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EXECUTIVE SUMMARY

During February 11 through 15, 1991 a Nuclear Regulatory Commission (NRC) inspection team conducted a motor-operated valve (MOV) inspection at the Joseph M. Farley Nuclear Plant, Units 1 and 2 (FNP). The inspection focused on the programs implemented at FNP to address NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," and was accomplished in accordance with NRC Temporary Instruction 2515/109, "Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance." The team reviewed the programs and program implementation for performing MOV design basis reviews, for establishing MOV switch settings, for performing differential pressure and flow testing, for performing MOV training, and for performing MOV maintenance, as well as other related MOV activities.

The team found that a generally sound MOV program had been developed and implemented at FNP. However, the team did identify several weaknesses during the course of the inspection. Failure to validate the applicability of the MOVATS data base and vendor-calculated thrust requirements to non-tested groups of valves was one of two significant weaknesses. The other significant weakness concerned Alabama Power Company's (the licensee's) failure to verify the applicability to similar non-tested valves of valve thrust data taken from tested valves. Recent operating experience and research results indicate that MOVs appearing identical can have significantly different performance characteristics.

Other weaknesses included the lack of verification of the total system accuracies associated with the use of the MOVATS diagnostic equipment, the lack of a method for implementing recommendations obtained by the MOV trending program, the absence of an evaluation of high temperature effects on motor torque and actuator thrust capabilities, and the lack of an auditable rationale for selecting minimum and maximum thrust values and for updating these values based upon current program requirements.

Apparent strengths within the generic letter program included the licensee's involvement with MOV industry groups and evaluation of industry information, the thermal overload sizing and selection evaluations, the MOV maintenance program and maintenance training, and the knowledge of the FNP individuals involved in the MOV effort.

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1.0 INTRODUCTION

On June 28, 1989, the Nuclear Regulatory Commission (NRC) staff issued Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," requesting licensees and construction permit holders to establish a program to ensure that switch settings are selected, set, and maintained properly for safety-related motor-operated valves (MOVs) and certain other MOVs in safety-related systems. This generic letter expanded the recommendations in the Office of Inspection and Enforcement Bulletin 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings" (November 15, 1985), and its Supplement 1 (April 27, 1988). The bulletin and its supplement were limited to MOVs in certain safety-related systems and did not involve the effort requested by Generic Letter 89-10.

The staff held public workshops to discuss the generic letter and to answer questions regarding its implementation. On June 13, 1990, the staff issued Supplement 1 to Generic Letter 89-10 to provide the results of those public workshops. Supplement 2 of the generic letter was issued on August 3, 1990, to delay onsite inspections of the licensees' programs until at least January 1, 1991, to allow time for licensees and construction permit holders to incorporate the information provided in Supplement 1 into their MOV programs.

In response to concerns raised by the results of NRC-sponsored MOV tests, the staff issued Supplement 3 to Generic Letter 89-10 on October 25, 1990, requesting licensees of boiling-water reactors to evaluate the capability of MOVs used for containment isolation in the steam supply lines to the high pressure coolant injection and reactor core isolation cooling systems, in the supply line to the reactor water cleanup system, and in the lines to the isolation condenser, as applicable. The staff also indicated that all licensees and construction permit holders should consider the applicability of the information obtained from the NRC-sponsored tests to other MOVs within the scope of Generic Letter 89-10 and should consider this information in the development of priorities for implementing the generic letter program.

The NRC team followed Temporary Instruction 2515/109 (TI) (January 14, 1991), "Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance," in performing this inspection at the Joseph M. Farley Nuclear Plant, Units 1 and 2 (FNP). The team concentrated on Part 1 of the temporary instruction and evaluated Alabama Power company's (the licensee's) program to provide assurance that the MOVs within the scope of Generic Letter 89-10 are capable of operating under design basis differential pressure and flow conditions. The inspectors also addressed Part 2 of the instruction and evaluated the implementation of the program by sampling seven MOVs that the licensee indicated had been sized, set, and tested in accordance with its program. Although the licensee had developed a sound program to resolve the MOV issue at FNP, certain concerns regarding the licensee's program need to be resolved. The specific areas reviewed and the team's findings are described in sections 2 through 5 of this report. Each finding that was designated as an open item is provided in Appendix A. A list of persons attending the exit meeting is provided in Appendix B.

