



RLD
11/17

Westinghouse Owners Group

Domestic Utilities

Alabama Power
American Electric Power
Carolina Power & Light
Commonwealth Edison
Consolidated Edison
Duke Power
Duke Power

Georgia Power
Florida Power & Light
Houston Lighting & Power
New York Power Authority
Northeast Utilities
Northern States Power
Pacific Gas & Electric

Portland General Electric
Public Service Electric & Gas
Rochester Gas & Electric
South Carolina Electric & Gas
Tennessee Valley Authority
TJ Electric

Union Electric
Virginia Power
Wisconsin Electric Power
Wisconsin Public Service
Wolf Creek Nuclear
Yankee Atomic Electric

International Utilities

Belgian Utilities
Kansai Electric Power
Korea Electric Power
Nuclear Electric plc
Nucleonema Elektroma
Spanish Utilities
Swedish State Power Board
Taiwan Power

OG-94-29

March 28, 1994

Mr. Ashok C. Thadani
Associate Director for Inspection
and Technical Assessment
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Westinghouse Owners Group
Transmittal of WOG Correspondence Regarding WOG/NRC Activities
Addressing Generic Letter 93-04

Dear Mr. Thadani:

On March 9, 1994 the WOG met with Mr. Robert C. Jones and other members of your staff, to discuss the WOG Program for resolution of Generic Letter 93-04, "Rod Control System Failure and Withdrawal of Rod Control Cluster Assemblies, 10 CFR 50.54(f)". The WOG agreed to provide to the NRC a copy of the WOG correspondence reporting the results of the March 9 meeting to our membership and also a copy of the recent letter to our membership providing a status of the recent WOG/NRC activities prior to the March 9 meeting.

The following two letters are attached:

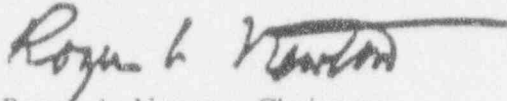
- o Westinghouse Owners Group letter: R.A. Newton to WOG Primary Representatives, Status Update of Recent WOG/NRC Activities For the NRC Generic Letter 93-04 Program Plan, OG-94-15, dated March 7, 1994.
- o Westinghouse Owners Group letter: R.A. Newton to WOG Primary Representatives, Summary of March 9, 1994 WOG/NRC Meeting on NRC Generic Letter 93-04, OG-94-24, dated March 21, 1994.

9404210287 940326
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C PDR

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Please contact me at (414) 221-2002, if you have any questions concerning the attached letters.

Very truly yours,



Roger A. Newton, Chairman
Westinghouse Owners Group

RAN/dac

attachments

cc: William T. Russell, USNRC (1L)
Martin J. Virgilio, USNRC (1L,1A)
Robert C. Jones, Jr, USNRC (1L,1A)
Westinghouse Owners Group Steering Committee (1L)
Westinghouse Owners Group Primary Representatives (1L)
Westinghouse Owners Group Systems and Equipment Engineering Subcommittee (1L)
C.K. McCoy, Georgia Power (1L)
J.P. O'Hanlon, Virginia Power (1L)
N.J. Liparulo, W (1L)
K.J. Voytell, W (1L)



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Georgia Power
 Florida Power & Light
 Houston Lighting & Power
 New York Power Authority
 Northeast Utilities
 Northern States Power
 Pacific Gas & Electric

Pennsylvania General Electric
 Public Service Electric & Gas
 Rochester Gas & Electric
 South Carolina Electric & Gas
 Tennessee Valley Authority
 T. Electric

Union Electric
 Virginia Power
 Wisconsin Electric Power
 Wisconsin Public Service
 Wolf Creek Nuclear
 Yankee Atomic Electric

International Utilities

Belgian Utilities
 Kansai Electric Power
 Korea Electric Power
 Nuclear Electric plc
 Nucleon Electric
 Spanish Utilities
 Swedish State Power Board
 Taiwan Power

OG-94-15

March 7, 1994

To: Westinghouse Owners Group Primary Representatives (1L, 1A)

Subject: Westinghouse Owners Group
Status Update of Recent WOG/NRC Activities
For the NRC Generic Letter 93-04 Program Plan

The purpose of this letter is to provide information on the latest events regarding the Westinghouse Owners Group (WOG) Program Plan to address NRC Generic Letter 93-04, "Rod Control System Failure and Withdrawal of Rod Control Cluster Assemblies, 10 CFR 50.54(f)," issued June 21, 1993.

Background

As part of the WOG Program Plan to address NRC Generic Letter 93-04, "Rod Control System Failure and Withdrawal of Rod Control Cluster Assemblies, 10 CFR 50.54(f)," the Westinghouse Owners Group initiated a Rod Control System Enhancement Program. This program is developing two enhancements to system reliability. The first is a modification to the timing of control rod drive mechanism (CRDM) current orders in order to preclude asymmetric rod withdrawal in the presence of a Rod Control System failure. The second enhancement is a surveillance test to be performed on a refueling basis that verifies that the CRDM current orders are not corrupted.

