



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos. 50-269/95-25, 50-270/95-25, and 50-287/95-25

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-269, 50-270, and 50-287 License Nos.: DPR-38, DRP-47
and DRP-55

Facility Name: Oconee Nuclear Station Units 1, 2, and 3

Inspection Conducted: December 4-8 and 11-15, 1995

Lead Inspector: H. Whitener 1-11-96
H. Whitener, Reactor Inspector Date Signed

Accompanying Personnel: M. Miller, Reactor Inspector RII
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Approved by: Paul Fredrickson 1/11/96
Paul Fredrickson, Chief Date Signed
Special Inspection Branch
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SUMMARY

Scope:

This special, announced inspection was performed at the Oconee Nuclear Station to assess the licensee's implementation and completion of commitments made in response to Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance."

Results:

The inspectors concluded that the licensee's implementation of the recommendations of GL 89-10 had been completed in a satisfactory manner. Therefore, the NRC staff is closing its review of the Oconee GL 89-10 program. However, the licensee is still expected to maintain the GL 89-10 valves in accordance with the recommendations in the generic letter. In addition, two inspector followup items (IFIs) and several other concerns and commitments remain to be completed. The first IFI concerns the licensee's need to respond to the Vectra Report on butterfly valves. The second IFI addresses hard seat contact for the "Anchor/Darling" Double Disc Gate valves. One violation identified during the GL 89-10 Part 2 inspection was closed. There are no operability concerns with any of the followup items and remaining items. These items are listed below:

Inspector Followup Items

(Closed) VIO 50-269/94-13-01, Inadequate Procedure Preparation For IST Testing. [Section 3.0]

(Open) IFI 50-269,270,287/95-25-01, "Response To Vectra Report - Butterfly Valves". The licensee needs to address and respond to three areas in the report, 1) flow resistance, 2) procedure improvement, and 3) shaft orientation. [Section 2.5]

(Open) IFI 50-269,270,287/95-25-02, "Anchor/Darling Double Disc Gate Flow Cutoff". The licensee needs to address hard seat contact. The licensee determined that the MOVs meet theoretical flow isolation of the EPRI model but not hard seat contact. [Section 2.5]

Remaining Items

Thirteen commitments which were stated in Attachment 1 of the licensee's letter to the NRC, "Request for Closure of Generic Letter 89-10" dated March 31, 1995, remain to be completed. All the other commitment items addressed in the Request for Closure Letter have been satisfactorily addressed by the licensee and were closed during this inspection. [Section 2.0 and 2.5]

Strengths

- 1) The licensee implemented "flow loop testing". [Section 2.5]
- 2) The licensee used innovative technology such as "bench testing" and the Motor Power Monitor. [Section 2.10]
- 3) Licensee personnel, including both engineering and maintenance, were very knowledgeable of the issues related to GL 89-10. [Section 2.0]
- 4) The licensee personnel were pro-active in the MOV industry. [Section 2.5]

REPORT DETAILS

1.0 Persons Contacted

1.1 Licensee Employees

- *E. Burchfield, Manager, Regulatory Compliance
- *T. Cline, Valve Engineering Support, General Office
- *J. Davis, Manager, Engineering
- *J. Hampton, Site Vice President
- *T. Ledford, Engineer
- *D. King, Valve Engineering
- *K. Matthews, Valve Engineering
- *B. Millsaps, Mechanical/Civil Engineering Manager
- *D. Nix, Regulatory Compliance
- *B. Peele, Station Manager
- *B. Sealy, Engineer
- *J. Smith, Regulatory Compliance
- *C. Tompkins, Valve Engineering Supervisor
- *L. Underwood, Engineer

1.2 U. S. Nuclear Regulatory Commission

- *P. Harmon, Senior Resident Inspector

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2.0 GENERIC LETTER (GL) 89-10 "SAFETY-RELATED MOTOR-OPERATED VALVE (MOV) TESTING AND SURVEILLANCE" (TI 2515/109)

On June 28, 1989, the NRC issued GL 89-10, which requested licensees and construction permit holders to establish a program to ensure that switch settings for safety-related MOVs were selected, set, and maintained properly. Subsequently, six supplements to the GL have been issued. NRC inspections of licensee actions implementing commitments to GL 89-10 and its supplements have been conducted based on guidance provided in Temporary Instruction (TI) 2515/109, "Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance." Temporary Instruction 2515/109 is divided into Part 1, "Program Review," and Part 2, "Verification of Program Implementation".