2.0 REVIEW OF THE LICENSEE'S GENERIC LETTER PROGRAM

In its submittal dated December 28, 1989, the licensee committed to have available a description of and schedule for its Generic Letter 89-10 program. As required by Section 04.01 of the TI, the team reviewed the documentation describing the licensee's program in response to the generic letter and discussed the program in detail with licensee personnel.

As required by Section 04.02 of the TI, the team reviewed the licensee's response to each aspect of Generic Letter 89-10. The inspection findings are described below.

2.1 Generic Letter Program Scope

The scope of Generic Letter 89-10 includes all safety-related MOVs and other MOVs that are position-changeable in safety-related piping systems. In Supplement 1 to the generic letter, the staff defined "position-changeable" as any MOV in a safety-related piping system that could be inadvertently operated as a result of an action in the control room.

In Electrical Maintenance Procedure FNP-0-EMP-1005.02 (Rev. 2, February 8, 1991), "FNP User Guide for Motor-Operated Valves, Dampers, and Louvers," the licensee specified that all MOVs located in safety-related piping systems are considered within the scope of its generic letter program. By review of the piping and instrumentation diagrams for the chemical and volume and control, safety injection, and residual heat removal (RHR) systems, the inspectors confirmed that the MOVs in those systems were listed in the electrical maintenance procedure.

The licensee identified 356 MOVs to be included in its generic letter program (177 MOVs per unit and 2 MOVs shared between units). By comparison, the licensee's program in response to Bulletin 85-03 included 37 MOVs per unit. The licensee was not planning to reduce the number of MOVs in the program by preventing inadvertent operation. However, the licensee did consider interlocks and other mechanisms to prevent inadvertent operation in addressing the margin available in the capability of an MOV. This approach was acceptable.

2.2 Design Basis Reviews

In recommended action "a" of Generic Letter 89-10, the staff requests the review and documentation of the design basis for the operation of each MOV within the scope of the generic letter program to determine the maximum differential pressure and flow and other design basis parameters (such as voltage) expected for normal and abnormal conditions.

FNP Project Desk Instructions (PDI) 005.3 (Revision 1, January 8, 1991), "Engineering Guidelines Used in FNP MOV Program," described the licensee's process for conducting the design basis reviews. The elements of this review are discussed below.

2.2.1 Differential Pressure Requirements

The licensee examined the Westinghouse Electric Corporation (Westinghouse) equipment specifications, FNP piping specifications, the FNP Final Safety

Analysis Report (FSAR), valve procurement specifications, and other appropriate documents to obtain the maximum differential pressure and flow conditions for each MOV in the scope of the generic letter program. The licensee applied the worst-case differential pressure conditions for opening and closing each MOV. The licensee selected this approach because, as part of its response to Bulletin 85-03, it had evaluated individual scenarios and had found that the differential pressures from the above documents bounded the results of the examination of individual scenarios. Although not specifically discussed in its guidelines, the licensee's design basis reviews encompassed the consideration of valve mispositioning by selecting the worst case differential pressure conditions that could be experienced by each MOV and applying those conditions to both opening and closing the valve.

In some cases, the selected worst-case differential pressure was significantly greater than the maximum differential pressure that would likely be experienced by the MOV during any plant event. For example, the selected differential pressure for MOV 8889 was 2750 pounds per square inch differential (psid) although the licensee indicated that the piping was sized for 700 pounds per square inch gauge (psig).

2.2.2 Reduced Voltage Capability of MOVs

The licensee calculated the pullout thrust capabilities for each MOV using 80 percent of the voltage rating for that motor. FNP electrical calculations indicated that all safety-related MOVs will be supplied with more than 80 percent voltage after a loss-of-coolant accident (LOCA) if voltages before a LOCA are assumed to be at the lowest expected grid voltage. This lowest expected grid voltage was determined by a licensee study of the electrical distribution system and was higher than the corresponding degraded grid relay setpoints. However, if pre-LOCA voltages are instead assumed to be just above the degraded grid relay setpoints, some MOVs might be supplied with less than 80 percent voltage after a LOCA. Also, during the initial 5 to 10 seconds of a postulated LOCA, the majority of the MOVs required to change position at this time might receive voltages less than 80 percent. Therefore, the licensee performed a specific analysis to better determine actual motor terminal voltages and actual differential pressures expected across the affected valves. These refined calculations indicated that adequate thrust would be available to stroke most of the valves at the expected reduced voltage. For those MOVs still not acceptable, FNP performed a stall test using reduced voltage conditions. During this test, the actual expected reduced voltage was applied to an MOV, the valve stem was driven into a load cell, and spring pack displacement was measured using MOVATS diagnostic equipment. The corresponding thrust value was then adjusted by the ratio of the pullout to stall thrusts. FNP was able to justify the reduced voltage capability of the remaining actuators with the stall-test thrust numbers, which were considerably higher than those that would be calculated using the standard Limitorque equations.