After reviewing the results of tests performed on the Salem Training Center Rod Control System equipment and historical records from many plants, a modification to the timing was selected that was expected to accomplish two major objectives:

- 1) There must be no effect on normal rod motion, and
- 2) There should be no withdrawal of the rods when a fault similar to the one that occurred at Salem is present and rod motion is requested.

It was preferred and expected that the initial timing change developed would lead to no rod movement when a Salem-type failure is present and rod motion is requested. In December, draft versions of the surveillance test, the Technical Bulletin describing the timing change, and the post-modification testing were transmitted to the WOG primary representatives. Transmittal of the final versions was to occur once results from a plant demonstration test were incorporated.

Results of Tests at South Texas Plant

The South Texas Plant volunteered to perform the plant demonstration testing. Plant personnel incorporated the timing change by modifying the Unit 1 Rod Control System slave cyclers decoder cards. In January 1994, rod movement and rod drop tests verified that the timing modification met objective 1 in that normal motion was observed on all rods.

On February 13, the WOG test program was begun with the plant in Mode 3 Hot Standby, hot zero temperature. The test consisted of three sections:

- 1) Slave cyclers current order recordings to verify proper implementation of the timing modification
- 2) Insertion of faults similar to the Salem event and verification that no rod motion occurs when requested with rods both initially on the bottom and at 10 steps withdrawn
- 3) CRDM coil current recordings (after removal of faults) to verify proper timing and to collect a sample of the variation in the responses of individual CRDMs

Section 1 was accomplished and proper slave cyclers current orders were recorded. The first part of section 2 verified that no rod withdrawal occurs with the new timing when the control rods are initially on the bottom, i.e., with the fault installed and rod withdrawal requested, no motion occurred.

The second part of section 2 of the test involved removing the fault and withdrawing the control bank A rods to 10 steps, then reinstalling the fault. The reactor operator then commanded rod withdrawal, but shortly afterwards noted rod position indications that showed that some of the control bank A rods had inserted. In accordance with the plant test procedure, he tripped the reactor.

Houston Light & Power notified the NRC of the occurrence of a manual reactor trip while in Mode 3. The test was suspended and the recordings were analyzed to determine why inward rod motion had occurred. The data shows that the modification allows the moving gripper assembly (controlled by the lift coil) to rise before the moving grippers engage the drive rod groove: this is what prevents outward rod motion. Toward the end of the cycle, however, the moving gripper assembly is dropping down before the stationary gripper has reengaged the drive rod groove. This lets the rod take one inward step.

The limited data thus shows that a portion of the two major objectives of the timing change were met by demonstrating that normal rod motion was not affected by the timing change and no rods withdrew with a Salem-type fault present and out motion demanded.

As a result of the testing at South Texas being incomplete, the WOG has recognized that rod control testing at another plant will be required to demonstrate the acceptability of the new current order timing. Therefore, the WOG is actively working with another plant to test the timing modifications.

Impact on Licensing Basis

As noted above, inward rod motion (in the presence of the Salem failure) was observed on an outward demand for rod motion at South Texas with the implementation of the CRDM timing changes. New current order timing changes are being recommended to ensure with a high degree of confidence that all rods of the affected group(s) would insert (as discussed below). However, to conservatively address the unlikely situation that inward motion is not symmetric, two limiting scenarios will be evaluated.

1. One entire group moves IN or OUT reliably, while individual rods in the other group either move IN or do not move. The individual rods could respond in either manner during the demand for motion.
2. All rods within a bank(s) selected for motion move IN or remain stationary for either an IN or OUT demand (but not both).

Both of the above failure scenarios are covered by existing licensing basis analyses, that is they meet the applicable Condition II acceptance criteria. The above failures could only hypothetically occur if there is a demand for rod movement.

For the first scenario, the most limiting conditions for the primary Condition II acceptance criterion (DNB) occur if the reactivity addition due to the one group moving OUT is sufficient to enable the power to reach 100%. In automatic rod control, there may be some small amount of power overshoot when the reactor reaches full power. In addition, the primary Tavg is expected to be within or below the normal Tavg deadband once full power

is reached. This failure scenario is bounded by the Condition II Dropped Rod accident which results in a much larger power overshoot (relative to the above scenario) due primarily to the larger assumed withdrawn bank worths. With the same type of failure and IN motion demanded, one entire group will move IN while individual rods in the affected group will either move IN or not move. This is less limiting than the OUT motion demand scenario.

For the second scenario, the most limiting condition occurs at or near full power. Whether the demand is for IN or OUT motion, the rods in the affected bank(s) can only insert or remain stationary. Thus, given any demand for rod motion, multiple rods could be driven into the core. The rod demand position indicators (group step counters) would show outward motion for the selected bank (most likely Control Bank D) when, in actuality, some of the rods would be moving in. These rods, under automatic rod control, would continue to be driven in. No rods from the next bank in overlap (Control Bank C) would move because no overlap would be indicated by the group step counters. Under this failure scenario, the peaking factors would increase and, in the presence of an end of life negative moderator temperature coefficient, the drop in RCS temperature would tend to maintain power close to full power. With a drop of RCS temperature, a drop in both the primary and secondary pressure would occur. For these limiting conditions, the applicable RCCA misalignment Condition II acceptance criteria would be satisfied. Conservatively, no credit is taken for the decrease in reactor power due to the limitations of the turbine throttle valves to maintain full secondary power at reduced RCS temperatures. Additionally, for larger worth insertions, a reactor trip on low pressurizer pressure or low steamline pressure would most likely result prior to reaching the limiting conditions discussed above.

