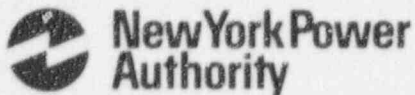


James A. FitzPatrick  
Nuclear Power Plant  
P.O. Box 41  
Lycoming, New York 13093  
315-342-3840



May 28, 1996  
JAFF-96-0218

Michael J. Colomb  
Plant Manager

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

SUBJECT: DOCKET NO. 50-333  
10CFR21 REPORT  
LICENSEE EVENT REPORT: LER-96-005

Error in Safety Limit Minimum Critical Power Ratio  
Calculation

Dear Sir:

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

Questions concerning this report may be addressed to Mr. David E. Burch at (315) 349-6311.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'Michael J. Colomb'.

MICHAEL J. COLOMB

MJC:DEB:las  
Enclosure

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

9606040021 960528  
PDR ADOCK 05000333  
S PDR

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EXPIRES 04/30/98

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY  
INFORMATION COLLECTION REQUEST: 60.0 HRS. REPORTED LESSONS  
LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED  
BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN  
ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH  
(T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC  
20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-  
0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20603.

FACILITY NAME (1)

James A. FitzPatrick Nuclear Power Plant

DOCKET NUMBER (2)

05000333

PAGE (3)

01 OF 05

TITLE (4)

Error in Safety Limit Minimum Critical Power Ratio Calculation

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
05	06	96	96	-- 005	-- 00	05	28	96	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	X 50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Mr. David E. Burch, Senior Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

(315) 349-6311

## 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

## SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On 5/6/96 while at 100 percent rated power, the New York Power Authority (NYPA) was notified by the General Electric Company that the Safety Limit Minimum Critical Power Ratio (SLMCPR) supplied for the current operating cycle was not correct in the non-conservative direction. The value previously supplied was 1.07, while the value should be 1.08.

NYPA had been notified on 4/16/96 that preliminary recalculation of SLMCPR for the current operating cycle indicated the value could be 1.09. At that time NYPA instituted administrative controls to limit operating MCPR such that MCPR would not go below 1.09 if the plant experienced the limiting abnormal operating occurrence.

A review of operating records for the cycle demonstrated that the fraction of the operating limit MCPR has at no time exceeded 0.98, therefore there was no potential that the new SLMCPR would have been violated in the event of a limiting abnormal operating occurrence at any time in this cycle.

The SLMCPR applicable to cycle 13 was verified to be correct. An Operating License amendment request for cycle 12 SLMCPR will be submitted.

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James A. FitzPatrick Nuclear Power Plant	05000333	96	-- 005	-- 00	02 OF 05

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

EIIS Codes are in []

**EVENT DESCRIPTION**

On May 6, 1996 during normal plant operation at 100 percent rated power, the New York Power Authority (NYPA) was notified by the General Electric Company (GE) (Reference 1) that the Safety Limit Minimum Critical Power Ratio (SLMCPR) for cycle 12 (the current operating cycle) should be 1.08. The present Technical Specification value of SLMCPR is 1.07 (TS 1.1.A), therefore this change is non-conservative.

On April 3, 1996, NYPA was notified by GE that the process for generating generic SLMCPR values might not always give the most conservative result (Reference 2). This discovery was made during efforts to develop a process for calculation of cycle specific SLMCPR. Following this discovery, GE initiated action to evaluate the adequacy of the generic SLMCPRs for all plants operating with GE fuel. The NRC (Office of Nuclear Reactor Regulation, Reactor Systems Branch) had been informed of this, by phone, on March 27, 1996. During that phone call, plans were made for an April 17, 1996 meeting between GE and the NRC to discuss the issue. The April 3 letter from GE stated that they had "no information that the fuel operating in FitzPatrick Cycle 12 is affected," so NYPA's action at the time was to monitor further developments regarding this problem.

An April 16, 1996 letter from GE (Reference 3) informed NYPA of the results of a preliminary calculation of SLMCPR for the current operating cycle. The unverified result of this work was that SLMCPR for FitzPatrick for the present cycle should be 1.087. In response to this notification, the plant instituted administrative controls over operating MCPR, such that if the limiting abnormal operating occurrence were to occur, MCPR would not lower below 1.087.

NYPA attended the GE meeting with the NRC on April 17, 1996 at which the SLMCPR issue was discussed. Included in this discussion was a description of the cause of the error in SLMCPR calculation, which will be treated below under Event Cause.