FNP also used the stall test as a basis to justify other MOVs that would receive more than 80 percent voltage but whose calculated thrust output was inadequate at 80 percent. The team was concerned that the stall test could give unrealistically high thrust values because the rate-of-loading and other concerns were not yet quantified. In addition, other margins (such as conservative design basis differential pressure and voltage) that account for

uncertainties in MOV performance were not considered because of the refined calculations. Although the team found no specific instance where reduced voltage stall testing was misused, it expressed concern about overreliance on this testing methodology.

2.2.3 Harsh Environmental Effects

The licensee did not specifically address the possible effects of a harsh environment on the thrust capability of the motor actuators. Although all FNP actuators required to be environmentally qualified have apparently been so, the qualification tests did not include provisions for quantifying high temperature effects on motor-torque and actuator-thrust capabilities. Although the licensee attempted to relate the standard equations for calculating a motor's torque capability to increases in temperature, a review of those calculations showed that at locked-rotor conditions, the torque of an ac motor would decrease with increasing motor stator resistance. Correspondingly, the stator resistance would increase with increasing temperatures. Although high temperatures would apparently cause a decrease in motor torque, the magnitude of the effect of such a decrease could not be determined. This issue is identified as Open Item 91-201-01 in Appendix A of this report.

2.2.4 Thermal Overloads

Thermal overload devices for MOVs are not bypassed during a safety injection signal at FNP. The licensee uses thermal overloads when the opened and/or closed torque switch is bypassed as protection against spring pack hydraulic locking and valve thermal binding or pressure locking.

The licensee established three criteria for the sizing of the thermal overloads. The first two of those criteria were for ensuring valve operability while the third was for protecting the motor actuator. The first criterion was to ensure that overloads were sized to allow for one complete valve stroke, either closed-to-opened or opened-to-closed, while drawing twice the full load amperes. The second criterion was to size the overloads to allow 10 percent of the design stroke time (with a minimum of 2 seconds and a maximum of 4 seconds) at the rated locked-rotor current. The third criterion was to ensure the thermal overload will trip at or before the rated safe stall time of the motor actuator at rated locked-rotor current.

In the sizing process, the licensee gave precedence to the operational criteria over the protection criterion. Of the 221 MOVs reviewed to date, all met the three sizing criteria except for approximately 20. Those that did not meet all sizing criteria were properly sized to ensure operability.

The plots of running current versus time for selected valves that had been subjected to full differential pressure testing indicated that the licensee's thermal overload selection process was acceptable and encompassed all MOVs presently in the program. FNP's sizing of thermal overloads was considered a strength by the inspection team.

2.3 MOV Switch Settings

In recommended action "b" of Generic Letter 89-10, the staff requests licensees review, and revise as necessary, the methods for selecting and setting all MOV switches.

FNP PDI 005.3 described the licensee's process for sizing MOVs and setting their switches. To size and set an MOV, the licensee (1) determined a maximum and minimum torque switch thrust for that MOV on the basis of the worst-case differential pressure determined from its design basis review and (2) evaluated the capability of the MOV to deliver the required thrust. The licensee then used the MOVATS diagnostic equipment to set the torque switch to achieve the desired thrust at torque switch trip. The licensee records torque switch settings, but relies on MOVATS readings for the control of MOV thrust output.

The licensee determined a maximum allowable thrust from the lowest value of the valve thrust rating, the actuator thrust rating, the spring pack compression limit, and the actuator pullout thrust at reduced voltage conditions. The licensee then reduced this value by an amount intended to compensate for MOVATS equipment inaccuracy and torque switch repeatability. The torque switch limiter plates were sized and installed for each MOV using the maximum allowable thrust.

