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July 14, 1983

Mr. James P. O'Reilly, Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street NW, Suite 2900  
Atlanta, Georgia 30303

Subject: McGuire Nuclear Station Units 1 and 2  
Docket Nos. 50-369 and 50-370  
LER/RO-369/83-43 and 370/83-29

Dear Mr. O'Reilly:

Please find attached Reportable Occurrence Reports RO-369/83-43 (Unit 1) and 370/83-29 (Unit 2). These reports concern T.S. 6.9.1.10(h), "Errors discovered in the transient or accident analyses or in the methods used for such analyses as described in the safety analysis report or in the bases for the Technical Specifications that have or could have permitted reactor operation in a manner less conservative than assumed in the analyses". This incident was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

*H.B. Tucker*  
Hal B. Tucker

PBN:jfw  
Attachments (3)

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

Records Center  
Institute of Nuclear Power Operations  
1100 Circle 75 Parkway, Suite 1500  
Atlanta, Georgia 30339

Mr. W. T. Orders  
NRC Resident Inspector  
McGuire Nuclear Station

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DUKE POWER COMPANY  
MCGUIRE NUCLEAR STATION  
REPORTABLE OCCURRENCE REPORT NOS. 369/83-43 and 370/83-29

REPORT DATE: July 14, 1983

FACILITY: McGuire Units 1 and 2, Cornelius, NC

IDENTIFICATION: Potential for Exceeding  $F_Q$  Limits During Power Escalation  
Following Extended Operation at Low Power

DESCRIPTION: On June 1, 1983, Westinghouse informed Duke Power, via telephone, that a "potential unreviewed safety question" had been identified during an  $F_Q$  analysis for Zion Unit 1. This question was related to a possible unanalyzed condition due to extended operation at low power and subsequent escalation to power in the same fuel cycle. A review of several plant specific operating histories indicated that this mode of operation would result in violations of the heat flux hot channel factor ( $F_Q$ ) limit for the Loss of Coolant Accident (LOCA) analysis. ( $F_Q$  limit is given in Technical Specification 3.2.2.) Subsequent correspondence from Westinghouse resulted in a determination on June 30, 1983, that this incident was reportable pursuant to Technical Specification 6.9.1.10(h). NRC/OIE Region II was notified by telephone the same day. Unit 2 was in Mode 5 and Unit 1 in Mode 1, 100% power at the time of notification.

This event is attributed to Unusual Service Conditions.

EVALUATION:  $F_Q$  can be defined as the heat flux at the highest heat flux point in the core divided by the average heat flux of all the rods in the core. One purpose of the  $F_Q$  limit (2.32 at 100% power) is to help ensure that the peak fuel clad temperature will not exceed the 2200°F Emergency Core Cooling Systems acceptance criteria limit in the event of a LOCA.

On June 1, 1983, Westinghouse notified Duke Power that certain modes of operation could result in violations of the  $F_Q$  limit for a LOCA. Westinghouse advised that if McGuire operated at less than 85% power for greater than 500 MWD/MTU, then Westinghouse should be notified prior to going above 85% power. The burnup was checked on the day of the call; Unit 1 burnup was less than 96.2 MWD/MTU (2.5 EFPD) in fuel cycle 1A, and Unit 2 burnup was approximately 38 MWD/MTU (1 EFPD) in cycle 1.

Mr. R. S. Howard's (W/OPP) letter to Mr. P. H. Barton (DPC/NO) dated June 10, 1983 detailed the effects of prolonged low power operation (and subsequent escalation) on the  $F_Q$  limit. This letter indicates that the analysis methodology used to verify that the LOCA  $F_Q$  would be maintained during load following did not account for a shift in power distribution (resulting from extended low power operation and subsequent escalation above 85% power) significant enough to affect  $F_Q$ .

ATIVE ACTION: Both units were verified to have operated less than 500 MWD/MTU on June 1, 1983 (following telephone notification by Westinghouse). The NRC was notified on June 1, 1983, when the event was deemed reportable.

Time versus the 500 MWD/MTU was monitored on a daily basis while awaiting notification by Westinghouse.

An Administrative Limit on power operation was placed in the Plant Data Book as a fuel maneuvering limit on June 30, 1983. This Administrative Limit will be removed in an unanalyzed condition.

DUKE POWER COMPANY  
MCGUIRE NUCLEAR STATION  
REPORTABLE OCCURRENCE REPORT NOS. 369/83-43 and 370/83-29

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This event is attributed to Unusual Service Conditions.

EVALUATION:  $F_Q$  can be defined as the heat flux at the highest heat flux point in the core divided by the average heat flux of all the rods in the core. One purpose of the  $F_Q$  limit (2.32 at 100% power) is to help ensure that the peak fuel clad temperature will not exceed the 2200°F Emergency Core Cooling Systems acceptance criteria limit in the event of a LOCA.

On June 1, 1983, Westinghouse notified Duke Power that certain modes of operation could result in violations of the  $F_Q$  limit for a LOCA. Westinghouse advised that if McGuire operated at less than 85% power for greater than 500 MWD/MTU, then Westinghouse should be notified prior to going above 85% power. The burnup was checked on the day of the call; Unit 1 burnup was less than 96.2 MWD/MTU (2.5 EFPD) in fuel cycle 1A, and Unit 2 burnup was approximately 38 MWD/MTU (1 EFPD) in cycle 1.

Mr. R. S. Howard's (W/OPP) letter to Mr. P. H. Barton (DPC/NO) dated June 10, 1983 detailed the effects of prolonged low power operation (and subsequent escalation) on the  $F_Q$  limit. This letter indicates that the analysis methodology used to verify that the LOCA  $F_Q$  would be maintained during load following did not account for a shift in power distribution (resulting from extended low power operation and subsequent escalation above 85% power) significant enough to affect  $F_Q$ .

CORRECTIVE ACTION: Both units were verified to have operated less than 500 MWD/MTU on June 1, 1983 (following telephone notification by Westinghouse). The NRC was notified June 30, 1983, when the event was deemed reportable.

Operating time versus the 500 MWD/MTU was monitored on a daily basis while awaiting further evaluation by Westinghouse.

An Administrative Limit on power operation was placed in the Plant Data Book as a supplement to fuel maneuvering limit on June 30, 1983. This Administrative Limit will prevent operation in an unanalyzed condition.

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Additional operating instructions are expected from Westinghouse in regard to  $F_Q$  limit. These instructions will be incorporated into the Plant Data Book, or operating procedures as appropriate.

SAFETY ANALYSIS: Unit 2 has not exceeded the 500 MWD/MTU limit at less than 85% power and thus has not operated in a potentially unanalyzed condition ( $F_Q$  values that may exceed previously determined values).

Unit 1 has not operated in a potentially unanalyzed condition during the present cycle 1A. During Unit 1 initial power escalation in cycle 1, however, the burnup reached 700 MWD/MTU (on January 5, 1982) after extended operation below 85% power. The unit was escalated to approximately 90% power on the same day, thereby placing the unit in a potentially unanalyzed condition. A flux map taken within 24 hours of reaching the 90% plateau showed that the  $F_Q$  limit was not challenged or exceeded at that time. All flux maps taken during cycle 1 verified that  $F_Q$  was below the Technical Specification limit.  $F_Q$  cannot be continuously monitored, however, so it is unknown if the  $F_Q$  limit was exceeded during the initial power changes to 90 and 100%. In any case, exceeding the  $F_Q$  limit would have been detrimental to core integrity only in the event of a LOCA.

The health and safety of the public were unaffected by this event.