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SUBJECT: Provides suppl info for closure audit re request for closure of GL 89-10, "SR MOV Testing & Surveillance."

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March 31, 1995

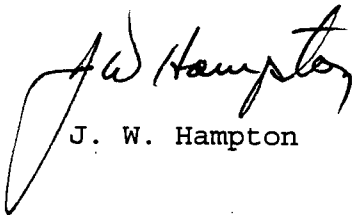
U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Generic Letter 89-10 "Safety-Related Motor-Operated
Valve Testing and Surveillance"
Request for Closure of Generic Letter 89-10
Supplemental Information for Closure Audit

In a letter dated December 12, 1994, Oconee Nuclear Station requested NRC closure of the Generic Letter 89-10 Program. Subsequent to this letter a phone conversation was held between Duke and NRC representatives on January 23, 1995. In this phone conversation, Oconee committed to provide the NRC a "Generic Letter 89-10 Closure Audit Package" as described by applicable sections of a July 12, 1994 NRC memo entitled "Guidance on Closure of Staff Review of Generic Letter 89-10 Programs". The information to support closure of Generic Letter 89-10 is enclosed as Attachment 1.

If you have any questions or need further information you may contact D. A. Nix at (803) 885-3634.

Very truly yours,



J. W. Hampton

attachment

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Page 2

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ATTACHMENT 1

To close GL 89-10, selected audit information for NRC review is provided, as requested, in the sequence addressed in the July 12, 1994 NRC Memo. As covered in the January 23, 1995 phone conference with the NRC, only the applicable sections of this memo are discussed. For purposes of brevity, as requested by NRC, the discussion of already documented audit results are not included in this submittal.

Mispositioning

This issue was addressed in the letters dated March 23, 1993 and September 7, 1993, from DPC to the NRC and the NRC responses dated August 5, 1993 and April 12, 1994. In the April 12, 1994 response, the NRC stated, "the NRC staff finds it acceptable to remove passive position-changeable MOVs from your GL 89-10 program." Based on the results of the NRC study on mispositioning for PWRs, the exclusion of passive position-changeable MOVs at ONS will be reconsidered.

Pressure Locking and Thermal Binding

The progress of the "DPC Guideline for Performing Thermal Binding (TB) and Pressure Locking (PL) Review" plan was reviewed during the June 20-24, 1994 ONS GL 89-10 Phase II audit.¹ This item was considered open during the June 23, 1994 exit meeting following the GL 89-10 Phase II audit pending issuance of the Generic Letter on PL/TB. ONS is currently refining its plans to address this issue based on GL 89-10, Supplement 6 guidance and a draft copy of the Generic Letter.

Periodic Verification

To address the periodic verification issue, DPC is identifying typical time-dependent degradation mechanisms that can affect MOV stem thrust or torque delivery. For each degradation mechanism, a description of how it will either be prevented by a preventative maintenance (PM) activity, detected by a periodic test parameter, or is compensated for by switch set-up margin will be provided. Engineering analysis is nearly complete on developing diagnostic techniques to identify the applicable common MOV deficiencies, misadjustments, and degraded conditions identified in Attachment A of GL 89-10. In addition, periodic verification is currently scheduled on a 3 RFO / 5 year frequency per GL 89-10, item j, until information is available to justify an extended or reduced schedule.

Quality Assurance

This item was addressed in the June 20-24, 1994 ONS GL 89-10 Phase II audit. Per the inspection report, adequate quality assurance was implemented in the GL 89-10 program.

Part 1 Issues

a. Valve Factor

DPC-1205.00-00-0001² analyzed the overall distribution and significance of *in-situ* DP tested gate valve factors (VF) within the DPC GL 89-10 program. Test results demonstrated that the programmatic assumptions for many gate valves were conservative and acceptable. Testing also indicated that some groups of valves behave in predictable, consistent manners that permit non-testable valves to be analyzed using grouping (bounding) methodologies. Testing has also shown that some groups of valves do not behave in a consistent manner and must be treated in a more individual fashion.