The licensee determined the minimum required thrust by using the dynamic thrust (i.e., the thrust necessary to overcome the maximum differential pressure and flow conditions) above the measured running load. The licensee obtained a value for minimum required dynamic thrust from either (1) an in situ design basis differential pressure and flow test of the MOV at FNP, (2) the application of data (using a 90 percent confidence band) from tests of MOVs at Farley considered identical by the licensee, (3) the application of the database compiled by the MOVATS manufacturer, or (4) the use of vendor-calculated thrust values. The licensee increased the minimum thrust value by an amount intended to compensate for MOVATS equipment inaccuracy and torque switch repeatability.

The team's concerns regarding the licensee's method for the selection of minimum required thrust are discussed below

(1) In applying test data between MOVs that have or have not been subjected to a differential pressure test, the licensee constructed a plot of measured thrust versus differential pressure for tested MOVs that it considered to be physically identical. From a least-squares-fit line through the data points, the licensee drew a 90 percent confidence band curve for use in estimating required minimum thrust for other MOVs that it considered identical to those tested. To avoid biasing the confidence band, the licensee indicated that only one data point for each MOV was plotted. The inspectors stated that a 90 percent confidence level that an MOV will operate under design basis conditions is by itself unacceptable. Further, the licensee's comparison of MOVs did not adequately address the performance characteristics of the MOVs under various differential pressure and flow conditions.

    For the s[illegible]m, the licensee committed to perform a detailed comparison of the diagnostic traces obtained during static testing of the MOVs. However, because an accepted relationship between the performance of MOVs at static conditions and at high differential pressure conditions does not

currently exist, the staff cannot accept the licensee's use of general physical parameters and static test characteristics to justify, over the long term, the capability of the MOVs not tested under design basis differential pressure conditions. Therefore, the licensee committed to obtain information from a program being developed by the Electric Power Research Institute (or other sources) to determine whether the MOVs have similar performance characteristics that allow the application of test data between them. If the licensee is unable to justify the applicability of the test data from other MOVs, the staff will expect the licensee to demonstrate by some other means that the MOVs are capable of operating under design basis conditions. This concern is identified as Open Item 91-201-02 in Appendix A of the report.

(2) The licensee applied minimum required thrust estimates from the MOVATS data base and vendor calculations without demonstrating that this information is appropriate for the MOVs at FNP. A memorandum dated February 8, 1991, by S. L. Gates indicated that the MOVATS data base would have adequately predicted the thrust for only 64 percent of the 55 MOVs tested under differential pressure conditions at FNP, and that 83 percent of the 55 tested MOVs would have been bounded by the MOVATS data base if certain tested MOVs in the auxiliary feedwater (AFW) system had been excluded. However, this increase in the success percentage did not appear appropriate because the licensee had not confirmed that other groups of MOVs with excessively high thrust requirements (such as the tested AFW MOVs) did not exist at FNP. For example, the licensee indicated that the torque switches for 46 motor-operated gate valves with a design basis differential pressure of 150 psid were set using the MOVATS data base, despite the fact that no differential pressure tests of those MOVs had been conducted. Similarly, the licensee indicated that the torque switches of 20 motor-operated gate valves with a design basis differential pressure of 700 psid had been set using vendor information without any of those MOVs being differential-pressure tested. The licensee stated that many of those 700 psid MOVs had significant margin in their assumed design basis differential pressure although the margin had not been specifically quantified.

Through a conference call, the team discussed the MOVATS data base with licensee personnel and representatives of the diagnostic equipment vendor. The MOVATS representatives indicated that the data base for gate valves combined various valve sizes, manufacturers, and operating conditions by plotting required thrust versus a calculation using differential pressure and seat and stem areas. (The calculation appeared to be the typical vendor thrust equation with an assumed 0.3 valve factor.) Further, the MOVATS representatives indicated that data bases existed for valve opening and closing, but that 75 data points or less were contained in each data base. Therefore, the team determined that such a purely statistical data base was unacceptable without specific justification of its conservatism for those MOVs for which it was used, because of the wide range of performance characteristics of valves under various conditions.

In addition, the team was concerned about the adequacy of the licensee's use of the valve vendor thrust calculations, particularly after the licensee had noted (Gates memorandum) that the vendor equation would have

adequately predicted the required thrust for only 30 percent of the 55 tested MOVs. Another memorandum dated February 7, 1991, by J. E. Garlington discussed the licensee's determination in response to Bulletin 85-03 that MOV 3764 A through F in both units required 150 to 250 percent more thrust to open and close under differential pressure conditions than predicted by vendor calculations. Consequently, the motor-operators for those valves had to be modified by increasing the gear ratios and installing heavier spring packs to allow more thrust to be delivered.