On April 29, 1996, NYPA notified the NRC Operations Center of a potential non-conservative error in Cycle 12 SLMCPR for FitzPatrick in accordance with 10 CFR 50.72(b)(1)(ii)(B). This report followed discussion with GE that use of a generic SLMCPR for GE11 fuel which was potentially non-conservative when applied to FitzPatrick cycle 12 could have resulted in a condition that is outside the design basis of the plant.

By letter on May 6, 1996 (Reference 1), GE provided NYPA with the final, verified results of calculations which demonstrated that the SLMCPR for cycle 12 should be 1.08 (1.09 for Single Loop Operation).

**LICENSEE EVENT REPORT (LER)**  
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**EVENT CAUSE**

An error in the application of the methodology used to determine SLMCPR led to calculation of non-conservative SLMCPR for FitzPatrick cycle 12.

The process used to determine the generic SLMCPR for the GE11 fuel design (the limiting bundle in the FitzPatrick cycle 12 core) assumes the following regarding core design (Reference 4):

- Equilibrium GE11 core
- BWR/4 764 bundle core
- Flat rod power distribution in bundle
- 18 month cycle design
- 33 percent batch fraction
- Limiting point in cycle - Peak hot excess reactivity point

The calculation process finds the control rod pattern which places the most fuel bundles on limits (peak hot excess reactivity was chosen because of increased flexibility in positioning control blades), then power is raised until 0.1 percent of fuel rods are statistically determined to be in boiling transition. This power is then used to calculate the SLMCPR.

The calculation of cycle 12 SLMCPR used the same plant and power uncertainties as the generic SLMCPR evaluation, as well as the same calculation process. The difference is that core power distributions were obtained from power distributions projected for the current operating cycle. The evaluation used the following core design features:

- Actual core loading
- Projected control blade patterns
- Actual rod powers used for R-factor distributions
- Carried out for several points in the cycle

The use of actual core design affects the SLMCPR calculation through the following factors:

- Bundle designs have been optimized for local peaking which yields flatter R-factors
- In mixed cores (cycle 12 uses a mix of 8x8 and 9x9 fuel) there are fewer rods to get to a fixed value of 0.1 percent of all rods in the core in boiling transition
- End-of-cycle (EOC) points have been considered. At EOC R-factors are lower (R-factor is generally lowest near lattice reactivity peak which for longer cycles is at EOC).

Recalculation of SLMCPR using FitzPatrick cycle 12 specific values rather than generic values for core design resulted in an increase in SLMCPR from 1.07 to 1.08.



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

**EVENT ANALYSIS**

This event is being reported in accordance with 10 CFR 50.73(a)(2)(v). That is, the design error alone could have prevented the fulfillment of the safety function of systems needed to : (A) shut down the reactor and maintain it in a safe shutdown condition, (B) remove residual heat, (C) control the release of radioactive material, and (D) mitigate the consequences of an accident.

The ratio of operating limit MCPR to operating MCPR has been less than 0.98 throughout cycle 12, therefore there has been no actual safety consequence of this error. If the limiting abnormal operating occurrence had occurred at any time in the cycle, MCPR would not have decreased to less than the revised SLMCPR value of 1.08.

**CORRECTIVE ACTIONS**

1. Administrative controls on operating MCPR have been instituted such that if the limiting abnormal operating occurrence were to occur, MCPR would not lower below 1.08 (the verified SLMCPR for cycle 12). (complete)
2. Ensure calculation of SLMCPR for cycle 13 addressed issues which caused cycle 12 values to be non-conservative. Confirmation of SLMCPR applicable to GE12 fuel (limiting fuel type in cycle 13 core) was accepted by NYPA on May 14, 1996. (complete)
3. Submit an Operating License amendment request to revise the Technical Specification for SLMCPR for cycle 12. Planned date of transmittal: July 19, 1996.

**ADDITIONAL INFORMATION**

**Failed Components:**

None

**Previous Similar Events:**

LER 83-008

**References:**

1. GE letter, D.C. Serell to R.C. Taylor (LB 262-96-071), "Safety Limit MCPR Calculation," dated May 6, 1996
2. GE letter, John A. Baumgartner to R.C. Taylor (JAB-N6021), "Safety Limit MCPR Calculation," dated April 3, 1996

LICFNSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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

3. GE letter, John A. Baumgartner to R.C. Taylor (JAB-N6024),  
"FitzPatrick Cycle 12 Safety Limit MCPR Calculation," dated April  
16, 1996
4. General Electric Standard Application for Reactor Fuel, (GESTAR  
II), NEDE-24011-P-A-11, November 1995