Finally, as mentioned above, in response to a demand for outward rod motion, the rod demand position indicators (group step counters) would indicate outward rod motion for the affected rods whether they are moving in or remaining stationary. Once the rod demand position indicators approach an all out position, the C-11 interlock would prevent further rod motion for the affected rods. This would limit the consequences of failure scenarios discussed above.

Results of WOG Systems & Equipment Engineering Subcommittee Working Group Meeting

Under the direction of the Systems & Equipment Engineering Subcommittee Chairman, the WOG assembled a task group of utility and Westinghouse Rod Control experts on February 23. They evaluated the results of the South Texas Plant test and alternatives for slave cyclor timing. The group determined that insertion of rods affected by a fault similar to the one that occurred at Salem when out rod motion is requested was to be expected with the revised timing. Furthermore, timing modifications to prevent rod motion in the presence of the fault would compromise reliable normal rod motion (objective 1). It was further decided that increasing the delay of the withdrawal cycle timing would give increased assurance that no rods would withdrawal but that all rods in the affected group would insert.

Based on the results of the Working Group meeting, it was agreed that the test would need to be performed at another plant. Discussions have been held and a plant has been identified. Provided that all the necessary preparations can be made, Ginna will perform the testing before the end of April. This would allow distribution of the Technical Bulletin describing the timing modification in May 1994. This distribution will also include the results of plant testing and revisions to the failure assessment to incorporate the final timing values.

It was decided to issue guidance on the current order surveillance in March, 1994. Several improvements to the draft surveillance suggested by utilities are being incorporated.

Interactions with the NRC

On February 16, a telephone conference was held between the NRC, the WOG, and Westinghouse to discuss the test, the observed results, and future plans. The primary NRC representatives were Tom Alexion (new Issue Manager), Margaret Chatterton (technical lead), and Bob Jones (Reactor Systems Branch). The WOG was represented by Chairman Roger Newton (Wisconsin Electric), Vice Chairman Tom Greene (Georgia Power), Regulatory Response Group chairman Doug McKinney (Southern Nuclear), and Systems & Equipment Engineering Subcommittee chairman Bryce Shriver (Virginia Power). The WOG position was that, based on not being able to complete all of the recommended testing at South Texas, there is a need to identify a plant to perform the test. The WOG also indicated that their position regarding GDC 25 (or its equivalent) has not changed with respect to meeting the licensing basis and that the timing modification is intended to enhance the system. The NRC stated that they do not necessarily agree with the position regarding GDC 25. The WOG committed to get back to the staff with further information regarding future activities in approximately two weeks.

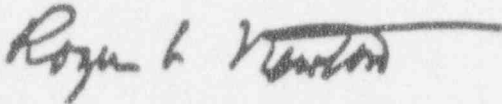
On February 25 at the request of the NRC, a second conference call was held with the same NRC personnel. The purpose of the call was to receive NRC feedback from their internal management discussions. The NRC expressed concerns over the expediency of the final resolution to this issue. The staff questioned the results of inward rod motion during the South Texas testing, any related safety impacts associated with those results, and identification of future plant testing. In addition, they also expressed concerns over the withdrawal of the 3-D RCCA Withdrawal Report (WCAP-13803). Subsequently, the NRC has requested that the WOG meet with them to discuss future direction of the program. This meeting has been scheduled for Wednesday, March 9, 1994, beginning at 1:00 pm in 16B11 One White Flint in Rockville.

The objectives of this meeting will be to discuss the South Texas testing and results, the root cause of those results, any effect on the recommended timing changes, future plant testing, and the schedule for resolution.

In response to the NRC concern with satisfying GDC 25, the WOG still believes that GDC 25 is met based on results of a single failure (all CRDMs in a given group receive the same signal), frequency of card failures, and appropriate acceptance criterion based on frequency of occurrence.

Additional information will be provided as necessary.

Very Truly Yours,

A handwritten signature in black ink, appearing to read "Roger A. Newton". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Roger A. Newton, Chairman
Westinghouse Owners Group

cc: Westinghouse Owners Group Primary Representatives
WOG Steering Committee
WOG Regulatory Response Group
Operations Subcommittee Representatives
Analysis Subcommittee Representatives
Licensing Subcommittee Representatives
Systems & Equipment Engineering Subcommittee Representatives
C.K. McCoy, Georgia Power
J.P. O'Hanlon, Virginia Power
N.J. Liparulo, W
K.J. Voytell, W



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Houston Lighting & Power
New York Power Authority
Northeast Utilities
Northern States Power
Pacific Gas & Electric

Portland General Electric

Public Service Electric & Gas
Rochester Gas & Electric
South Carolina Electric & Gas
Tennessee Valley Authority
Tulsa Electric

