

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Fort St. Vrain, Unit No. 1
DOCKET NUMBER (2): 0 5 0 0 0 2 6 1 7 1 OF 0 4
PAGE (3): 1 OF 0 4

TITLE (4): NEUTRON FLUX RATE-OF-CHANGE HIGH SCRAM

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER (5)
0	4	0	4	8	8	0	0	5	N/A		0 5 0 0 0 0
0	4	0	4	8	8	0	0	5	0 5 0 0 0 0		0 5 0 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11):

OPERATING MODE (9): N	20.402(b)	20.405(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10): 01010	20.406(a)(1)(i)	50.36(a)(1)	50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.36(a)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 388A)
	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	
	20.406(a)(1)(vi)	50.73(a)(2)(iv)		

LICENSEE CONTACT FOR THIS LER (12):

NAME: Mark A. Joseph, Technical Services Supervisor
TELEPHONE NUMBER: 3 0 3 6 2 0 1 - 1 2 0 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13):

CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14): YES (If yes, complete EXPECTED SUBMISSION DATE:) NO

EXPECTED SUBMISSION DATE (15): MONTH: DAY: YEAR:

ABSTRACT (Limit to 1400 spaces - i.e. approximately fifteen single-spaced typewritten lines) (16):

On April 4, 1988, and again on April 12, 1988, with the reactor shutdown, the Plant Protective System (PPS) reactor scram logic and alarm circuitry was actuated on Wide Range Channel (WRC) neutron flux rate of change high. Since all control rod pairs were already fully inserted in the core, no control rod movement occurred as a result of these actuations. This event is being reported per the requirements of 10CFR50.73(a)(2)(iv).

The cause of these scram actuations was electrical noise induction in the wide range nuclear instrumentation channels. The source of electrical noise for April 4 was a malfunction in Linear Power Channel 7. The noise source on April 12 was a chattering Electro-Hydraulic Control (EHC) relay, KT-873, initiated during EHC testing.

The malfunction of Linear Power Channel 7 on April 4 was repaired and the channel was verified to be operable. The testing on April 12 of the EHC relay was suspended until alternate test directions could be implemented. The test was then completed without further incident. Public Service Company has been actively pursuing the identification and suppression of noise sources within the plant electrical system. Investigations of past noise related actuations of the PPS have resulted in the completion of corrective actions which have greatly reduced, but not eliminated, noise interference problems within PPS instruments.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Fort St. Vrain, Unit No. 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 7 8 8	LER NUMBER (5)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			0 0 5	0 0	0 2	OF 0 4

TEXT (if more space is required, use additional NRC Form 3054 (11/77))

EVENT DESCRIPTION:

On April 4, 1988, and again on April 12, 1988, with the reactor shutdown, the Plant Protective System (PPS) reactor scram logic and alarm circuitry was actuated on Wide Range Channel (WRC) neutron flux rate of change high. The spurious actuations were immediately attributed to electrical noise in the wide range channels. No rod movement occurred as a result of these scram actuations, since all control rod pairs were already inserted. The noise source on April 4 was a malfunction in Linear Power Channel 7. The noise source on April 12 was a chattering relay KT-873. The chattering of KT-873 was caused during testing of the EHC.

CAUSE DESCRIPTION:

The noise source for the actuation on April 4, 1988, was a result of a malfunction in Linear Power Channel 7 which caused the chattering of various relays associated with the Rod Withdrawal Prohibit circuitry. A faulty amplifier was replaced by SSR# 88502156 and the problem could not be repeated. The refueling surveillance SR 5.4.1.1.4D-R/5.4.1.4.2.D-R, Linear Power Channel Calibration, was performed as the PMT to verify operability.

The actuation on April 12, 1988, was caused by chattering of EHC Relay KT-873. Testing of this portion of the EHC is not normally done at power so there is no plan to permanently suppress this relay. Personnel were instructed on how to avoid chattering relays when removing lugs by determinating them in one smooth motion, instead of removing the screw and then the lug.

The pulse sensing design of the wide range channels, in combination with the low reactor count rate during shutdown, makes the WRC rate of change scram function susceptible to induced electrical noise during such conditions. During reactor operation between 0% and 5% power, increased neutron count rate negates the impact of noise disturbances within the wide range channels, and reactor scram actuations due to plant noise are extremely unlikely to occur. At approximately 5% power, the Interlock Sequence Switch (ISS) is taken from "STARTUP" to "LOW POWER" position, and the WRC neutron flux rate of change scram function is disarmed. Since the wide range channels sense electrical pulses and are unable to distinguish between a valid signal pulse and a noise pulse, they respond to noise pulses and automatically actuate the PPS reactor scram logic and alarm circuitry.