In a letter to the NRC dated December 12, 1994, the licensee provided notification and requested closure of the Generic Letter 89-10 Program. On January 23, 1995, a phone conversation was held between Duke and NRC representatives concerning GL 89-10 closure. In that phone conversation, Oconee stated they would provide the NRC a "Generic Letter 89-10 Closure Audit Package". In a letter to the NRC dated March 31, 1995, the licensee provided the "Supplemental Information for Closure Audit". The supplemental information listed the licensee's commitments in Attachment 1 of the letter. The inspectors verified that all licensee commitments

listed in the March 31, 1995, Duke letter have been satisfactorily addressed and are closed except for 11 Unit 1 and two Unit 2 items. These remaining commitments are as follows:

| | <u>Valves</u> | <u>Document</u> | <u>Modification or Work</u> |
|-----|---------------|---------------------------------------|-----------------------------|
| 1) | 2-BS-001 | W095067563 | Replace motor |
| 2) | 2-HP-024 | W095067625 | Change motor gear set |
| 3) | 2-HP-025 | W095067629 | Change motor gear set |
| 4) | 2-HP-409 | W095067535 | Replace valve |
| 5) | 2-HP-409 | W095064580 | Replace operator |
| 6) | 2-HP-410 | W095064581 | Replace valve |
| 7) | 2-HP-410 | W095067858 | Replace operator |
| 8) | 2-CCW-10 | W095067575 | Change gear ratio |
| 9) | 2-CCW-11 | W095067577 | Change gear ratio |
| 10) | 2-CCW-12 | W095067579 | Change gear ratio |
| 11) | 2-CCW-13 | W095067583 | Change gear ratio |
| 12) | 3-LP-001 | Replace actuator and (possibly) valve | |
| 13) | 3-LP-002 | Replace actuator and (possibly) valve | |

The Unit 2 items are scheduled for implementation during the next refueling outage 2EOC15 in late Spring 1996. The Unit 3 items are scheduled for implementation by the end of 1996. The inspectors verified there were no operability concerns and the work order (WO) schedule for implementation was satisfactory.

The current inspection assessed the completion of the licensee's GL 89-10 program as stated in the closure letter. The assessment was conducted utilizing guidance described in an NRC memorandum of July 12, 1994, "Guidance on Closure of Staff Review of Generic Letter 89-10 Programs" and in TI 2515/109, "Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance." The licensee's GL 89-10 program and its implementation were previously examined and documented in NRC Inspection Reports 50-269, 270, 287/91-13 (Part 1 program) and 94-15 (Part 2 implementation). Details of this inspection and findings are described below.

2.1 Design-Basis Reviews

During the Part 2 inspection, the inspectors examined the licensee's design-basis documentation used in the implementation of the GL 89-10 Motor Operated Valve Plant Program for diagnostic testing of MOVs. That examination included review of mechanical flow diagrams (piping and instrumentation); design-basis calculation results of the expected differential pressures; the sizing and switch setting calculations; and diagnostic test data. The inspectors also conducted a walkdown of selected MOVs. The inspectors reviewed the licensee's design-basis documentation (DBD) to determine and verify its adequacy in general for all MOVs in the program. In addition, the recommended action "a" of GL 89-10 that requested licensees to determine the maximum differential pressure and flow expected for both normal and abnormal (accident) conditions was examined to verify that maximum parameters were used.

During this inspection, the inspectors examined the design-basis calculations and the torque/thrust calculations to verify their adequacy for all the GL 89-10 valves. The calculations were reviewed to ensure all the GL 89-10 recommendations were included.

The design-basis calculations for differential pressure were reviewed to verify electrical degraded grid voltage, flow, and temperature were used in the design calculations for thrust and torque. The calculations were reviewed to determine if the worst case design-basis differential pressure and flow conditions, design temperature, and other design parameters for each MOV selected met the recommendations of GL 89-10. The inspectors verified that degraded grid calculations were included to ensure that the lowest motor terminal voltage commensurate with design-basis conditions was factored into the determination of maximum thrust ratings. The inspectors also verified that the licensee satisfactorily addressed the Limitorque Part 21 high temperature motor concern.