For gate valves that were not DP tested, justified based on an open-only safety function, or justified based on a similarity study, bounding VFs were used in accordance with DPC-1205.00-00-0001. For most gate valves that could not be bounded by DPC-1205.00-00-0001, a VF of at least 0.55 was used with 22% rate of loading (ROL). Since high VFs and high ROL do not typically occur simultaneously, this is considered very conservative. Other valves not bounded by DPC-1205.00-00-0001 are:

- Two non-bounded gate valves used a 0.6 VF with at least 10% ROL. Gear changes are planned for the next Unit 2 outage on these two MOVs to add additional margin.³
- Four non-bounded, open/throttle gate valves use a VF of at least 0.4 in the open direction and 0.35 in the closed direction. These are Westinghouse valves which demonstrated low VFs during the EPRI testing; however, replacement of these MOVs is planned for the next Unit 1 and 2 outages.^{4 5}

b. Stem Friction Coefficient

DPC-1205.19-00-0001⁶ provided a technical basis for using a stem coefficient of friction (COF) of 0.15 based on DPC GL 89-10 *in-situ* DP tests and industry sponsored tests. Information from these sources justified the assumption that the effective COF between the motor operator stem nut and a valve stem is generally bounded by the 0.15 value.

c. Load Sensitive Behavior

Seventy-four gate and globe valves have been DP tested or justified based on an open-only safety function. Twenty-one gate and globe valves have been justified based on similarity studies as discussed below:

- Twelve of these grouped valves used a VF of 0.6 or 1.1 (gate or globe) and a ROL of 22%.
- Six Kerotest globe valves used the VF, ROL, and stem COF as outlined in DPC-1205.01-00-0001⁷ which evaluated the flow loop tests of Kerotest valves.
- Three Borg Warner gate valves used a VF of 0.6 with a ROL of at least 5%. This is considered acceptable since high valve factors and high ROL do not typically occur simultaneously. Replacement of these valves is planned to provide additional margin.⁸

DPC-1205.19-00-0002⁹ evaluated the ROL effects of DP tested DPC GL 89-10 MOVs. Eighty-one gate and globe valves have been justified based on using the bounding ROL specified for the ONS valves per DPC-1205.19-00-0002. Modifications are planned on seven MOVs to add additional margin.¹⁰

d. Margins for Stem Lubrication Degradation and Spring Pack Relaxation

Results of the EPRI MOV Performance Prediction Program Stem/Stem Nut Lubrication Test Report, TR-102135, and the DPC Kerotest program, DPC-1205.01-00-0001, provided confirmation that the original programmatic assumption of 0.15 for stem COF is adequate. This information also indicated that there is no significant degradation of stem factors or stem COFs with sequential, highly loaded strokes.

PIP 0-G93-0140¹¹ addressed spring pack relaxation as outlined in Limitorque Technical Update 93-02.

e. Motor Performance Factors

(1) Motor Rating

PIP 0-O93-0744¹² and OSC-5558¹³ addressed this issue as outlined in Limitorque Technical Update 93-03. This item was reviewed during the June 20-24, 1994, ONS GL 89-10 Phase II audit.

(2) Efficiencies Used in Open and Close Directions

In most cases, pullout efficiency is used for valves that have an opening safety function and run efficiency is used for valves that have a close-only safety function. However, the following exceptions exist:

- Twelve new valves will use pullout efficiency in the opening direction and run efficiency in the closing direction. The safety function for these valves is to open and throttle.
- The use of run efficiency for another two valves is justified since the current valves leak and have hammer blow. Replacement of these valves is scheduled for later this year.¹⁴
- Run efficiency for 12 other valves is justified since the maximum load will not occur until mid-stroke. Gear changes are scheduled during the next three outages to increase margin on these valves.¹⁵

(3) Application Factor

This item was addressed in the June 24-28, 1991, ONS GL 89-10 Phase I audit¹⁶ as Written Response Requested item 5. This item was closed during the June 23, 1994 exit meeting following the GL 89-10 Phase II audit.

(4) Power Factor Used in Degraded Voltage Calculations

The electrical undervoltage calculations were reviewed during the June 20-24, 1994, ONS GL 89-10 Phase II audit. The starting power factor values for GL 89-10 MOVs are based on manufacturer's information.

f. Basis for Extrapolation Method of Partial DP Thrust Measurements

DPC-1205.00-00-0003¹⁷ showed that linear extrapolation of low-DP test results can be used to determine MOV performance at high DP.

g. Torque Switch Repeatability (TSR)

PIP 0-093-0505¹⁸ addressed this issue. This item was addressed during the June 20-24, 1994, ONS GL 89-10 Phase II audit.

h. Use of Limitorque, Kalsi, or other sources for increasing thrust and torque allowable limits

This item was addressed in the June 24-28, 1991, ONS GL 89-10 Phase I audit as Written Response Requested item 3. This item was closed during the June 23, 1994 exit meeting following the GL 89-10 Phase II audit.

i. Equipment Error

PIPs 3-092-0226,¹⁹ 0-092-0622,²⁰ and 0-093-0610²¹ addressed MOV diagnostic test equipment inaccuracy. All evaluations and additional corrective actions have been completed.