The licensee's use of the MOVATS data base and vendor calculations to size and set the MOVs is adequate for the near term because most of those MOVs had low design basis differential pressures or appeared to have significant margin in the selection of their design basis differential pressures. Nonetheless, the licensee will need to demonstrate that the MOVATS data base and vendor calculations provide conservative thrust estimates for those MOVs. The licensee committed to evaluate and to test selected MOVs to justify the applicability of the MOVATS data base and vendor calculations. This issue is identified as Open Item 91-201-03 in Appendix A of this report.

(3) Setpoint data sheets were prepared and are maintained for each MOV within the generic letter program. Among the information provided on those sheets are MOV size and manufacturer, design basis conditions, and thrust requirements. However, those data sheets did not indicate the rationale for selecting the minimum and maximum thrust limits and the new maximum thrust limit for those actuators that could receive less than 80 percent voltage. In addition, the licensee should reevaluate the minimum thrust requirements on the basis of updated estimates of the accuracy of the MOVATS equipment and reflect any changes on the setpoint data sheets. The licensee also should correct the data sheet information regarding maximum allowable thrust limits when ongoing reevaluations are completed. The licensee has committed to make the above changes to the MOV setpoint data sheets. This issue is identified as Open Item 91-201-04 in Appendix A of this report.

The team commended the licensee for completing its design basis reviews and switch settings calculations before scheduling MOVs for adjustment and testing, but reminded the licensee to be alert for instances where the design basis reviews and switch setting calculations reveal that an MOV would not be capable of operating under design basis conditions. In such cases, the licensee is obligated to follow the requirements of the NRC regulations and its technical specifications to report a determination that an MOV is not operable and to take appropriate action as specified in the technical specifications.

2.4 Design-Basis Differential Pressure and Flow Testing

In recommended action "c" of the generic letter, the staff requests licensees to perform in situ tests on MOVs within the scope of the generic letter program at their design basis differential pressure and flow conditions. If this testing is not practicable, the staff allows alternate methods to be used to

demonstrate the capability of the MOV. If design basis testing is not practicable and an alternate method cannot be justified, the staff suggests a two-stage approach in which a licensee would evaluate the capability of the MOV using the best data available and then would work to obtain applicable test data within the schedule of the generic letter.

FNP PDI 005.3 and the internal licensee memorandum dated February 8, 1991, by S. L. Gates described the licensee's method of demonstrating the capability of MOVs within the generic letter program. In response to Bulletin 85-03, the licensee tested 28 and 27 MOVs in Units 1 and 2, respectively, under partial or full differential pressure conditions. The licensee indicated in a letter dated August 15, 1988, to the NRC that, in response to Bulletin 85-03, 34 MOVs had been tested at 90 percent of design basis differential pressure or greater. Under its generic letter program the licensee stated that each MOV was being tested using MOVATS diagnostic equipment under static conditions, but that it had not performed any additional design basis testing.

The licensee is not following the recommendations of Generic Letter 89-10 for demonstrating the capability of MOVs to function under design basis conditions. Rather than testing each MOV under design basis conditions where practicable, the licensee established the following set of criteria to determine whether to perform design basis testing of an MOV: (1) testing does not place the plant in a condition outside the limits defined in the Technical Specifications; (2) the test does not endanger personnel or equipment; (3) the design basis differential pressure is greater than 300 psid; (4) a test pressure of at least 50 percent of the design basis differential pressure can be achieved; and (5) the test can be conducted with installed plant equipment. On the basis of these criteria, the licensee has not scheduled any differential pressure testing beyond the 55 MOVs already tested at FNP. As discussed above, where design basis testing was not conducted, the licensee was using test data from other MOVs at Farley, the MOVATS data base, or vendor calculations in its efforts to demonstrate MOV capability.

The licensee's total exclusion of any design basis testing for MOVs with a design basis differential pressure of less than 300 psid is unacceptable because the performance characteristics of MOVs under various differential pressure conditions are not currently well understood. Although the licensee might prioritize its testing program on the basis of design basis differential pressure conditions, justification is needed for demonstration of MOV capability even if the design basis differential pressure is less than 300 psid.