ANALYSIS:

Since this actuation of the PPS reactor scram logic and alarm circuitry was not part of a pre-planned sequence, it is reportable pursuant to the requirements of 10CFR50.72(b)(2)(ii) and 10CFR50.73(a)(2)(iv).

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FACILITY NAME (1) Fort St. Vrain, Unit No. 1	DOCKET NUMBER (2) 0 5 1 0 0 0 2 1 6 7	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	- 0 1 0 5	- 0 1 0	0 3	OF

TEXT (If more space is required, use additional NRC Form 366A's) (17)

At the time of this actuation, the reactor was shutdown with all thirty-seven control rod pairs fully inserted in the core. The Reactor Mode Switch (RMS) was in the "OFF" position, thus inserting a continuous manual scram signal to the PPS. The WRC scram functions are armed and capable of completing the actuation logic when the RMS is in the "OFF" position. The signal pulse induced into these channels from electrical noise is similar to that generated from a neutron detector and therefore did not cause the wide range nuclear channels to operate in a manner outside of their design. During this event, the wide range channels responded to a noise signal and initiated automatic protective action. This unnecessary actuation of the reactor scram circuitry did not affect or degrade the operational capability of the wide range channels to detect reactor neutron flux conditions and initiate automatic protective action, as designed.

Based on this analysis, it is concluded that this event had no impact on safe plant operation and posed no threat to the health and safety of the public.

Similar events were reported in LER's 84-003, 85-001, 85-008, 85-025, 86-004, 86-014, 86-015, 86-028, 87-010, 87-021, 87-024, 87-027, 87-029, and 88-003.

CORRECTIVE ACTION:

The faulty amplifier in Linear Power Channel 7 was replaced and the channel was verified to be operable through performance of the refueling surveillance, SR 5.4.1.1.4.D-R/5.4.1.4.2.D-R, Linear Power Channel Calibration.

Personnel were cautioned and given specific test directions to avoid chattering relays.

Public Service Company has been actively pursuing the identification and suppression of noise sources within the plant electrical system. Investigations of past noise related actuations of the PPS have resulted in the completion of several successful corrective actions including installation of zero crossing switches that all but eliminated spurious rod withdrawal prohibit actuations, and the grounding of unterminated and abandoned cables communicating with the control room. These completed actions have greatly reduced noise interference problems within PPS instruments, and such efforts will continue whenever problem noise sources are identified.

In addition, a Change Notice (CN-2762) is being developed to replace or modify the existing WRC cables in an attempt to reduce the effects of electrical noise induction in the WRC instrumentation. Testing must still be conducted, however, to determine the benefits, if any, of replacing or modifying the existing cables. It is currently planned to conduct preliminary testing of cable replacement/modification during the upcoming circulator outage scheduled to begin on July 5, 1988.

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FACILITY NAME (1) Fort St. Vrain, Unit No. 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 7	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	- 0 0 5	- 0 0	0 4	OF 0 4

TEXT (If more space is required, use additional NRC Form 365A's) (17)

Mark A. Roush 5/2/88

 Mark A. Roush
 Results Engineer

Mark A. Joseph

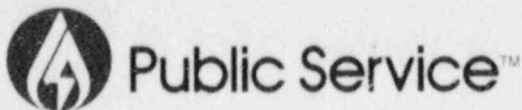
 Mark A. Joseph
 Technical Services Supervisor

J.M. Stamling

 Licensing

F.J. Novachek

 F.J. Novachek
 Technical/Administrative Services Manager



Public Service
Company of Colorado

16805 WCR 19 1/2, Platteville, Colorado 80651

May 4, 1988
Fort St. Vrain
Unit No. 1
P-88158

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

Docket No. 50-267

SUBJECT: Licensee Event Report
88-005-00, Final Report

REFERENCE: Facility Operating
License No. DPR-34

Gentlemen:

Enclosed please find a copy of Licensee Event Report
No. 50-267/88-005-00, Final, submitted per the requirements
of 10 CFR 50.73(a)(2)(iv).

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

Sincerely,

C. H. Fuller
Manager, Nuclear Production

Enclosure

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

Director Nuclear Reactor Regulation
ATTN: Mr. J. A. Calvo, Director
Project Directorate IV

Mr. R. E. Farrell
Senior Resident Inspector, FSV

CHF/djm

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11