



**Public Service™**

**Public Service  
Company of Colorado**  
P.O. Box 840  
Denver, CO 80201-0840

March 10, 1988  
Fort St. Vrain  
Unit No. 1  
P-88087

**R.O. WILLIAMS, JR.**  
VICE PRESIDENT  
NUCLEAR OPERATIONS

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Docket No. 50-267

SUBJECT: Report on Evaluations of Long Term  
Fire Recovery Enhancements

- REFERENCE:
- 1) NRC Letter, Callan to Williams, dated December 8, 1987 (G-87425)
  - 2) PSC Letter, Williams to NRC, dated January 14, 1988 (P-88016)
  - 3) PSC Laboratory Report No. 136, dated October 26, 1987
  - 4) NRC Letter, Callan to Williams, dated January 28, 1988 (G-88016)
  - 5) NRC Letter, Heitner to Williams, dated February 29, 1988 (G-88057)
  - 6) NRC Memorandum, Crutchfield to Milhoan, dated December 7, 1987 (G-87437)

Gentlemen:

Public Service Company of Colorado (PSC) herein provides results of the evaluations for each of the items considered to be Long Term Enhancements for Fort St. Vrain (FSV) resulting from the October 2-3, 1987 Turbine Building fire. This PSC submittal is being made in fulfillment of the NRC directives in References 1 and 6 that the results of these evaluations be submitted within 60 to 90 days after the fire recovery restart, and in fulfillment of PSC's commitment in Reference 2 to submit these results by March 10, 1988. The following represents the individual item to be considered, a brief explanation of the issue, and the final determination.

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- 1) Evaluate Replacement of Oil Filter Canisters: This item refers to the procurement of new filter canisters to replace ones in the hydraulic system that have pipe wrench marks.

Conclusion:

PSC has initiated procurement of aluminum filter canisters to replace those canisters having pipe wrench marks. Two of the twenty filter canisters have already been replaced. The PSC evaluation in Reference 3 concluded that the pipe wrench marks did not contribute to canister failure during the fire. PSC plans to replace the remaining canisters having pipe wrench marks during the course of normal filter maintenance as new canisters become available.

The filter canister evaluation originated at the time when failure of the aluminum filter canister was thought to be the initiating event for the fire. As concluded in Reference 3, failure of the aluminum filter canister was not the initiating event. PSC has investigated the use of alternate canister materials. Even though filters made of materials having higher strength at elevated temperatures are available, PSC has concluded that filter replacement using these higher strength materials would not guarantee that filter failures could not occur at the elevated temperatures experienced during a fire. Additionally, the hydraulic oil system contains various elastomeric seals that would fail during a fire at much lower temperatures than the aluminum filter canisters, thereby adding fuel to any fire. Therefore, changing filter canister materials would not diminish the need to isolate the source of hydraulic oil feeding any fire. Furthermore, as shown in Reference 3, the present aluminum filter canisters have been proven capable of withstanding all normal operating system temperatures and pressures with considerable margin. Based on the preceding analysis, no filter canister modifications or material changes are planned.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 2) Evaluate Removal of Thermal Relief Valves: This item indicates a possible approach to reduce hydraulic oil leakage.

Conclusion:

PSC has evaluated the removal of cap-side and stem-side thermal relief valves from the five hydraulically operated valves that use them and removal of the stem-side relief valve from the hydraulically operated valve that uses only this relief valve. It has been concluded that only the cap-side relief valves could be removed. For the case where the cap-side hydraulic fluid subject to possible thermal expansion is trapped, sufficient heat transfer to heat up the cap-side fluid and lift the thermal relief valve is not anticipated. However, due to present satisfactory operation of these valves, PSC will retain the system as currently installed.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 3) Enhance Pre-Fire Plans: This item refers to upgrading fire brigade effectiveness.

Conclusion:

Phase 1 of the pre-fire plan enhancements which includes updating pre-fire plan drawings is scheduled for completion by April 1, 1988. Phase 2 includes updating fire hazards, ingress/egress routes, etc., and is scheduled for completion by June 1, 1988. These enhancements are being monitored through the Fire Protection Program.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 4) Evaluate Fire Detection System Enhancements: This item refers to a complete analysis of the present system to determine improvements.

Conclusion:

The fire detection system has been evaluated for possible improvements, and is considered acceptable, although the following enhancements are in progress. PSC is implementing the Fire Protection Program Plan which includes Fire Protection Operability Requirements for the minimum operable detectors required for operations. Instructions have been provided to operators for removing nuisance alarms without disabling the control room annunciator. Finally, an alarm printer will be installed, per CN-2003 F, in the control room as an operator aid during the fourth refueling outage as part of the Fire Protection Program.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 5) Evaluate Suppression Needs for Hydraulic Oil Hazards: This item is a "lessons-learned" approach to assess means of suppressing hydraulic oil fires beyond the Fire Hazard Analysis of this topic.