With a test pressure of at least 50 percent of the design basis differential pressure, the licensee stated that the results could be extrapolated to design-basis conditions. For the most part, the licensee performed the extrapolations (1) over small pressure ranges for high differential pressures (less than 10 percent) and (2) for MOVs with low design basis differential pressures (e.g., 200 psid). On the basis of its MOV test data, the licensee believed that the extrapolation of test data can be estimated using a linear formula from zero to beyond the test differential pressures. The licensee's linear extrapolation of test data was acceptable for the limited test-data ranges reviewed. The staff will expect the licensee to provide specific justification

for any other extrapolation of test data (such as over longer ranges at high differential pressures).

As discussed earlier, the licensee selected design basis differential pressures that, in some cases, were significantly greater than the maximum differential pressure that would likely be experienced by the MOV during any plant event. Such highly conservative assumptions of design basis differential pressures can result in a determination that testing of MOVs in situ under design basis differential pressure and flow conditions is not practicable. Such conservatism should not be used to restrict MOV testing that is practicable.

The licensee indicated that no tests of globe or butterfly valves had been performed under design basis differential pressure and flow conditions. Although the most significant performance concerns have been related to gate valves, the staff will expect the licensee to justify the capability of globe and butterfly valves as part of its generic letter program.

2.5 Periodic Verification of MOV Capability

In recommended action "d" of the generic letter, the staff requests that licensees prepare or revise procedures to ensure that adequate MOV switch settings are determined and maintained throughout the life of the plant. In Paragraph j of the generic letter, the staff recommends that the surveillance interval be based on the safety importance of the MOV as well as its maintenance and performance history, but that the interval not exceed 5 years or three refueling outages. Further the capability of the MOV will need to be verified if the MOV is replaced, modified, or overhauled to an extent that the existing test results are not representative of the MOV.

In its response to the generic letter, the licensee stated that procedures and administrative controls were in place for initially determining settings and for controlling activities that could alter the settings; procedures or guidance would be developed to provide for periodic testing to verify that the settings remain adequate; the periodic test interval would be established in the future; and post-maintenance testing would be used to verify switch settings following maintenance (as necessary, based on the maintenance performed).

The licensee has initiated actions to provide for periodic verification of switch settings although the verification process was not yet fully defined or controlled procedurally. According to the licensee's MOV coordinating engineer, the procedures for controlling the verification testing and related activities were under development. The licensee planned to verify switch setting adequacy within 5 years of the initial setting. The initial setting of the MOVs in accordance with the practices currently used by the licensee began in 1987 in response to NRC Bulletin 85-03; therefore, first verifications would start by 1992. The periodic verification was included in the preventive maintenance (PM) schedule. The Unit 1 PM schedule, for example, provided for periodic performance of procedure FNP-0-EMP-1501.05 on MOVs in the generic letter program at a frequency of 5 years or less. This procedure is used to inspect and adjust the electrical components of MOVs and was in the process of being revised to specify and control the future switch setting verifications and associated activities. The team found that the redrafted procedure

specified a flowpath for MOV testing, inspection, trending of related data, and other activities, through reference to other procedures. Several of the procedures referenced were to be issued later.

MOVs within the scope of the generic letter program that require maintenance are referred to the MOV engineer by the maintenance planners for specification of appropriate post-maintenance testing to ensure that adequate settings are maintained. Procedure FNP-0-EMP-1501.06, Attachment 14, "Suggested Guidelines for MOV Retesting" provides post-maintenance testing guidance as well as instructions for periodic testing and maintenance of MOVs using MOVATS.

2.6 MOV Failures, Corrective Actions, and Trending

In recommended action "h" of the generic letter, the staff requests that licensees analyze or 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. It is also suggested that the material be periodically examined (every 2 years or after each refueling outage after program implementation) as part of the monitoring and feedback effort to establish trends of MOV operability. These trends could provide the basis for a licensee revision of the testing frequency established to periodically verify the adequacy of MOV switch settings. The generic letter indicates that a well-structured and component-oriented system is necessary to track, capture, and share equipment history data.