The "design-basis" differential pressure calculations reviewed are as follows:

| | <u>CALCULATION</u> | <u>SYSTEM - MOTOR OPERATED VALVES</u> |
|-----|-----------------------------------|---|
| 1) | OSC-4374, R4 ----- 17,26,82,84 | Main Steam (MS), MS- |
| 2) | OSC-4363, R5 ----- | MS-24,33,35,36,47,76,79 |
| 3) | OSC-4412, R0 ----- | Purg (PR), PR-15, 19 |
| 4) | OSC-4416, R6 ----- | Low Pressure Service Water (LPSW), LPSW-4, 5 |
| 5) | OSC-4564, R0 ----- | LPSW-6, 15 |
| 6) | OSC-4502, R1 ----- | LPSW-18, 21, 24 |
| 7) | OSC-4551, R3 ----- | LPSW-45 |
| 8) | OSC-4560, R0 ----- | LPSW-137 |
| 9) | OSC-4553, R3 ----- | LPSW-139 (Unit 1) |
| 10) | OSC-4536, R1 ----- | LPSW-565, 566 |

| <u>CALCULATION</u> | <u>SYSTEM - MOTOR OPERATED VALVES</u> |
|------------------------|---|
| 11) OSC-4697, R2 ----- | High Pressure Injection (HP), HP-3, 4, 20, 24, 25, 26, 27, 409, 410 |
| 12) OSC-4676, R4 ----- | HP-398, 417, 426, 428 |
| 13) OSC-4281, R4 ----- | Low Pressure Injection (LP), LP-1, 2, 3, 14, 15, 16, 17, 18, 19, 20, 21, 22, 103, 104 |
| 14) OSC-4542, R3 ----- | Building Spray (BS), BS-1, 2 |
| 15) OSC-4784, R1 ----- | Component Cooling (CC), CC-3, 4, 5, 6, and 7 |
| 16) OSC-4494, R2 ----- | Condensate Circulating Water (CCW), CCW-1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 90, 91, 93 |
| 17) OSC-5628, R1 ----- | CCW-268, 287 |
| 18) OSC-4692, R2 ----- | CCW-269, 347 |
| 19) OSC-4479, R3 ----- | Condensate (C), C-124, 152, 153, 156, 158, 391 |
| 20) OSC-5692, R0 ----- | Core Flood (CF), CF-1, 2, 3, 4, 5, 6 |
| 21) OSC-4385, R2 ----- | Feedwater (FDW), FDW-103, 104, 105, 107 |
| 22) OSC-4431, R2 ----- | FDW-33, 36, 38, 42, 45, 47 |
| 23) OSC-4643, R2 ----- | Reactor Coolant (RC), RC-3, 4, 5, 6 |
| 24) OSC-4555, R1 ----- | Spent Fuel (SF), SF-82, 97 |

During the Part 2 inspection, MOV LPSW-139 was identified as having a small thrust margin. At that time the licensee indicated the actuator would be replaced. The inspectors verified that the licensee had replaced LPSW-139 using work order WO 95014138. In addition, the inspectors reviewed the completed modification package, ID No. TN/5/A/2972/AL1/01, "Replace Valve LPSW-139" dated December 3, 1995. The inspectors concluded the licensee implemented appropriate corrective action to increase the thrust (torque) margin of LPSW-139.

Conclusion

The inspectors concluded the licensee's satisfactory implementation of the GL 89-10 recommendations for addressing the design-basis was adequate for closure.

2.2 Motor Brakes

During the Part 2 inspection, the inspectors verified that Units 1 & 3 had been walked down and no motor brakes were installed on GL 89-10 MOVs. The licensee indicated that a motor brake walkdown inspection was planned during the October 1994 Unit 2 refueling outage. During this inspection, the inspectors reviewed work order Nos. 94010077 and

94020444 to determine the results of the Unit 2 motor brake walkdown inspection. No GL 89-10 MOVs in Unit 2 had motor brakes installed.

Conclusion

The inspectors concluded that no motor brakes are installed on GL 89-10 MOVs.

