

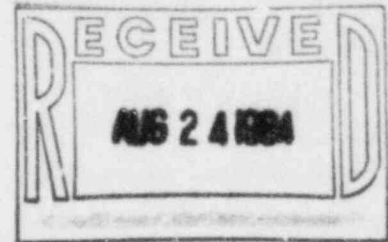


Public Service Company of Colorado

August 20, 1984  
Fort St. Vrain  
Unit No. 1  
P-84287

50-267

Regional Administrator, Region IV  
Attn: Mr. E. H. Johnson, Chief  
Reactor Project Branch 1, Region IV  
U. S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, Texas 76011



SUBJECT: Fort St. Vrain PCRV Tendons

- REFERENCES: 1.) Letter, Denise to Lee,  
7/20/84, G-84252
- 2.) Letter, Warembourg to  
Collins, 4/25/84, P-84119

Dear Mr. Johnson:

This letter is in response to your July 20, 1984 letter (G-84252), and addresses your concerns in the following areas:

- 1.) "a description of possible design modifications to the PCRV tendons and details of the evaluations of these modifications"
- 2.) "a schedule of the completion of reports detailing the results of the metallurgical examinations"

The remaining item from your letter, "Tendon Surveillance Technical Specification Change", has been addressed in PSC's August 9, 1984 letter (P-84266).

In order to evaluate possible design modifications for the PCRV tendons, PSC is performing the following actions:

- 1.) The atmosphere of all accessible tendons is being tested to identify any which have moisture levels consistent with a corrosive environment.
- 2.) Methods for removing the moisture from the tendon atmosphere have been tested and are being evaluated for implementation in order to return these tendons to a non-corrosive environment.
- 3.) Design modifications are being considered for the tendon system which will ensure that a non-corrosive environment is maintained.

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- 4.) Metallurgical and corrosion evaluations are continuing to provide us with essential information for evaluating any potential design modification.

The following is a more detailed discussion of the four (4) action items listed above:

The results from the corrosion analyses which have been performed indicate that moisture is a common element. Therefore, the moisture content of all accessible tendon tubes is being assessed by gas sampling methods. PSC will complete the sampling for all 448 tendons within thirty (30) to sixty (60) days from the date of this letter. Along with this testing, PSC is reviewing the physical integrity of the sealed tendon assemblies by checking the cover cap check valves and O-rings for those tendons in which moisture has been identified. In addition, we are investigating a possible moisture ingress path at the tendon tube/bearing plate joint. A pressure decay leak test will be performed to further demonstrate tendon assembly integrity.

PSC is pursuing the development of a method for drying tendon atmospheres. We have been successful in reducing the moisture found in tendon tube atmospheres by utilizing either a vacuum method or an inert gas purge method. We will continue this testing in order to qualify the effectiveness and economic merits of both methods. The tendon moisture removal effort will be initiated when the most practical method is identified. PSC will submit a schedule outlining this moisture removal effort within thirty (30) days of the completion of the moisture sampling program described above.

Various design modifications are being evaluated with the objective of maintaining a corrosion free tendon environment. One approach is to use an oxygen scavenging additive in the tendon tube which will maintain a non-corrosive environment. Another would be the physical displacement of any oxidizing environment which could be accomplished by the addition of a bulk petroleum filler or by maintaining an inert gaseous blanket.

With reference to the metallurgical report it is our intent to investigate all possible types of corrosion. Preliminary results indicate that microbiological corrosion may be a primary contributor. However, no samples of the type required for this type of examination were available among those originally collected. In order to provide the required samples, we have recently detented a bottom crosshead tendon, (BI<sup>L</sup>U3) for a detailed corrosion evaluation. Failed wires from this tendon were removed and the samples were distributed to a microbiological expert, a GA Technologies metallurgist and a PSC metallurgist for analysis. As a result, the issuance of that report has been delayed until some conclusive work can be performed.

Aside from the specific action items, a trip is scheduled during the week of August 27 to the United Kingdom to consult with the Central Electric Generating Board. They reported similar corrosion observations at the Dungeness B Plant. It is hoped that this visit will provide valuable information for the completion of the corrosion analysis. At this time it is not possible to predict the results of this visit and therefore the impact on the direction of this program. As a result of this continuing investigation, we are anticipating the completion of the metallurgical and corrosion report in November, 1984. Given this schedule it is our intention to submit an Engineering Report in December, 1984. This report will present our findings for the metallurgical and corrosion analysis and will specify plans and schedules to be taken to modify the tendon system for prevention of further corrosion.

If there are any further questions concerning the PCRV tendons, please contact myself or Mr. M. E. Niehoff at (303) 785-2223, extension 403.

Very truly yours,

*D. W. Warembourg*  
D. W. Warembourg,  
Manager, Nuclear Engineering Division

DWW/MDS/scm