe Shutdown equipment, and they do not include the boiler feed pumps.
 - b. Section 4.2.2.1 indicates that feedwater is the normal supply for the helium circulators on water drive.
 - c. Tables 4.2-2 and 4.2-3 identify feedwater as the supply for circulator drives with the PCRV depressurized.
 - d. Section 14.11.2 and Figure 14.11-11 discuss the DBA-2 cooldown accident. 8000 rpm is the analyzed circulator speed, which is only possible using feedwater (per Section 14.4.2).

The above references indicate that the use of non-safety grade boiler feed pumps at FSV to provide adequate primary coolant circulation in the event of DBA-2 has been approved. Further, the documentation demonstrates that the NRC took into account that the rapid depressurization accident was not originally a design basis accident, and that DBA-2 requires multiple coincident failures and is, therefore, highly unlikely to occur. For these same reasons, PSC continues to believe that operation with non-safety grade boiler feed pumps is acceptable. Boiler feed pump operability is currently assured through the Technical Specifications and it will continue to be assured in the TSUP. The additional expense associated with upgrading these pumps to safety grade status would not result in a commensurate increase in the protection of the health and safety of the public.

PSC considers this information responsive to NRC concerns and requests that Action Items 29 and 38 of Reference 1 be closed. If you have any questions regarding this issue, please contact Mr. M. H. Holmes at (303) 480-6960.

Very truly yours,



R. O. Williams, Jr.
Vice President
Nuclear Operations

ROW/SWC/paw