Union Electric

Virginia Power
Wisconsin Electric Power
Wisconsin Public Service
Wolf Creek Nuclear
Yankee Atomic Electric

International Utilities

Belgian Utilities
Kansas Electric Power
Korea Electric Power
Nuclear Electric plc
Nucleonema Elektrom
Spanish Utilities
Swedish State Power Board
Taiwan Power

OG-94-24

March 21, 1994

To: Westinghouse Owners Group Primary Representatives (1L, 1A)

Subject: Westinghouse Owners Group
Summary of March 9, 1994 WOG/NRC Meeting on NRC Generic Letter 93-04

The purpose of this letter is to provide a summary of the March 9th meeting and describe the agreements reached between the Westinghouse Owners Group (WOG) and the NRC regarding the WOG Program to address NRC Generic Letter 93-04, "Rod Control System Failure and Withdrawal of Rod Control Cluster Assemblies, 10 CFR 50.54(f)," issued June 21, 1993.

In addition, the WOG is conducting an informal survey to gather an estimate of the time period required by utilities to implement proposed Rod Control System changes. Thus each WOG Primary Representative is requested to complete and return the survey, Attachment A, by May 2, 1994.

Overview

The intent of the NRC-requested meeting was to inform the NRC of the most recent events surrounding the WOG Program to address NRC GL 93-04. Items discussed at the meeting were a synopsis of the results from the South Texas plant testing, potential modifications to the proposed timing changes, subsequent effects on the safety analyses, the WOG position regarding the review of WCAP-13803, Rev 1, "Generic Assessment of Asymmetric Rod Cluster Control Assembly Withdrawal" not being required, and future plans for additional testing and final resolution of the issue. A copy of meeting attendees and the presentation material is included in Attachment C.

Opening Remarks

Robert C. Jones, acting Deputy Director of the Systems Safety and Analysis Division, NRC, opened the meeting with a summary of NRC concerns regarding the pace at which the Rod Control Failure issue was being resolved. He also expressed NRC concern over the results of the South Texas testing, the apparent unwillingness of the WOG to permit the NRC to review WCAP-13803, Rev 1, and reiterated that the NRC did not agree with the WOG's position on GDC 25.

Roger Newton, Chairman of the WOG, also provided a brief overview of WOG activities to date and the WOG's position on safety significance of the issue and future actions as they stood following the last meeting with the NRC which was held on September 13, 1993. He also restated the WOG's position that the licensees continue to comply with GDC 25.

Meeting Summary

Steve Fowler, Westinghouse, presented the results of the testing at South Texas. The NRC was satisfied with the presentation of the testing results. The South Texas testing demonstrated that for the new current order timing changes 1) normal rod operation was not affected, 2) there was no rod withdrawal in the presence of a Salem-type failure, and 3) there might be some rod insertion. Based on the test results, Steve also outlined the proposed modifications to the current order timing changes to 1) ensure that normal rod operation is not affected, 2) preclude any rod withdrawal in the presence of a Salem-type failure, and 3) ensure with a high degree of confidence that all rods will insert given a Salem-type failure.

Dave Huegel, Westinghouse, then presented the potential impacts on the safety analyses should asymmetric rod insertion occur. Two limiting cases were identified: 1) One group of the selected bank is affected by the failure when outward motion is demanded. The other unaffected group in the selected bank moves OUT reliably while individual rods in the affected group move IN or remain stationary. 2) All the rods are affected by the failure and all the rods within the bank(s) selected for motion move IN or remain stationary for either an IN or OUT demand. The evaluation concluded that Scenario 1 was bounded by the Dropped Rod event, and that for Scenario 2, Dropped Rod continued to be a more limiting DNB transient and all Condition II acceptance criteria would continue to be met.

Roger Newton reiterated the WOG's position that GDC 25 is met, and thus, NRC review of WCAP-13803, Rev 1 is not required. Roger stated that WCAP-13803, Rev 1, was generated to document the assessment/evaluation of asymmetric rod withdrawal on Condition II DNBR limits which demonstrates a level of safety significance consistent with allowing orderly resolution of the issue (i.e., the test program). He also presented that the other activities (industry survey, FMEA, probability of occurrence) the WOG had pursued concluded that Westinghouse plants continue to satisfy GDC 25. Given this, there was no need to submit the WCAP for review. The WOG recommended that the focus be on enhancing operational safety and reliability, rather than on analytical compliance. He also stressed that if GDC 25 was not satisfied, then all utilities would be required to file a justification for continued operation (JCO) and request an exemption at a significant expenditure of utility and NRC resources.

Issues and Resolution

The WOG's overall position was that a Salem-type failure is a low probability event and under the acceptance criteria applicable to Condition III events, all licensing basis requirements are satisfied and GDC 25 continues to be satisfied. The industry uses probability in other general design criteria, i.e., containment isolation (two valves with a common mode failure) is a low probability event that does not have to be considered in conjunction with an existing accident. The NRC responded that this was not the proper forum to address a general interpretation of the General Design Criteria.