The licensee has implemented controls for documenting MOV failures, including corrective actions performed. The deficiencies and corrective actions are identified on maintenance work requests (MWRs) in accordance with Procedure AP-52. Historical information from these work requests is entered in the licensee's computerized data base and is retrievable by equipment number. Historical data of interest for a given MOV is identified by MOV equipment number or equipment numbers of its associated actuator, limit switch or breaker. The licensee indicated that the equipment number for a given MOV maintenance item might have been in some cases incorrectly identified. For example, repair of an MOV's limit switch might have been identified with that valve's equipment number either because the valve number was more easily obtained or the limit switch was not originally known to be deficient when a valve deficiency was noted and recorded. However, the licensee was correcting the data base to reflect the proper equipment numbers for repairs. The effort was about 50 percent complete.

Codes were used to identify the cause of failure for the MWRs and the work history data base. The responsible maintenance foreman for each MWR determined the cause code. However, during a NRC maintenance team inspection at FNP in 1989, code entries were often found incorrect. At the time of this inspection, the licensee had efforts under way to improve cause code entries and make the data more useful in assessing equipment performance and maintenance adequacy.

In addition to the equipment history recorded from MWRs, the more significant failures also were recorded on incident reports for more detailed technical review and analysis in accordance with Procedure AP-30. The 1990 and 1991 file

of maintenance incident reports (specifically, report numbers MIR91-002 and MIR90-005, -021, and -025) showed that root causes of failure and appropriate corrective actions to preclude recurrence were identified.

Procedure FNP-0-EMP-1005.4 provides the requirements for an annual assessment of MOV failures. However, the controlling procedure was issued February 7, 1991, and the recently completed assessment of 1990 MOV failures was issued about one week earlier. Information for the assessment had been obtained by reviewing separate work order history printouts for all MOVs (not just safety-related or those in the GL 89-10 program), all actuators, and all 600 volt breakers. However, it appeared that some degradation and failures described in work requests might have been missed in the review because work requests for the limit switch equipment numbers were not reviewed. The MOV engineer explained that until recent upgrading of the data base entries, little failure data would have been identified to the limit switch equipment numbers.

The assessment report identified eight MOV failures for 1990 although it did not identify the valves that failed or give any indication of their importance to plant operation or safety. According to the MOV engineer, only two of the valves were in safety systems and only one performed a safety significant function. Only a small amount of data on valve degradation was included in the report. Degradation information had been collected that was not formally required by procedure and was not in the work order computerized data base. The data were recorded on checklists in the course of MOV diagnostic testing and were retained with the work request packages. Although these data had been compiled by the MOV system engineer, they had not been utilized in the formation of the MOV periodic assessment report.

As a result of the failure and degradation data summarized in the assessment report, six recommendations for improvement were also included in the report. In accordance with the controlling procedure, the assessment report was provided to the Maintenance Engineering Support Group Supervisor for review and approval and was then maintained as a preventive maintenance task record. There was no provision for transmittal of the report or its recommendations to other management or any indication of how the recommendations should be implemented to provide corrections or improvement to the MOV program. The absence of a mechanism for implementing recommendations obtained from the MOV assessment report is identified as Open Item 91-201-05 in Appendix A of this report.

2.7 Schedule

In Generic Letter 89-10, the staff requested that licensees complete all design basis reviews, analyses, verifications, tests, and inspections that were initiated in order to satisfy the generic letter recommended actions by June 28, 1994, or within three refueling outages after December 28, 1989, whichever is later.

Procedure FNP-0-EMP-1005.02 provides the schedule for the licensee's generic letter program. The licensee stated that the design basis reviews for the 356 MOVs within the scope of the generic letter program were complete. The licensee had completed initially setting and testing 221 MOVs within the program and intends to have the remaining MOVs initially set and tested within the 5-year schedule. However, because the licensee has made commitments

regarding additional design basis testing of MOVs that might affect its schedule, it should inform the staff if it determines that the schedule commitments might not be met.

3.0 IMPLEMENTATION OF THE LICENSEE'S PROGRAM IN RESPONSE TO GENERIC LETTER 89-10

The inspectors selected seven MOVs from FNP Unit 2 to review the implementation of the licensee's program in response to Generic Letter 89-10. Those MOVs were MOV 8000A (power-operated relief valve (PORV) block valve, which is a 3-inch Velan flexible wedge gate valve); MOV 3350B (steam generator B AFW isolation valve, which is a 4-inch Rockwell stop/check valve); MOV 8701A (reactor coolant system loop C to RHR Pump A valve, which is a 12-inch Copes-Vulcan flexible wedge gate valve); MOV 8884 (charging pump to reactor coolant system (RCS) hot leg isolation valve, which is a 3-inch Velan flexible wedge gate valve); MOV 3764C (motor-driven AFW pump to steam generator 2C isolation valve, which is a 4-inch Velan flexible wedge gate valve); MOV 3406 (turbine-driven AFW pump trip and throttle valve, which is a 3-inch Schutte & Koerting mechanical throttle globe-type valve); and MOV 8889 (RHR to Hot Leg valve, which is a 10-inch Copes-Vulcan flexible wedge gate valve). The licensee demonstrated to the inspectors that the differential pressure conditions selected for those MOVs were conservative.