2.3 Scope Change

The inspectors examined the scope change since the Part 1 inspection. The licensee reduced by 15 the number of valves in the scope of the GL 89-10 Program.

VALVES REMOVED

JUSTIFICATION

1(2,3)-CS-5

Diaphragm Type

1(2,3)-AS-40

Converted to Manual

1(2,3)-MS-47

Converted to Manual

1(3)-CCW-90, 91

Removed Valves

1(3)-LPSW-137

Ball Type

Conclusion

The inspectors concluded the removal of 15 MOVs from the GL 89-10 scope was justified.

2.4 Establishing MOV Settings

The inspectors reviewed the following thrust calculations to determine and assess the licensee's general requirements for switch settings. The following thrust calculations were reviewed:

- 1) OSC-5675, Revision 0 GL 89-10 MOV Calculation For Unit 2 Gate And Globe Valves At Oconee
- 2) OSC-5761, Revision 0 GL 89-10 MOV Calculation For Unit 2 Butterfly Valves
- 3) OSC-5859, Revision 1 GL 89-10 MOV Calculation For Butterfly Valves On The ECCW System
- 4) OSC-5760, Revision 0 GL 89-10 MOV Calculation For Unit 1 Butterfly Valves At Oconee
- 5) OSC-5599, Revision 1 GL 89-10 MOV Calculation For Unit 3 Gate And Globe Valves At Oconee

- 6) OSC-5762, Revision 0 GL 89-10 MOV Calculation For Unit 3 Butterfly Valves At Oconee
- 7) OSC-5674, Revision 1 GL 89-10 MOV Calculation For Unit 1 Gate And Globe Valves At Oconee

The inspectors reviewed the thrust calculations and test packages for each program MOV to verify the licensee had implemented the recommendations in GL 89-10. In addition, the inspectors verified that several findings identified during the Part 2 inspection were satisfactorily resolved by the licensee. A fixed 15 percent thrust margin was previously used to account for diagnostic equipment uncertainty and torque switch repeatability. The current MOV setup and calculations now properly account for VOTES diagnostic equipment inaccuracies and incorporates Limitorque's published values for torque switch repeatability. A fixed 15 percent margin was previously used for load sensitive behavior (rate of loading). The method to determine this margin has been revised to add 5.6 percent as a bias error and 26.4 percent as a random error. The random margin is combined with diagnostic equipment uncertainty and torque switch repeatability using the square root of the sum of the squares method. The approach using this method was consistent with the load sensitive behavior measured on the MOVs tested.

Conclusion

The inspectors concluded the licensee's satisfactory implementation of GL 89-10 recommendations for addressing switch settings was adequate for closure.

2.5 Design-Basis Capabilities

Conclusions

The licensee determined that several MOVs were marginal and established plans to upgrade or replace those MOVs. The modifications to these valves were commitments in Attachment 1 of licensee's letter, "Generic Letter 89-10 Closure Audit Package" to the NRC. The licensee's closure letter is discussed in Section 2.0 and the remaining MOV commitments are also listed in Section 2.0.

The licensee typically assumed valve factors of 0.6 for gate valves and 1.1 for globe valves. The licensee supported these valve factors with actual plant data, grouping of test data, or the application of the EPRI MOV Performance Prediction Methodology. The licensee verified the proper guide or seat area in predicting the thrust required to operate globe valves.

For the 8-inch Posi-Seal butterfly valves, a licensee contractor (Vectra) performed a similarity study to apply prototype test data from Utah State University. Vectra provided several recommendations for establishing the applicability of the prototype data to the Oconee

valves. The licensee had not documented its response to these recommendations. This issue is categorized as an IFI 50-269,270,287/95-25-01, "Response To Vectra Report-Butterfly Valves". The licensee evaluation of flow resistance, procedure improvement, and shaft orientation will require further NRC review. Because the licensee's response to inspector questions in this area revealed that the licensee had considered the Vectra recommendations, the inspectors determined that the staff's review of the licensee's GL 89-10 program can be closed with this followup item.