Conclusion:

PSC has determined that the existing suppression systems are adequate and were proven capable of controlling the October 2-3, 1987 Turbine Building hydraulic oil fire. Additionally, PSC's Fire Protection Engineer is working with American Nuclear Insurer (ANI) representatives to pursue suppression enhancements that can be shown to be cost-effective. PSC will inform the NRC of specific fire suppression enhancements that are determined to be economically feasible prior to installation of the enhancements.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 6) Evaluate Functional Testing of 6 GPM Flow Control Valves: This item refers to the procurement of appropriate instrumentation and subsequent testing of the 6 gpm flow control valves in System 91.

Conclusion:

PSC has initiated procurement of flow measuring instrumentation and will perform testing during the Circulator Outage for the sixteen 6 gpm flow control valves in System 91.

Therefore this item is considered complete regarding the Fire Recovery Program.

- 7) Evaluate Hydraulic Oil Catch Basin Enhancements: This item refers to the evaluation of the hydraulic oil catch basins for the possible inclusion of flame arrestors and a level alarm to detect abnormal system low flow leakage.

Conclusion:

PSC relies upon the System 91 low-pressure alarms, hydraulic oil system storage tank(s) low level alarms, and normal shift inspection rounds to detect abnormal leakage. Low flow leakage that is contained by the funnel system would be detected by observed level changes in the catch basins and investigated. Evidence of hydraulic oil leakage not contained by the funnel system would be observed by routine equipment operator inspections. Fire detection is relied upon to alert operations of undetected oil leakage that is oxidizing. System modifications to the catch basins for inclusion of level alarms are not planned.

PSC has also concluded that flame arrestors for the hydraulic oil catch basins are not necessary due to detection/suppression capability presently installed for these areas.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 8) Evaluate Hot Surfaces Adjacent to Hydraulic System: This item refers to the analysis of hot surfaces (> 500 degrees Fahrenheit) within a 10-foot sphere of hydraulic valves for possible shielding or shrouding.

Conclusion:

On November 14, 1987, a walkdown of the hydraulic system was performed to evaluate the existence of exposed surfaces in the proximity of the hydraulic system which are of a sufficient temperature that they could pose a threat as an ignition source for hydraulic oil. On January 11, 1988, with the reactor at approximately 70% power, a second confirmatory walkdown of the hydraulic system was performed. A thermoscope was used to evaluate the temperature of the

exposed surfaces in the vicinity of the hydraulically operated valves. The parameters for this evaluation were:

- 1) The hydraulic power units were not walked down, since they each have their own deluge fire suppression system.
- 2) Surfaces of concern were those above a temperature of approximately 400 degrees Fahrenheit, chosen for conservatism relative to the hydraulic oil's flash point of 515 degrees Fahrenheit. The results of the second walkdown confirmed the findings of the first walkdown; there are basically two kinds of components that are above approximately 400 degrees Fahrenheit which are in the proximity of the hydraulically operated valves. These components are steam traps and the valve yokes for valves in high energy lines.

PSC has determined that the valve yokes will not have any protective additions because shielding the yokes from the actuators is impractical. The steam traps M-7534 through M-7543 will have simple sheet metal shields installed to shield them from possible hydraulic oil spray from the hydraulic actuators as an added precaution. It should be noted that the steam traps listed above do not constitute all of the steam traps in the plant but are the only ones considered to be an ignition source threat to the hydraulic oil system. This modification will be performed per CN-2761 before March 1, 1989.

Therefore, this item is considered complete regarding the Fire Recovery Program.

- 9) Evaluate Building 10 vs. Control Room HVAC: This item refers to possible enhancements to the control room or Building 10 HVAC systems in the event of a fire in Building 10.

Conclusion:

PSC has evaluated the possibility of a fire in Building 10 affecting the control room environment and has concluded that improvements will be made to both the Building 10 and control room HVAC systems to preclude adverse conditions in the control room. PSC is currently designing a modification to the Building 10 HVAC system that will control this system at a lower pressure than the control room. Additionally, an added feature of this modification is the capability to shut down the Building 10 HVAC System if the control room pressure drops to a predetermined setpoint relative to Building 10 pressure. Change Notice 2769 will be implemented prior to startup following the fourth refueling outage.

Therefore, this item is considered complete regarding the Fire Recovery Program.

10) Evaluate Replacement of F-7504 Charcoal Filters: This item refers to the change-out of control room filter cartridges which were not available prior to restart.

Conclusion:

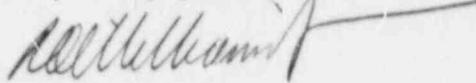
PSC has received incompatible replacement charcoal filters for F-7504, as identified during receipt inspection. PSC has been in contact with the manufacturer and has been assured that the correct replacements are being processed and should be received within 60 days. Upon receipt of the correct filters, replacement will be accomplished as directed by testing results.

This is judged to be normal maintenance and, as such, this item is considered complete regarding the Fire Recovery Program.

Based on the above, PSC has completed all of the Long Term Enhancement evaluations and considers the Fire Recovery Program closed. Followup actions will be tracked as identified through PSC's normal work prioritization process.

If there are any questions, please contact Mr. M. H. Holmes at (303) 480-6960.

Very truly yours,



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

ROW/WMD:dvd

cc:  
Regional Administrator, Region IV  
ATTN: Mr. T. F. Westerman, Chief  
Projects Section B

Mr. Robert Farrell  
Senior Resident Inspector  
Fort St. Vrain