James A. FitzPatrick
Nuclear Power Plant
P.O. Box 41
Lycoming, New York 13093
315 342-3840

New York Power Authority

Harry P. Salmon, Jr.
Resident Manager

June 23, 1993
JAFP-93-0356

United States Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

SUBJECT: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 93-013-00- Reactor Scram During Startup Due to Neutron Monitor Spike

Dear Sir:

This report is submitted in accordance with 10CFR50.73(a)(2)(iv).

Questions concerning this report may be addressed to Mr. W. Verne Childs at (315) 349-6071.

Very truly yours,

HARRY P. SALMON, JR.

HPS:WVC:tld
Enclosure

cc: USNRC, Region 1
USNRC Resident Inspector
INPO Records Center

290032

Cert # P375457262

JE22

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
James A. FitzPatrick Nuclear Power Plant	05000333	01 OF 05

TITLE (4)
Reactor Scram During Startup Due to Neutron Monitor Spike

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 NAME	DOCKET NUMBER 05000
05	25	93	93	013	00	06	23	93	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
		20.402(b)		20.405(c)	X	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	006	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Mr. W. Verne Childs, Senior Licensing Engineer	(315) 349-6071

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	IL	RM	G080	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

EIIS Codes are in []

On May 25, 1993, at 2045 hours, an automatic reactor scram took place when Average Power Range Monitor (APRM) [IG] E spiked while indicated power level was approximately 6 percent with the plant in the startup mode. Main Steam Line Radiation Monitor (MSLRM) [IL] D had been intentionally tripped approximately 5 minutes prior to the APRM E spike after being declared inoperable due to intermittent downscale alarms. Systems performed as designed, no isolations or other engineered safety feature actuations took place and no significant reactor temperature, pressure or level transient took place. A Local Power Range Monitor (LPRM) detector spike was the probable cause of the APRM. LPRMs susceptible to spiking were tested per vendor recommendations to reduce spiking. Stronger radiation sources were placed adjacent to the MSLRM detectors to increase the detected radiation level above the downscale alarm setpoint. No previous LERs have been submitted for scrams due to APRM spikes.

EIIS Codes are in []

Event Description

Plant startup was in progress on May 25, 1993, with the reactor mode switch in the Startup/Hot Standby position. Indicated reactor power level was approximately six percent of rated thermal power. Reactor water level was being automatically maintained at a normal level of approximately 202 inches above the top of active fuel (TAF) with one turbine driven reactor feedwater pump [SJ] in manual control and the low flow (startup) feedwater control valve in automatic. The main turbine seal steam system [TC] was in service and warming of the high pressure turbine [TA] shell had begun. Reactor pressure was being automatically maintained at approximately 940 psig by bypassing steam to the main condenser [SG]. Average Power Range Monitor (APRM) [IG] Channel C had been bypassed at 1416 hours due to intermittent spurious spikes.

At 2040 hours, Main Steam Line Radiation Monitor (MSLRM) [IL] Channel D was declared inoperable by the shift supervisor and was placed in the tripped condition as required by Technical Specification Table 3.1-1 after the monitor provided a downscale alarm. The indicated radiation level on MSLRM D was approximately 2.8 millirem per hour compared to approximately 4.8 millirem per hour on MSLRM A, B, and C. This action resulted in Reactor Protection System (RPS) [JC] trip system B being tripped. At 2045 hours, APRM E spiked upscale resulting in trip of RPS trip system A. Since RPS trip system B had been tripped approximately 5 minutes earlier due to the problem with MSLRM D, the APRM E trip resulted in an automatic reactor shutdown (scram) due to RPS trip systems A and B being in a tripped condition at the same time.

Plant systems responded as designed. Operators verified that all control rods [AA] fully inserted and completed other actions required by Abnormal Operating Procedure (AOP) 1, Reactor Scram. Reactor water level experienced a minor transient with the lowest level approximately 10 inches below normal and the highest level approximately 12 inches above normal. No Engineered Safety Feature system actuations or isolations occurred. Reactor pressure decreased to below the pressure regulating system setpoint, steam bypass valves closed as designed and

operators secured other steam loads such as main turbine shell warming to limit the magnitude and rate of reactor cooldown. During the first hour after the reactor shutdown, the cooldown was 75F degrees compared to a Technical Specification limit of 100F degrees. The cooldown rate after the first hour of cooldown was approximately 20F degrees per hour. The plant was placed in the cold condition to allow repair of MSLRM D and troubleshooting of APRM C and E prior to again starting up the plant.

