

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fort St. Vrain, Unit No. 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 7	PAGE (3) 1 OF 0 5
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TITLE (4)
Incorrect ISS Position RWP Received During Shutdown

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(S)
0 2	0 6	8 6	8 6	0 1	2	0 0	0 3	0 8	N/A		0 5 0 0 0
									0 5 0 0 0		

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																
POWER LEVEL (10) 0 0 0	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(a)(1)(vi)	50.73(a)(2)(i)	50.73(a)(2)(iv)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(2)(viii)(B)	50.73(a)(2)(ix)	73.71(b)	73.71(e)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	
								X									

LICENSEE CONTACT FOR THIS LER (12)									
NAME Jim Eggebroten, Superintendent, Technical Services Eng.								TELEPHONE NUMBER	
								AREA CODE	
								3 0 3	7 8 5 - 12 2 2 13

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
X	IIG	IHS	0 2 2 3	N					

SUPPLEMENTAL REPORT EXPECTED (14)							EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO										

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

On February 6, 1986, at approximately 1825 hours, with the reactor shutdown and all thirty-seven control rod pairs fully inserted into the core with their power supply breakers open, reactor power indication on linear power channels VII and VIII increased to approximately 10% power. Since the Interlock Sequence Switch (ISS) was in the "startup" position, these upscale indications of reactor power actuated the Rod Withdrawal Prohibit (RWP) system "Incorrect ISS Position" alarm. Control room operators immediately verified correct ISS position and normal shutdown core flux levels on remaining control room nuclear instrumentation. At approximately 1835 hours, linear power channels VII and VIII indication returned to normal and the "Incorrect ISS Position" alarm cleared.

Upon investigation, the high sensitivity switches (normally closed contacts), of linear power channels VII and VIII were found to exhibit abnormally high resistance values, thereby causing intermittent changes in channel operation. The high sensitivity switches have been replaced on all six linear power channels.

Although the RWP function is not classified as an Engineered Safety Feature, nor is it considered part of the Reactor Protection System (i.e., reactor scram system) the licensee has agreed to report spurious/unplanned RWP actuations until formal guidance from the Nuclear Regulatory Commission is obtained.

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

BACKGROUND:

The six linear power channels at Fort St. Vrain are DC current measuring instruments, specifically designed for use in nuclear reactors. The input signal to each channel's nuclear instrumentation is supplied from a fission chamber located in the reactor neutron flux field to be measured. A high sensitivity mode of channel operation is provided to permit observing the alpha current of the channel's fission chamber, which allows verification of cable and detector continuity during pre-reactor startup when there is insufficient neutron flux to be detected. Normal channel sensitivity is approximately 1×10^{-3} amperes increasing to 5×10^{-8} amperes when placed in the high sensitivity mode.

Linear channel operation in the high sensitivity mode is obtained by operating the high sensitivity push button switch, located on the channel drawer deck plate. Pushing this switch alters the channel feedback path thereby increasing the channel's full scale sensitivity to 5×10^{-8} amperes. This sensitivity is sufficient to measure alpha current of the fission chamber.

EVENT DESCRIPTION:

On February 6, 1986, the reactor was shutdown with all thirty-seven control rod pairs fully inserted into the core with their power supply breakers open. The Reactor Mode Switch (RMS) and Interlock Sequence Switch (ISS) were in the "off" and "startup" positions respectively. With this configuration, a RWP was already locked in. The Prestressed Concrete Reactor Vessel (PCR) was pressurized to approximately 177 psia with reactor core cooling being provided by "J" and "C" helium circulators operating on steam drive. Reactor fuel temperatures were approximately 327 degrees Fahrenheit.

At 1825 hours, with no control rod movement in progress, control room alarm "Incorrect ISS Position" was actuated. Upon investigation, linear power channels VII and VIII were found to be reading approximately 10% power. Control room operators immediately verified normal shutdown flux levels on remaining control room nuclear instrumentation. No abnormal indications were identified, and the indications of linear power channels VII and VIII were quickly determined to be invalid. At approximately 1835 hours, the upscale indications on channels VII and VIII had returned to normal, and the "Incorrect ISS Position" alarm cleared.