For the Anchor/Darling double disk gate valves, the licensee set these MOVs to accommodate a 0.6 valve factor. The licensee applied the EPRI methodology for these valves and determined that they could meet the thrust prediction for theoretical flow isolation but not for hard seat contact. The licensee believed that its contractor (MPR Associates) had assumed the more severe orientation of the valve disk than applicable at Oconee. The inspectors determined that the licensee needs to resolve the orientation question or determination whether these valves can meet their performance requirements with possible leakage. This issue is categorized as an Inspector Followup Item (IFI) 50-269,270,287/95-25-02, "Anchor Darling Double Disc Gate Flow Cutoff". Because the MOVs are set to accommodate a reasonable valve factor for these type of valves, the inspectors determined that the staff's review of the licensee's GL 89-10 program can be closed with this followup item.

The inspectors reviewed the licensee's application of similarity studies conducted by Siemens for a group of Anchor/Darling double-disk gate valves (approximately 1-inch in size) and a group of Borg-Warner flexible wedge gate valves (4-inch and 6-inch) at Oconee. Because the sizes of the grouped valves were similar, the inspectors did not identify any concerns regarding the application of the similarity study at Oconee.

For Kerotest globe valves, the licensee applied information from flow loop testing of these valves in verifying the design-basis capability of its similar valves. The inspectors did not identify any concerns regarding the applicability of the flow loop data to the particular valves at Oconee.

The licensee relied on an EPRI method to obtain a bounding rate-of-loading assumption (5.6 percent bias and 26.4 percent random). The inspectors consider the licensee's assumption to be supported by its plant data.

The licensee had committed to perform certain MOV modifications in a letter dated March 31, 1995. However, during this inspection the licensee justified not replacing valve 1/2/3 CCW-287 based on its open safety function (its close function had been eliminated) and not replacing valves 2CCW-7 and 3CCW-93 based on a revised lower design differential pressure. The inspectors considered these adjustments to the licensee's commitments to be acceptable. The licensee stated its

intent to perform the remaining MOV modifications specified in the March 31 letter.

The licensee determined that the diagnostic test data for 52 MOVs had been outside the calibration range in the opening direction. The licensee reevaluated these MOVs to verify their capability. The inspectors considered 2LP-21 to be marginal. However, there is no safety concern since the licensee enters a "limiting condition of operation" (LCO) whenever the valve is closed. Further, the licensee plans to retest the MOV in April 1996 to verify margin.

The licensee is active in applying new technologies to improve the performance of its MOVs. The licensee has conducted flow-loop testing to provide information on MOV performance. The licensee has been applying the EPRI methodology in some cases where plant test data was not available. The licensee has been bench testing its motor actuators to obtain detailed information on their performance capability. The licensee has demonstrated strong technical expertise in providing information to other licensees on MOV performance.

During the inspection the inspectors provided additional information for consideration by the licensee. The licensee stated that this information, discussed below, would be evaluated.

- 1) - The licensee applies linear extrapolation to its dynamic test data. The licensee requires the test differential pressure to be at least 50 percent of the design to perform linear extrapolation.
 - Review of the EPRI guidance on extrapolation of test data and the NRC safety evaluation for any adjustments to its extrapolation technique.
- 2) - The licensee applied the EPRI methodology to verify the design-basis capability of several MOVs in its GL 89-10 program. Review of the NRC safety evaluation (when issued) on the EPRI methodology to determine whether any adjustments to its capability determination are necessary.
- 3) - The licensee currently relies on a stem friction coefficient of 0.2 in the justification for the design-basis capability of its MOVs.
 - Justify use if a 0.15 stem friction coefficient is to be assumed in its program in the future.
- 4) - For gate valves manufactured by Powell with inverted-guide design, the licensee applied the EPRI methodology in a best possible effort to predict thrust requirements for these valves. The inspectors considered the licensee's determination of thrust requirements for these valves to

be adequate for closure of its review of the licensee's GL 89-10 program.

- As part of the periodic verification program, confirm the assumptions regarding these valves.
- 5) - For gate valves manufactured by Crane with non-stellite seating material, the licensee applied the EPRI methodology with an assumed friction coefficient for their seating material. The inspectors considered the licensee's determination of thrust requirements for these valves to be adequate for closure of its review of the licensee's GL 89-10 program.
 - As part of the periodic verification program, confirm the assumptions regarding these valves.
- 6) - The licensee used a run efficiency in determining the output capability of certain Limitorque MOVs when operating in the closed direction.
 - Evaluate recent industry and research test information concerning Limitorque actuator efficiency.