MSLRM D had been declared inoperable by the Shift Supervisor due to drift of the indicated radiation level. The monitor provides a downscale alarm when the indicated radiation level decreases to less than approximately 3 millirem per hour. This downscale alarm occurred when the other three monitors indicated approximately 4.8 millirem per hour. Testing of the monitor did not indicate any problem resulting in the conclusion that the monitor was inoperable. APRM C, which had exhibited spikes earlier during the startup, had been bypassed to avoid the associated trips of RPS trip system A. The spiking of APRM E which caused the reactor scram at 2045 hours was similar to the spiking observed on APRM C earlier in the day.

Troubleshooting of APRM C and E revealed excessive ripple in the 5 volt direct current power supplies. Filter capacitors were replaced and the 5 volt power supply ripple was reduced to acceptable values. It should be noted that the power supply ripple is not considered to be a likely cause of the spiking on APRM C and E.

APRM input signals are from Local Power Range Monitors (LPRMs). The LPRM manufacturer has indicated in an industry wide communication (GE Service Information Letter No. 500) that certain LPRM detectors can produce spikes in the detector output due to the buildup of conductive pathways within the detector after a period of operation. The manufacturer recommends subjecting the identified detectors which have exhibited spikes to a "capacitor discharge test" to reduce the conductive pathways and thus reduce the probability of spiking. The LPRMs identified as susceptible to the problem and which are used as inputs to APRM C and E were subjected to this recommended test prior to startup of the plant. APRM C and E did not experience spiking during the subsequent plant startup.

Event Cause

The automatic reactor scram was caused by an APRM E spike and trip at the 15 percent level which caused RPS trip system A to trip while RPS trip system B was also in a tripped condition. The probable cause of the APRM E spike was the spiking of an LPRM input to APRM E. As discussed above, some LPRM detectors appear to be more susceptible to spiking than others. While LPRM spikes are known to be caused by short time duration short circuits or by arcing within the detector the precise cause cannot be determined. An LPRM spike is considered to be the likely cause of the APRM spike because APRM E was in the trip condition for only 12 milliseconds as indicated by the plant computer system and none of the other APRM channels or the eight Intermediate Range Monitor Neutron Monitoring Channels indicated any increase in power level.

The cause of the small drift in the Main Steam line Radiation Monitor D output is not known. The detectors for the radiation monitors are provided with a small radiation source adjacent to the detector to maintain the instrument reading above the downscale alarm. This radiation source normally results in an indicated radiation level of approximately 5 millirem per hour. MSLRM D indicated approximately 5 millirem per hour for most of the time, but occasionally, at irregular time intervals, would decrease to approximately 3 or 4 millirem per hour and would remain at this lower level for irregular time periods prior to returning to approximately 5 millirem per hour. Changing the source adjacent to the detector to cause a reading of approximately 10 millirem per hour had no effect on the irregular drift in indicated radiation level. The indicated level continued to decrease by approximately 1 or 2 millirem per hour at irregular intervals for irregular time periods. Monitoring of the detector output signal did not detect any change which corresponded to changes in the indicated radiation level of MSLRM D. Replacement of the entire MSLRM with a new unit did not result in any change.

Increasing the strength of the radiation source adjacent to the detector did have the desired effect of eliminating the downscale alarm when indicated level drifted down.

Event Analysis

The event requires a report under 10CFR50.73(a)(2)(iv) due to the automatic actuation of the Reactor Protection System when APRM E spiked.

The event was not safety significant. No actual reactivity or reactor power transient took place. Plant systems responded as designed and no system isolation occurred. No increasing pressure transient occurred and reactor water level remained near the normal level. The reactor pressure and temperature decrease was well within limits.

Corrective Actions:

1. Plant operators verified automatic actions were as expected and completed the actions required by AOP-1, Reactor Scram.

2. Local Power Range Monitors (LPRMs) assoicated with APRM C and E that are considered to be susceptible to spiking were subjected to capacitor discharge testing as recommended by the manufacturer in GE Service Information Letter (SIL) 500.

3. The radiation sources adjacent to the MSLRM detectors were replaced with stronger sources to maintain the detected radiation level above the downscale alarm setpoint when minor drifting occurs.

Additional Information

Failed Components:

Component: Main Steam Line Radiation Monitor (17RM-251D)

Manufacturer: GE (NPRDS Code G080)

Manufacturers Model No.: NUMAC LRM (Nuclear Measurement and Control Log Radiation Monitor)

Previous Similar Events:

No previous LERs have been submitted for this facility as a result of LPRM spiking problems. A number of other spiking events have occurred, however, none has resulted in a reactor scram.