The NRC identified the following issues which were openly discussed during the meeting:

- 1) The NRC requested that the WOG submit WCAP-13803, Rev 1, "Generic Assessment of Asymmetric Rod Cluster Control Assembly Withdrawal" for a limited review. The NRC will use the review of the WCAP to bridge the question of adherence to GDC 25 and demonstrate that there is a reasonable assurance associated with the issue. This will enable the NRC and the WOG to agree to disagree on

GDC 25 interpretation without any further action necessary by the NRC provided one of the enhancement options will be implemented by each licensee. The NRC will ultimately complete their assessment that licensees continue to meet GDC 25 based on 1) actual frequency of occurrence, 2) actual safety significance, 3) results of the revised FMEA (from WCAP-13864 "Rod Control System Evaluation Program"), 4) commitment to long-term enhancements, and 5) demonstration of Condition II accident impact (WCAP-13803, Rev 1).

- 2) In its SER, the NRC is expected to identify that the WCAP-13803, Rev 1, is being used in the manner described above and that no JCO or regulatory exemption is required. In addition, the WCAP and its analyses (and the identified transient) will not become part of the licensee's permanent licensing basis (based on long-term enhancements being made).
- 3) The NRC strongly indicated that every plant would have to make some type of enhancement to complete the assessment of GDC 25 compliance.
- 4) The NRC stressed the importance of completing a successful test at Ginna. The NRC wants to continue to believe that the WOG is "acting expeditiously and in good faith."
- 5) The NRC requested a copy of the Westinghouse Technical Bulletin once the successful completion of plant testing is accomplished.
- 6) The NRC requested a copy of WOG correspondence OG-94-15, dated March 7, 1994, and a copy of this letter.

WOG Future Plans and Schedule

Bryce Shriver, Chairman of the Systems & Equipment Engineering Subcommittee, presented the WOG's future actions.

The testing at Ginna should commence on or about April 10.

The instructions and guidance for the new surveillance test procedure will be issued separate from the results of the Ginna testing to provide more timely support for its implementation. The instructions are to be issued by the end of March.

Once the Ginna testing is complete, the results of the new testing along with the final timing changes will be issued to all utilities by Westinghouse. This package will also include a generic 50.59 safety evaluation. This effort is scheduled to be completed by the end of the second quarter of 1994. WCAP-13864 "Rod Control System Evaluation Program" will also be revised once the final timing changes are defined and any subsequent modifications required for the FMEA are completed.

A complete schedule of remaining program milestones is contained in Attachment B.

Utility Implementation

The NRC considers that all licensees should implement the enhancements on a timely (prompt) manner. The NRC is likely to ask each licensee for a specific schedule for implementation. The NRC will probably request a modification to the 90 day/45 day response for those licensees that were not specific in their long-term

actions or that responded that they had no plans to implement any enhancements. Furthermore, the NRC believes that each utility should begin preparing now for the timing modifications and the new surveillance testing.

The NRC also expressed a concern for the apparent lack of attentiveness by the licensees regarding a commitment for implementation in a timely fashion. The NRC questioned if the timing change could be made during normal operation. The WOG responded that it should be performed during a normal refueling outage. The earliest a utility may be able to implement a change would be during a fall 1994 outage, but this will be difficult to achieve. The NRC then requested what is a reasonable time period for implementing the timing change. The WOG responded that they would conduct an informal survey to gather as much information as possible, but it was ultimately up to each licensee to decide on their individual action. Please complete and return the survey contained in Attachment A as soon as reasonably possible.

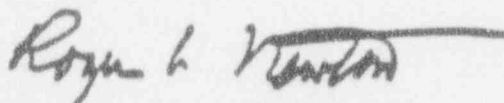
If a given utility elects to not implement the current order timing changes and instead pursues the analysis option, that utility will have to submit WCAP-13803, Rev 1, or other plant-specific analyses on their docket for NRC review and long-term incorporation into their licensing basis.

Advisory Committee on Reactor Safeguards (ACRS) Meeting

It is anticipated that the WOG will be asked to participate in an ACRS meeting on the overall Rod Control Failure program sometime this spring.

Additional information will be provided as identified in Attachment B. Should you have any questions concerning this information, please call Mark Proviano (412) 374-5651 or Bryce Shriver (804) 273-2721.

Very truly yours,



Roger A. Newton, Chairman
Westinghouse Owners Group

/dac

attachments

cc: Steering Committee (1L,1A)
Westinghouse Owners Group Regulatory Response Group (1L,1A)
Operations Subcommittee Representatives (1L,1A)
Analysis Subcommittee Representatives (1L,1A)
Licensing Subcommittee Representatives (1L,1A)
Systems & Equipment Engineering Subcommittee Representatives (1L,1A)
C.K. McCoy, Georgia Power (1L)
J.P. O'Hanlon, Virginia Power (1L)
N.J. Liparulo, W (1L)
K.J. Voytell, W (1L)

ATTACHMENT A

LICENSEE SURVEY

WOG UTILITY SURVEY

The WOG has committed to provide the NRC an estimate of the time period utilities will need to implement the proposed Rod Control System enhancement. Please respond to the questions below as best you can. Your participation and prompt response by May 2, 1994, is appreciated by the WOG.