j. Post-Maintenance Testing, especially valve packing adjustments

The Post Maintenance Testing (PMT) matrix within the DPC GL 89-10 Program Plan was reviewed during the June 24-28, 1991, ONS GL 89-10 Phase I audit. The only concern noted was documented as Written Response Requested item 8, specifically addressing packing adjustments. This item was closed during the June 23, 1994 exit meeting following the GL 89-10 Phase II audit.

k. Grouping of MOVs

Groupings used at ONS are based on *in-situ* differential pressure (DP) tests and/or flow loop tests. Results are extrapolated to other similar valves by extrapolation reports, similarity studies, or calculations.²²

l. Trending of MOV Problems

This item was addressed in the June 20-24, 1994, ONS GL 89-10 Phase II audit. The Problem Investigation Process (PIP) was considered adequate and able to provide the necessary information to support the GL 89-10 recommendations per the inspection report.

- 1 NRC Inspection Report Nos. 50-269/94-15, 50-270/94-15, and 50-287/94-15
- 2 DPC-1205.00-00-0001 - Evaluation of "As Tested" Gate Valve Factors
- 3 2HP-24 Gear Change
2HP-25 Gear Change
- 4 1HP-409 MOV Replacement
1HP-410 MOV Replacement
- 5 2HP-409 MOV Replacement
2HP-410 MOV Replacement
- 6 DPC-1205.19-00-0001 - Evaluation of Stem Factor and Stem COF Assumptions
- 7 DPC-1205.01-00-0001 - Evaluation of Flow Loop Tests of Kerotest Valves
- 8 1,2,3 CCW-287 MOV Replacement
- 9 DPC-1205.19-00-0002 - Evaluation of Rate-of-Loading Effects
- 10 2BS-1 Motor Change
2HP-24 Gear Change
2HP-25 Gear Change
2HP-409 MOV Replacement
2HP-410 MOV Replacement
3LP-1 Operator Replacement
3LP-2 Operator Replacement
- 11 PIP 0-G93-0140 - VIL-0 93-51 Limitorque Technical Update 93-02: Torque Spring Pack
Relaxation, SMB/SB/SBD Actuators
- 12 PIP 0-O93-0744 - OEP VIL-0 93-45 Limitorque Technical Update 93-03: Reduced
Actuator Torque Capability due to Motor Temperature
- 13 OSC-5558 - Process Used in Responding to PIP MSE 0-O93-0744 (Limitorque Technical
Update 93-03 Affecting GL 89-10 MOVs)
- 14 2CCW-7 MOV Replacement
3CCW-93 MOV Replacement
- 15 1,2,3 CCW-10,11,12,13 Gear Change
- 16 NRC Inspection Report Nos. 50-269/91-13, 50-270/91-13, and 50-287/91-13
- 17 DPC-1205.00-00-0003 - Validity of Linear Extrapolation of Partial-DP Test Results
- 18 PIP 0-O93-0505 - OEP VIL-0 93-05, Limitorque Maintenance Update 92-02: Vendor
Information Requiring Potential Corrective Actions
- 19 PIP 3-O92-0226 - OEP Report VIL-0 92-08 Formally Notified Oconee of a Concern

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- 20 PIP 0-O92-0622 - 10CFR21 Notification on Valve Operation Test and Evaluation VOTES
- 21 PIP 0-O93-0610 - Notification from Liberty Technology: Liberty Probes Have a 3% Higher Sensitivity (U, Maxi-U, & D Clamps)
- 22 A-D TR-102 Anchor Darling Motor Operated Valve Testing for ONS
SPC. 5221/94/0004
Thrust and Function Verification of Safety Related MOVs:
Phase II Similarity Analysis: A-D Double Disk Gate Valves
- A-D TR-126 4" and 1/2" A-D Valve Testing for ONS
OSC-5880 GL 89-10 MOV Justification for Not DP Testing 1,2,3 CCW-268
- B-W SPC. 6300/93/017
Thrust and Function Verification of Safety Related MOVs:
Phase II Similarity Analysis: B-W Gate Valves
- C&S TRL-354 Flow and Torque Tests on 8- and 30-Inch C&S Butterfly Valves
LTR No. 0009-00349-L-02
C&S Butterfly Coefficient Interpolation and Extrapolation from Utah State University Test Data
- Kerotest DPC-1205.01-00-0001 Evaluation of Flow Loop Tests of Kerotest Valves
- Posi-Seal TRL-324 Flow and Torque Tests on 10- and 42-Inch Posi-Seal Butterfly Valves
LTR No. 0009-00353-L-01
Posi-Seal Butterfly Valve Coefficient Extrapolation from Utah State University Test Data