UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 16 1979

MEMORANDUM FOR: K. Kniel, Chief, Core Performance Branch, DSS

FROM: D. B. Fieno, Leader, Reactor Physics Section, CPB, DSS

SUBJECT: MEETING WITH WESTINGHOUSE ON THE PART 21 NOTIFICATION CONCERNING THE SINGLE ROD DROP ANALYSIS

A meeting was held in Bethesda on April 12, 1979 between the NRC and Westinghouse (W). The purpose of the meeting was to discuss a Part 21 notification by W concerning the analysis of the single rod drop event.

The single rod drop is a DNB-limited transient considered to be a Condition II event, that is, a moderate frequency transient. The calculated consequences for this event are dependent upon whether the reactor is being operated in an automatic or manual mode. The meeting was concerned primarily with the analysis of the single rod drop event with the reactor in the automatic mode. The analysis in the SARs for the single rod drop event with the reactor in a manual mode remains valid. This analysis indicates that the DNB limit is not exceeded.

If a single rod drop event occurs when the reactor is in the automatic mode, the reactor control system responds to both the reactor power drop (mismatch between turbine power and reactor power) and the decrease in the core average temperature and attempts to restore both quantities to their original values. This restoration of reactor power by the reactor control system may result in some power overshoot depending upon the excore power signal that is used. For the SARs this analysis has been performed using a point kinetics model to track the core power time-dependent behavior.

In 2- and 4-loop W plants the power signal to the reactor control system is auctioneered from among the four excore detectors to obtain a high value. This results in a power overshoot of the magnitude predicted in the SAR. In a 3-loop W plant the situation is somewhat different in that the reactor control system obtains its power signal from a dedicated excore detector. Recent spatial analyses by W indicate that for a dropped rod in the core quadrant adjacent to the dedicated excore detector, the power overshoot is greater than the value calculated by the methods used in the SAR. This could then lead to exceeding the DNB limit. For the SAR analysis, no credit

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is taken for the negative flux rate trip for the plants which have this feature; credit is taken for the turbine runback and rod stop for those plants which have this feature except for the Indian Point-3 4-loop plant.

These recent W calculations which model spatial effects have considered, among other things, different fuel cycles and times in fuel cycles. Based on these calculations, W has proposed changes to the high negative flux rate trip setpoints to assure that all dropped rod events result in a reactor trip. The negative flux rate trip setpoint would be decreased from 5 percent to 3 percent and the rate-lag time constant would be decreased from 2 seconds to 1 second.

In summary, the following points are noted:

(1) It was stated by the Westinghouse representatives that present experience shows that a dropped rod generally results in a reactor trip for a W plant if it has the present negative flux trip circuit and setpoint.

(2) The SAR analysis for 2- and 4-loop plants remains valid; however, the Technical Specification changes recommended by the Westinghouse representatives for plants which have negative flux rate trips should be made to provide added conservatism pending a more thorough analysis and review.

(3) For 3-loop W plants, which have a negative flux rate trip, a change to the trip setpoint should be made to provide additional assurance that a trip will result as a consequence of a rod drop. This change is in a conservative direction from a safety standpoint. Also, W analysis shows that the change recommended will not trip the plant in a spurious way as a result of normal operational maneuvers and, therefore, should not affect the reliability of the plant staying on line.

(4) For W plants without a negative flux rate trip, the turbine runback and rod stop feature of the control system, which were approved at the time of review, is relied on to avoid DNB in the dropped rod transient for all plants except Indian Point-3.

(5) W is committed to provide the NRC with a topical report on this matter in about 6 months.

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A list of meeting attendees is provided. Slides presented at the meeting are available in the Core Performance Branch office.

Daniel Fieno

Daniel Fieno, Leader
Reactor Physics Section
Core Performance Branch
Division of Systems Safety

Enclosure:
Attendance List

cc: R. Mattson/F. Schroeder
R. Fraley, ACRS (16)
DOR, DSS, DPM, & DSE ADs
SD & RES ADs
IE (3)
P. Check
S. Weiss
L. Kopp
W. Brooks
M. Dunenfeld
H. Richings
R. Schemel
J. Rosenthal
P. Kapo
S. Diab
D. Fieno
NRC PDR
Central File
NRR Rdg. File
CPB Rdg. File

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ENCLOSURE

Meeting Attendees

April 12, 1979

NRC		Westinghouse
Daniel Fieno	DSS/CPB	Dennis Richardson
Karl Kniel	"	Mike Hitchler
Larry Kopp	"	Rolando Perez
W. L. Brooks	"	
M. Dunenfeld	"	
H. Richings	"	
R. Schemel	"	
J. Rosenthal	DOR/RSB	
P. Kapo*	"	
S. Diab	"	

*Part-time attendance