Utility _____

Plant _____

Do you intend on implementing a Rod Control System enhancement ? YES ____ NO ____

If YES, what type of enhancement?

Current Order Timing Changes & New Surveillance Test _____

New Safety Analyses & New Surveillance Test _____

Other (developed by utility) _____

Assuming that the Ginna testing is successful and all necessary information is at your facility by 7/1/94, what is your best-estimate schedule for implementing the modification?

Is there any additional information from the WOG that you will require?

Name and phone number of utility contact: _____

Please respond by Monday, May 2, 1994

Please send your response to : Mr. Mark Proviano
Westinghouse Electric
PO Box 355; ECE 4-08
Pittsburgh, PA 15230-0355

FAX: (412) 374-4011

ATTACHMENT B

MILESTONE SCHEDULE

WOG ROD CONTROL SYSTEM PROGRAM

MILESTONE SCHEDULE

- March 21 Information letter sent to all utilities summarizing WOG/NRC meeting of 3/9/94.
- March 21 Resubmittal of WCAP-13803, Rev 1, "Generic Assessment of Asymmetric Rod Cluster Control Assembly Withdrawal" to the NRC.
- March 25 Letter to NRC forwarding WOG letters OG-94-15 and OG-94-24.
- March 31 Issuance of instructions and guidance on new surveillance test procedure.
- April 10 Beginning of Rod Control System testing at Ginna (RG&E)
- May-June ACRS meeting on Rod Control System failure.
- May 13 WOG letter to utilities on Ginna Rod Control System test results.
- June 1 Letter to NRC providing estimates of implementation time period and copy of May 13 WOG letter (Ginna test results).
- June 30 Issuance of Westinghouse Technical Bulletin on final Rod Control System current order timing changes and generic 50.59 evaluation.
Issuance of revision to WCAP-13864 "Rod Control System Evaluation Program."
- July 8 Copy of Westinghouse Technical Bulletin and revised WCAP-13864 "Rod Control System Evaluation Program" sent to the NRC.

ATTACHMENT C

WOG/NRC PRESENTATION MATERIALS

NRC/WOG Meeting

3/9/94

<u>Name</u>	<u>Company</u>	<u>Phone</u>
W Clatterton	NRC/SRXB	(301) 504-2889
I. Alvin	NRC/NRR	(301) 504-1326
Bruce Szivier	WOG/VIRGINIA POWER	(804) 273-7721
ARR/WALSH	NAESCO	(603) 474-9521
DAVE CAMPBELL	<u>W</u>	(412) 374-6206
Mark Proviano	<u>W</u>	(412) 374-5651
JACK LIPARULO	<u>W</u> /WOG	(412) 374-5169
Teff Bass	<u>W</u>	(412) 374-4262
Eric Bender	NRR/OEAB	(301) 504-1171
JAMES J. RALEIGH	SOUTHERN TECHNICAL SERV.	(301) 652-2500
Hans Renner	NNS	(301) 258-8693
HANK SEPP	<u>W</u> Nuclear Safety	(412) 374-5282
David Hugel	<u>W</u> Nuclear Safety	(412) 374-5424
Steve Fowler	<u>W</u> Reliability Eng.	(412) 374-6071
Hukam Garg	NRC/NRR/HICB	(301) 504-2929
ROBERT PETCH	NRC/NRR/SRXB	(301) 504-3236
Gene Lazarswitz	NRC/RI/ORS	(215) 337-5392
Robert Jones	NRC/NRR/DSSA	(301) 504-2884
Jared Wermiel	NRC/NRR/DRCH/HICB	(301) 504-2821
Roger Newton	WEPC.	(414) 221-2002

WESTINGHOUSE OWNERS GROUP

UPDATE ON

ROD CONTROL SYSTEM EVENT

March 9, 1994

1:00 - 3:00

ROOM 16B11, White Flint

Rockville, MD

AGENDA FOR MARCH 9, 1994
NRC/WOG MEETING ON WOG RESPONSE
TO NRC GENERIC LETTER 93-04

- INTRODUCTION/MEETING PURPOSE - Robert Jones, NRC
- INTRODUCTION OF WOG RESPONSE - Roger Newton, WOG
- SOUTH TEXAS DEMONSTRATION TEST - Steve Fowler, W
- TEST RESULTS - Steve Fowler, W
- ROOT CAUSE OF THE PROBLEM WITH SOUTH TEXAS TESTS - Steve Fowler, W
- EFFECTS ON SAFETY ANALYSES - Dave Huegel, W
- WOG POSITION ON NEED FOR WCAP-13803 REV. 1 REVIEW - Roger Newton, WOG
- FUTURE ACTIVITIES - Bryce Shriver, WOG
- CLOSING WOG SUMMARY - Roger Newton, WOG
- NRC COMMENTS - Robert Jones, NRC

INTRODUCTION OF WOG RESPONSE

- SUMMARIZE WOG ACTIVITIES AND RESULTS
- REVIEW SAFETY SIGNIFICANCE
- DISCUSS ISSUES AND TESTING AT SOUTH TEXAS
- DISCUSS POTENTIAL IMPACT ON THE SAFETY ANALYSES
- REVIEW WOG POSITION ON NEED FOR WCAP-13803 REV. 1 REVIEW
- SUMMARIZE WOG FUTURE ACTIONS