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CAUSE:

Dirty switch contacts.

Through normal operation, dirt/contaminants accumulated on the internal contacts of the high sensitivity push button switches in linear power channels VII and VIII. This condition caused the normally closed contacts to intermittently open, thereby causing intermittent channel operation in the high sensitivity mode.

Increases in linear power channel VII indication had occurred earlier the week of February 3, 1986, and were under investigation at the time of this event. Apparently, on February 6, 1986, conditions were such that the high sensitivity switch contacts in linear power channels VII and VIII opened simultaneously, causing the upscale indications. With the ISS in the startup position, and reactor power being indicated as greater than six percent by linear power channels VII and VIII, an "Incorrect ISS Position" alarm was actuated.

SAFETY ANALYSIS:

The six linear power channels are provided to give accurate linear neutron flux measurements in the upper two decades (1.5 percent through 150 percent) of power operation, and ultimately, to initiate an automatic reactor scram at high reactor power, i.e. 140% (variable setpoint). The six linear power channels also provide an RWP when indicated reactor power disagrees with the ISS position. This RWP will alert the control room operator of the reactor power/ISS position discrepancy, ensuring the ISS is advanced accordingly and required Plant Protective System (PPS) functions are enabled. However, the RWP function does not initiate any automatic corrective actions directed toward reducing reactor power or actuating engineered safety features.

Linear power channel operation in the high sensitivity mode does not affect operability of the associated channel's scram or RWP function. Increased reactor power indications are conservative in that automatic actuation of the 140% reactor scram function will occur well before actual reactor power approaches the setpoint. Operability of each channel's automatic PPS actions was verified by switching the channel to the high sensitivity mode, raising indicated channel power by utilizing the trip test potentiometer, and verifying automatic RWP and reactor scram actuation. All six linear power channels were tested in this manner with no deficiencies identified.

Following actuation of the "Incorrect ISS Position" alarm, control room operators verified normal shutdown core neutron flux levels by observing the remaining control room nuclear instrumentation. No abnormal flux levels, other than those indicated on channels VII and VIII, were identified, and control room operators determined the upscale indications to be invalid. No immediate corrective action was required.

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

This incident posed no threat to the health and safety of the public, and no similar incidents have been reported.

CORRECTIVE ACTION:

Control room operators verified normal shutdown core flux levels on remaining control room instrumentation.

The high sensitivity push button switches for all six linear power channels (III, IV, V, VI, VII, and VIII) have been replaced with new switches.

Operability of each linear power channel's automatic PPS actions was verified through testing.

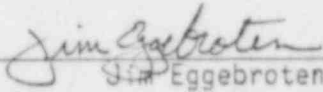
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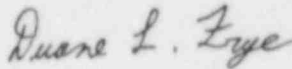
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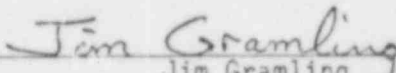


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 J. W. Gahm
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**Public Service
Company of Colorado**

March 8, 1986
Fort St. Vrain
Unit No. 1
P-86181

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

Docket No. 50-267

SUBJECT: Licensee Event Report
86-012, Final Report

REFERENCE: Facility Operating
License No. DPR-34

Gentlemen:

Enclosed please find a copy of Licensee Event Report
No. 50-267/86-012, Final, submitted per the requirements of
10 CFR 50.73(a)(2)(iv).

Sincerely,

J. W. Gahm
Manager, Nuclear Production

Enclosure

cc: Regional Administrator, Region IV
Attn.: Mr. J. E. Gagliardo, Chief
Reactor Projects Branch

cc: Director of Nuclear Reactor Regulation
Attn.: Mr. H. N. Berkow, Director
Standardization and Special
Projects Directorate

cc: Director, MIPC

JWG/djm

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