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

SEP 4 1979

MEMORANDUM FOR: Karl Kniel, Chief, Core Performance Branch, DSS

THRU: Daniel Fieno, Leader, Reactor Physics Section, CPB/DSS

FROM: M. Dunenfeld, Reactor Physics Section, CPB/DSS

SUBJECT: MEETING ON NORTH ANNA QUADRANT FLUX TILTS, 8/22/1979

A meeting was held at the VEPCO offices in Richmond, Virginia to discuss the quadrant flux tilt present in the North Anna Unit 1 reactor. A list of attendees is attached. As described in LERs 79-076, 79-079 and 79-085, North Anna Unit 1 has had a quadrant flux tilt which has exceeded the Technical Specification limit of 2% on three occasions involving power reduction. At full power the tilt has been 1.3 to 1.4% since its appearance following an extended shutdown in April.

As part of the investigation of possible causes of the tilt VEPCO personnel looked at and rejected for various reasons flow distribution, misprediction of burnable poison effects on detector locations, control bank misalignment and enrichment variations. A special test was run to show that the control bank was in alignment. The VEPCO physics people have been able, however, to simulate the power distribution seen in the reactor analytically by performing calculations which assume there are dropped control rodlets in three fuel assemblies. The fact that the tilt does not appear to be burning out with operation is supportive of control rodlets being the cause: the control material is so black that little change in its effect would take place over a period of months with a rodlet in the core at full power.

VEPCO specifically will look for broken rodlets during the refueling of North Anna Unit 1 in October. It would seem highly unlikely that three failures could have occurred during the April shutdown, which was only a cooldown cycle as far as the reactor core is concerned. It would also seem a significant problem if there were three failures, because that would suggest a common mode failure mechanism, and the possibility of more failures with continued use. There was such a problem in the Salem Unit 1 reactor* in which there were eight rodlet failures and which led to the replacement of 25 control pod assemblies in the Cycle 2 reload. Other rodlet failures in the past appear to have been random

*W. Ross, NRC, Docket No. 50-272, "Summary of Meeting Held on July 17, 1978 to Discuss Salem 1 Reload," July 25, 1979.

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and consist of three separate occasions on which the vane holding the rodlets separated at the braze joint holding the vane to the control rod assembly hub. We will pay particular attention to the findings made by VEPCO when the core is unloaded.

The return trip was made via the North Anna site, so that a tour of Unit 1 and the nearly completed Unit 2 could be made. In the Unit 1, control room APDMS operation was demonstrated and a thermocouple map was obtained. All of the thermocouples are operative, and the map is easy to get, but the thermocouple readings appear to have only limited utility in operation of the reactor.

/s/ Dunenfeld

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E. Lozito

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MEETING SUMMARY DISTRIBUTION

Docket Files/Central Files
NRC PDR
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E. Case
D. Crutchfield
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D. Vassallo
S. Varga
D. Skovholt
D. Gammill
F. Williams
J. Stolz
R. Baer
O. Parr
L. Rubenstein
T. Speis
W. Morrison
R. Bernero
Craig Roberts
Robert Purple
R. Vollmer
B. Grimes
J. Miller
J. P. Knight
R. Tedesco
R. Denise
T. Novak
S. Hanauer
W. Kreger
V. Moore
M. Ernst
C. Kelber
Long Tong
L. Shao
J. Durst
Jared Davis
R. M. Scroggins
R. Mattson/F. Schroeder
R. Fraley, ACRS (16)
IE (3)
Z. Rosztoczy
W. Butler

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