Conclusion

The inspectors concluded that the licensee's satisfactory implementation of GL 89-10 recommendations for addressing design-basis capability was adequate for closure.

2.6 Periodic Verification of MOV Capability

Recommended action "d" of Generic Letter (GL) 89-10 requested the preparation or revision of procedures to ensure that adequate MOV switch settings are determined and maintained throughout the life of the plant. Section "j" of GL 89-10 recommends surveillance to confirm the adequacy of the settings. The interval of the surveillance is to be based on the safety importance of the MOV as well as its maintenance and performance history, but was recommended not to exceed five years or three refueling outages. Further, GL 89-10 recommended that the capability of the MOV be verified if the MOV was replaced, modified, or overhauled to an extent that the existing test results are not representative of the MOV.

Conclusion

The inspectors concluded that the licensee has an adequate program for closure of the NRC staff review of GL 89-10 with respect to periodic verification to ensure MOV capability. However, the NRC is preparing a generic letter on the periodic verification of MOV design-basis capability. Consequently, the inspectors did not evaluate the licensee's long-term periodic verification plans. The NRC will review

the licensee's MOV periodic verification program following issuance of the new generic letter.

2.7 Post-Maintenance and Post-Modification Testing

The inspectors identified that the post-maintenance and post-modification test requirements for GL 89-10 MOVs were specified in Duke Power NRC Generic Letter 89-10 Program Document, Section 5.10 and Figure 4, Post Maintenance Test Matrix. These documents listed the test requirements and guidelines for maintenance and modification activities. These activities were placed in three categories, Minor, Intermediate, and Major. The "Minor" activities category include actuator PMs, motor control center PMs, limit switch adjustment, limit stop adjustment for gears, and replacement of certain seals and gaskets. Post-maintenance testing for "Minor" activities required electrically stroking the MOV twice. The "Intermediate" activities category included stem packing replacement/adjustment. Post-maintenance testing for this activity involves verification that the MOV running load has not increased beyond acceptable limits, or engineering justification. The current practice is to perform a new baseline test measuring stem thrust or torque to quantify packing load changes. Engineering justification can be used only in situations where available margin conservatively bounds packing load changes due to adjustment. The "Major" category included activities such as actuator removal and installation, actuator/gearbox rebuild, torque switch adjustment, valve disassembly, stem/nut replacement, spring pack adjustment, motor replacement, and upper housing cover bolt tightening or gasket replacement. Post-maintenance testing for major maintenance activities involves performing a new test equivalent to the baseline diagnostic test.

Conclusion

The inspectors concluded that the licensee's satisfactory implementation of the GL 89-10 recommendations for addressing post maintenance and post modification testing was adequate for closure.

2.8 MOV Failures, Corrective Actions, and Trending

Recommended action "h" of GL 89-10 requested that licensees analyze and justify each MOV failure and corrective action. The documentation should include the results and history of each as-found deteriorated condition, malfunction, test, inspection, analysis, repair, or alteration. All documentation should be retained and reported in accordance with plant requirements. GL 89-10 also recommended that the material be periodically examined (every two years or after each refueling outage after program implementation) as part of the monitoring and feedback effort to establish trends of MOV operability.

Equipment failure trending and analysis is specified in the Oconee Nuclear Station Engineering Manual. For MOVs the licensee combines the information obtained from a number of sources. For instance, reports

generated quarterly which look at the equipment trends over a 12 month period include:

- Average Failure Frequency Report (AFFR)
- Repeat Work Order Report
- Unit Trip Report
- Component Failure Analysis Report (CFAR)

The data base for these reports are the Nuclear Plant Reliability Data System (NPRDS) and the Work Management System (WMS) which includes equipment history and corrective maintenance work orders.

Two additional data bases important for MOV trending are:

- Votes "Sensor" Test Report Analysis Guideline
(Trends diagnostic test results with previous test data)
- Problem Investigation Process (PIP) reports
(Documents all MOV problems and associated corrective actions)

Since the Part 2 inspection, the licensee had generated a number of PIPs related to valves in the GL 89-10 program. Of these, 31 PIPs were open including 5 PIPs related to a potential for pressure locking and/or thermal binding. The inspectors reviewed the issues identified in the open PIPs and discussed with licensee engineers the determination of operability and proposed corrective actions.