SUMMARY OF WOG ACTIVITIES

June 14	WOG/NRC Meeting in Bethesda, Md
June 25	WOG RRG Letter issued to all members outlining RRG effort related to Salem Rod Control System Event (OG-93-39)
July 9	WOG/NRC Meeting in Rockville, Md
July 14	WOG Request to NRC for Scheduling Relief on GDC-25 Determination (OG-93-44)
July 26	NRC Letter granting relief
July 30	WOG 45 day generic response transmitted to all members (OG-93-53)
August 5	45 day response submitted to NRC
August 9-11	Rod control testing performed at Salem Training Center
September 3	WOG Status Report sent to NRC (OG-93-75)
September 9	WOG 90 day generic response transmitted to all members (OG-93-77)
September 13	WOG/NRC Meeting in Rockville, Md
September 20	90 day licensee response due to NRC
September 24	WCAP-13864, RCS Evaluation
November	Houston Light & Power volunteered to perform test
January, 1994	Modified timing installed at South Texas
February 13	Rod Control Testing at South Texas
February 23	WOG Rod Control Task Team met in Pittsburgh
March 9	WOG/NRC Meeting in Rockville, Md

WOG/NRC MEETING

SEPTEMBER 13, 1993

- GDC 25 CONTINUES TO BE MET
 - Satisfy appropriate criterion based on frequency of occurrence

- RECOMMENDATION OF ENHANCEMENTS
 - OPTION A - New Current Order Surveillance and Current Order Timing Changes
 - OPTION B - New Current Order Surveillance and New Safety Analyses

WOG/NRC MEETING

SEPTEMBER 13, 1993

- RECOMMENDED TIMING CHANGE GOALS
 - Ensure that, when Salem-like corrupted current orders are present, affected control rods will not move.
 - Ensure that the current order timing change has no impact on normal Rod Control System operation.

- WOG FUTURE ACTIONS
 - Demonstrate that recommended timing changes will preclude rod motion for a Salem-type failure and have no impact on normal operation.
 - Issue draft Westinghouse Technical Bulletin with new timing changes and surveillance testing instructions.

SAFETY SIGNIFICANCE OF POTENTIAL ASYMMETRIC ROD MOTION FOR SALEM-TYPE FAILURE EVENTS

- EXTREMELY LOW PROBABILITY OF OCCURRENCE
- FAILURE IS DETECTABLE THROUGH EXISTING TECHNICAL SPECIFICATION SURVEILLANCE
- ANY OCCURRENCE WOULD BE TERMINATED BY OPERATOR ACTION LONG BEFORE ANY FUEL DESIGN LIMIT IS CHALLENGED. FIVE HUNDRED REACTOR YEARS OF OPERATION HAS DEMONSTRATED THAT GDC 25 IS MET.
- THUS, THE FOCUS IS ON ENHANCING OPERATIONAL SAFETY AND RELIABILITY.

WOG ROD CONTROL ENHANCEMENT PROGRAM

BACKGROUND INFORMATION

PURPOSE:

The revised Failure Modes and Effects Analysis reported in WCAP-13864 determined that the only single failure that could potentially result in asymmetric rod withdrawal was the failure experienced at Salem.

PROGRAM ELEMENTS:

- Develop and test a modification to current order timing to prevent rod motion with Salem-type failures while ensuring reliable CRDM operation
- Develop a current order surveillance to be performed by plants on a refueling basis

TIMING MODIFICATION DETAILS

Timing modification focused on ensuring the following:

- With the Salem-type failure is present, the lift coil raises the moving gripper assembly prior to the moving gripper engaging the lower drive rod groove, thus preventing outward rod motion.
- Without the Salem-type failure present, normal insert and withdraw sequences among between lift, moving, and stationary coil signals are maintained

South Texas timing modification accomplished by:

- For rod insertion, advancing the lift coil energization from count 5 to count 1
- For rod withdrawal, retarding the current orders by 10 counts

SOUTH TEXAS PROJECT DEMONSTRATION TEST

- Recordings of slave cyclor current orders showed modification was correctly implemented.
- Rod withdrawal and insertion were normal during rod position indication and rod drop tests.
- When Salem-type fault was installed with rods on bottom and control bank A outmotion requested, no rods withdrew.
- When Salem-type fault was installed with control bank A rods at 10 steps and outmotion requested, no rods withdrew; however, rods indicated inward motion.
- Reactor operator tripped reactor in accordance with test procedure.
- Test was revised to allow for inward motion, but was not performed due to potential delays of plant startup.

EXPLANATION OF WHY RODS MOVE IN WITH REVISED TIMING

- At the beginning of cycle, energizing the lift coil raises the moving gripper assembly prior to the moving gripper engaging the drive rod groove. This prevents the rod from withdrawing.
- At the end of cycle, deenergizing the lift coil lowers the moving gripper assembly prior to the stationary gripper engaging the drive rod groove. This lowers the rod one step.

