



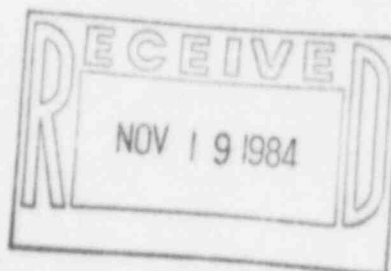
# Public Service Company of Colorado

16805 WCR 19 1/2, Platteville, Colorado 80651

November 8, 1984  
Fort St. Vrain  
Unit #1  
P-84460

Regional Administrator  
Region IV  
Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, TX 76011

ATTN: Mr. E. H. Johnson



Docket No.: 50-267

SUBJECT: Status of Fort St. Vrain  
Control Rod Refurbishment

REFERENCE: PSC Letter Gahm to Johnson  
Dated 09/24/84 (P-84370)

Dear Sir:

This letter is to provide you with the status of Fort St. Vrain control rod drive and orificing assembly (CRDOA) refurbishing efforts.

Further investigation of CRDOA #25 from Region 7 has determined that the cause of the damaged absorber string to not fully retract can be attributed to a cable failure. In order to determine this, it was necessary to disassemble the CRDOA and remove a portion of the remaining cable and the cable seal.

Upon removal of the cable seal a single strand of the cable (7 wires per strand, 19 strands per cable) was found to have failed and become entangled around the cable in the cable seal area. Apparently, as the control rods were being retracted in the mechanism, the failed strand became jammed in the seal, thus increasing the tension on the cable and causing it to fail approximately one foot above the seal. The upper portion of the failed cable then became entangled between the cable drum and gear train housing causing it to sever into five separate sections when the drive system was later activated.

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Starting from the end of the cable, attached to the cable drum, a 38 inch section (including the anchor) was found to be wrapped around the drum. The next section, 116 inches in length, was entangled around the drum and jammed in the cable channel at the bottom of the drum. It was observed that one end of this long section matched to the 38 inch section. The other end of the 116 inch section had a 5 inch section of the outer strands missing. The inner strands were still intact. A 5 inch section, which had fallen while the 200 Assembly was raised, consisted of the outer strands and fit around the inner strands of the 116 inch section. Another 5 inch section, fully intact but slightly distorted, matched the end of the inner strands from the 116 inch section and the outer strands of the other 5 inch section. Finally a 12 inch section, found on the orifice motor plate, matched the end of the 5 inch section. The other end of the 12 inch section matched the end of the remaining cable stuck in the cable seal. Figure 1 shows the five different sections and the manner in which they were pieced back together. Including the remaining cable still attached to the control rod, all cable has been accounted for.

An examination of the intact sister cable on CRDOA #25 revealed another single strand failure. This strand was not frayed, but had two failures separated by approximately one inch along the cable axis. No radially protruding ends were observed at this point.

The discovery of a second strand failure initiated an extensive investigation into the possible mechanisms causing the failures. In addition to the removal of the failed cable, the sister cable of CRDOA #25 was also removed for detailed testing and examination. CRDOA #25 was then reassembled using new cable that was swaged onto the remaining cables attached to the control rods. This enabled the two absorber strings to be fully retracted for removal from the hot service facility and temporarily stored in an equipment storage well. Refurbishment of the CRDOA will be completed at a later date in order to expedite additional cable examinations.

Examinations of other CRDOA's that have been refurbished have revealed one other failed wire on a cable from CRDOA #11.

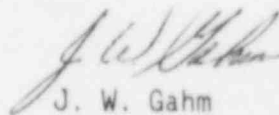
To determine the exact mechanism of these failures the failed cable from CRDOA #25 has been subjected to various tests and examinations. Thus far, examinations have consisted of optical metallography (including microhardness testing), scanning electron microscopic exams and chemical analysis of surface corrosion products. In addition, samples of the failed cable and a section of unused cable have been sent to Los Alamos National Laboratory, as requested by the Nuclear Regulatory Commission, for independent analysis.

The results of these tests and examinations are preliminary. Public Service Company will provide the Nuclear Regulatory Commission with the results and conclusions of this analysis as soon as it is completed.

The reserve shutdown hoppers of CRDOA's #26 (20 weight % boron) and #21 (40 weight % boron) have been functionally tested, and material samples have been collected for physical examination. Preliminary reports indicate that the material is in good condition, but the functional test of CRDOA #21 revealed that only approximately 33 pounds of the 80±8 pounds was recovered in the "catch" canister after blowing the rupture disk. The functional test of CRDOA #26 was successful. Investigations have been initiated to determine the reason for only 33 pounds of reserve shutdown material being expelled during the functional test of CRDOA #21.

As always, Public Service Company will keep the Nuclear Regulatory Commission abreast of the existing conditions. If you have any questions please contact Mr. Frank Novachek, of my staff, at (303) 785-2224, extension 201.

Sincerely,

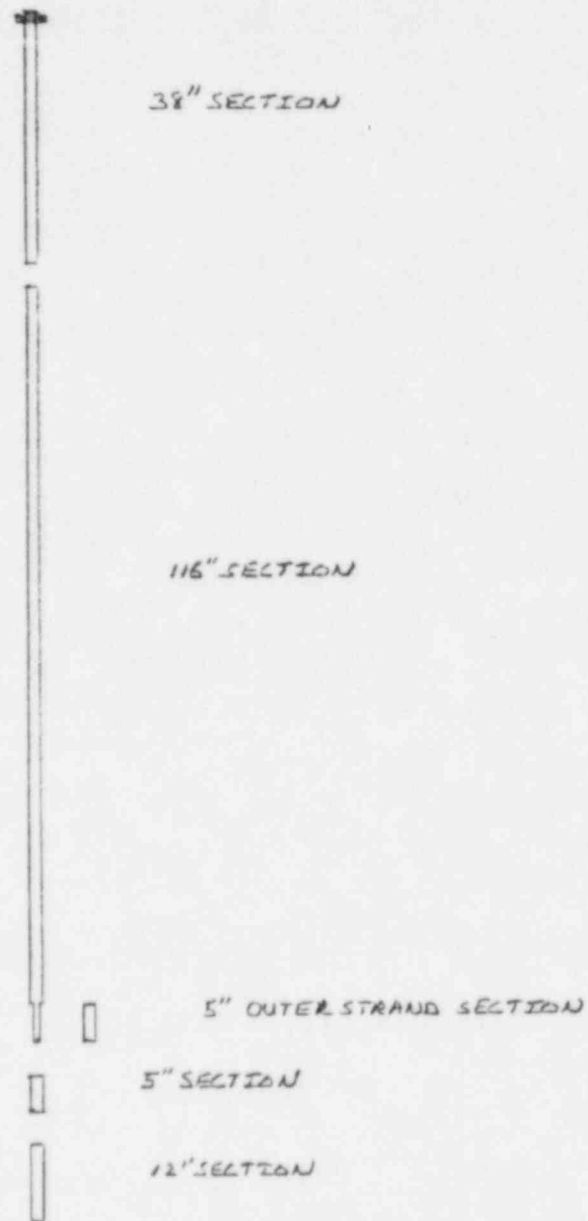


J. W. Gahm  
Manager, Nuclear Production

JWG:dr

Attachment

FIGURE 1



SEVERED CABLE FROM CDDA #25