Conclusion

The inspectors concluded that the licensee has an adequate program for identifying, tracking and reporting MOV problems. Review of the issues identified in PIP reports indicated a thorough analysis, accurate determination of operability and appropriate short term corrective actions. Long term corrective actions were identified and considered adequate for program closure.

2.9 Pressure Locking and Thermal Binding

The inspectors reviewed the licensee's actions taken to evaluate thermal binding and pressure locking in accordance with recommendations of GL 89-10 and the recently issued GL 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gates Valves". The inspectors determined that the licensee was in the process of reviewing systems and valves for pressure locking and thermal binding in accordance GL 95-07. The inspectors reviewed seven problem investigation process (PIP) reports in which the licensee had identified and documented short term corrective actions for valves susceptible to pressure locking or thermal binding. The inspectors did not identify any concerns with the PIPs.

In regards to GL 95-07, the licensee had completed its 90-day review. The licensee stated that valves 2/3 LP103 and 104 had been declared inoperable as a result of its review and that alternate paths were being relied on to meet their safety function. The licensee had drilled holes in the disk of these valves in Unit 1. The staff will evaluate the licensee's response to GL 95-07 when the 180-day review package is submitted.

Conclusions

The inspectors concluded that the licensee's satisfactory implementation of the GL 89-10 recommendations for addressing pressure locking and thermal binding was adequate for closure.

2.10 Quality Assurance Program Implementation

During the Part 2 inspection, the inspectors concluded that the licensee had satisfactorily implemented the GL 89-10 recommendations for quality assurance.

2.11 Walkdown

The inspectors conducted a walkdown of MOV Bench Testing Facility to observe the use of the motor power monitor. The licensee demonstrated all the functions and capabilities of the motor power monitor in conjunction with the use of a torque test stand developed by Kalsi Engineering. The inspector considered the licensee's bench testing of actuators and use of the motor power monitor as an innovative approach using advance technology. Several of the licensee's valve engineers are pro-active in this testing area. The inspectors concluded the use of this test facility and the advanced equipment was a strength in the GL 89-10 program.

3.0 Followup of Previous Items (92701)

(Closed) Violation 50-269/94-15-01, Inadequate Procedure Preparation For IST Testing. On June 21, 1994, during plant heat up, the 10 year IST Pressure Test No. 11HN-169 was performed on a section of piping between valves 1-LP-103 and 1-LP-104 using Work Request No. 94013014. Test Procedure MP/O/A/1720/016 was used. Valve 1-LP-103 was damaged because the test pressure and temperature exceeded valve set-up requirements. The inspectors concluded the IST Test procedure was inadequate since it did not address all parameters for conducting the test.

The inspector verified that the licensee revised IST Test Procedures MP/O/A/1720/016 Revision 13 and MP/O/A/1720/010 Revision 26 to address system parameters such as pressure to prevent damaging MOVs. In addition, the MOVs were listed to be reviewed prior to testing. The inspectors concluded the licensee implemented appropriate corrective action to prevent future occurrences. This violation was closed.

4.0 Exit Interview

The inspection scope and results were summarized on December 14, 1995, with those persons indicated in paragraph 1. Although proprietary information was reviewed, none is contained in this report. Dissenting comments were not received from the licensee.

5.0 Acronyms and Initialisms

| | | |
|------|---|--|
| DBD | - | Design Basis Document |
| DP | - | Differential Pressure |
| EPRI | - | Electric Power Research Institute |
| GL | - | Generic Letter |
| IFI | - | Inspector Followup Item |
| INEL | - | Idaho National Engineering Laboratory |
| IST | - | Inservice Test |
| LSB | - | Load Sensitive Behavior |
| MOV | - | Motor Operated Valve |
| NRC | - | Nuclear Regulatory Commission |
| NRR | - | NRC Office of Nuclear Reactor Regulation |
| PIP | - | Problem Investigation Process Report |
| QA | - | Quality Assurance |
| TI | - | Temporary Instruction |
| WO | - | Work Order |