EFFECTS ON SAFETY ANALYSES

Safety Analysis Assumption:

- Safety analysis evaluation conservatively assumes that the rod(s) of the affected group(s) insert asymmetrically.
- Two limiting asymmetric insertion scenarios:
 - One group affected by failure: one entire group moves OUT reliably, while individual rods in the other group move IN or do not move.
 - All groups affected by failure: All rods within a bank(s) selected for motion move IN or remain stationary for either an IN or OUT demand

EFFECTS ON SAFETY ANALYSES

Scenario A. One group affected by failure: One entire group moves OUT reliably, while individual rods in the other group move IN or do not move

- On an OUT demand where multiple rods insert, rods from the unaffected group move OUT and rod(s) from the affected group continuously move IN. Power stabilizes or drops and peaking factors increase.

BOUNDED BY DROPPED ROD (NO DNB)

EFFECTS ON SAFETY ANALYSES

Scenario B: All groups affected by failure: All rods within a bank(s) selected for motion move IN or remain stationary for either an IN or OUT demand

- On a demand for outward rod motion, no rods move out, but multiple rods could be driven into the core resulting in:
 - Power mismatch causing primary system cooldown and drop in secondary power.
(Drop in secondary power not credited in evaluation)
 - Primary power stabilizing if a conservatively negative moderator temperature coefficient is present
 - Drop in secondary and primary pressures potentially resulting in reactor trips on low pZR pressure or low steam pressure
(Not credited in evaluation)

EFFECTS ON SAFETY ANALYSES

Scenario B: All groups affected by failure: All rods within a bank(s) selected for motion move IN or remain stationary for either an IN or OUT demand
(CONTINUED)

- Increased peaking factors
- No power overshoot since rods do not move OUT

DROPPED ROD ANALYSIS GIVES
MORE LIMITING RESULTS

CONDITION II ACCEPTANCE CRITERIA
SATISFIED (NO DNB)

EFFECTS ON SAFETY ANALYSES

CONCLUSIONS:

- All Condition II acceptance criteria (DNB) satisfied for failure scenarios using licensed methods
- C-11 bank D automatic rod withdrawal stop would significantly minimize any rod movement/misalignment if credited

WOG POSITION ON NEED FOR WCAP-13803 REV 1 REVIEW

- WCAP-13803, REV 1, GENERATED TO DOCUMENT ASSESSMENT/EVALUATION OF ASYMMETRIC ROD WITHDRAWAL ON CONDITION II DNBR LIMIT
- WCAP USED METHODOLOGY/CODES NOT LICENSED IN U.S. BUT DEMONSTRATED THAT CONDITION II SATISFIED
- WOG POSITION THAT WE COMPLY WITH GDC 25 WAS MADE AT 9/13/93 MEETING
- MOST 90 DAY LICENSEE RESPONSES MADE TO NRC CONCLUDED THAT GDC 25 WAS MET
- NO NEED TO SUBMIT WCAP FOR REVIEW
- WOG RECOMMENDATION PROVIDES THE FOCUS ON ENHANCING OPERATIONAL SAFETY AND RELIABILITY, RATHER THAN ON ANALYTICAL COMPLIANCE.

FUTURE ACTIVITIES

OBJECTIVES

- NORMAL ROD OPERATION WITHOUT FAILURE
- PRECLUDE OUTWARD MOTION WITH SALEM-TYPE FAILURE

IDENTIFICATION AND SCHEDULE OF NEW TESTING

- ☛ ROCHESTER GAS & ELECTRIC GINNA
- ☛ WEEK OF APRIL 13, 1994

REVISION OF WCAP-13864, RCS EVALUATION PROGRAM

- ☛ ONCE TESTING IS COMPLETE (TIMING CHANGES ARE FINAL), REVISION OF WCAP WILL BE ISSUED

FUTURE ACTIVITIES

(CONTINUED)

SCHEDULE FOR ISSUANCE OF CURRENT ORDER SURVEILLANCE TESTING

- ☛ INSTRUCTIONS ON SURVEILLANCE TESTING TO BE ISSUED BY END OF MARCH

SCHEDULE OF TECHNICAL BULLETIN

- ☛ FINAL TECH BULLETIN TO BE ISSUED ONCE TIMING CHANGES ARE FINAL, EXPECTED BY END OF SECOND QUARTER 1994
- ☛ FINAL TECH BULLETIN TO INCLUDE GENERIC 50.59 SAFETY EVALUATION

CLOSING WOG SUMMARY

- NEW TIMING ORDER CHANGES WILL PRECLUDE ROD WITHDRAWAL IN THE PRESENCE OF A SALEM-TYPE FAILURE
- NEW TIMING ORDER CHANGES WILL NOT AFFECT NORMAL ROD OPERATIONS
- INWARD ROD MOTION HAS NO SAFETY IMPACT
- WOG DOCUMENTATION TO UTILITIES WILL BE COMPLETED ONCE TESTING IS SATISFACTORILY COMPLETED
- THE WOG CONTINUES TO BELIEVE THAT GDC 25 IS MET