The team evaluated the licensee's selection of the maximum and minimum torque switch thrust for each of the seven sample MOVs and their capability to function under design basis conditions. The licensee had obtained approval from Westinghouse and Limitorque to exceed the published rating of the actuators of MOV 8000A, MOV 8884, MOV 3764C, and MOV 8889. The licensee had not completed its reevaluation of the maximum allowable thrust for MOV 3406 and certain other MOVs previously evaluated under the Bulletin 85-03 program. As discussed in Section 2.3(3) of this report, the licensee committed to complete those reviews and to update its documentation as appropriate. There were no other concerns regarding the selection of maximum allowable torque switch thrust for the sample MOVs.

The licensee considered MOV 8000A (a PORV block valve) impracticable to test and applied data from other FNP MOVs considered identical. This MOV is appropriate for the two-stage approach described in Generic Letter 89-10. The first stage was the licensee's establishment of switch settings for the MOV using a 90 percent confidence band from test data for other Farley MOVs that the licensee considered identical. For the second stage, the licensee needs to verify that the performance of this type of MOV is understood to such an extent that data can be applied among these MOVs. The licensee tested MOV 3350B near its design basis differential pressure of 1600 psid. The inspectors had no concerns with the testing performed on this MOV. The licensee considered testing MOV 8701A at its design basis differential pressure of 700 psid to be impracticable and obtained minimum required thrust estimates from the MOVATS data base. The licensee stated that this MOV has an interlock that automatically closes at 700 psig and another that automatically opens at 403 psig. Although the licensee's approach is acceptable for the interim period, the licensee will need to justify the applicability of the MOVATS data base. To set MOV 8884, the licensee used a 90 percent the confidence band from test data for other FNP MOVs it considered identical to MOV 8884 although the licensee

indicated that this MOV was testable. The licensee will need to justify the applicability of the test data to this MOV. The licensee tested MOV 3764C near the design basis differential pressure of 1525 psid and adequately demonstrated the capability of this MOV. The licensee tested MOV 3406 at 630 psid and extrapolated the required thrust to the design basis differential pressure of 1250 psid. This approach was adequate for the interim setting of this MOV because there are no identified problems with globe valves. However, the staff expects the licensee to reevaluate the capability of this MOV as information regarding globe valve performance is obtained through operating experience and research results. The licensee considered testing MOV 8889 at the design basis differential pressure of 2750 psid impracticable because the piping is sized for 700 psig. Therefore, the torque switch for the MOV was set using information from Westinghouse for the required minimum thrust. The licensee may be able to justify the capability of the MOV by quantifying the margin resulting from the highly conservative design basis differential pressure assumption.

Although the sampled MOVs appeared to be sized and set in an adequate manner at this time, certain of the MOVs will need to be reevaluated to confirm the current MOV torque switch settings. The licensee should quantify the margins used, such as the highly conservative design basis differential pressures assumed in some cases. Quantifying the margin is important for justifying the licensee's decision not to test an MOV under design basis conditions even though such testing is practicable as defined by Generic Letter 89-10. Further, quantifying the margin is necessary because packing adjustments can directly affect the margin available to operate the MOV.

4.0 WALKDOWN

During the walkdown evaluations of six MOVs (3019A, 3023A, and 3024A in the service water system of both units), team inspectors recorded valve data which was compared to the MOV setpoint data sheets. There were no discrepancies found. The team identified that the torque switch limiter plate to MOV 3019A in Unit 2 had been bent to allow the closing torque switch to be set at the maximum value specified in plant documentation and on the limiter plate. The bending of the plate had not been recorded on the installation document (Maintenance Work Request 210900A). However, procedural controls have been established to prevent exceeding torque switch limits.

5.0 ASSOCIATED PROGRAMMATIC REVIEWS

The team reviewed certain other aspects of the licensee's overall program as discussed below.

5.1 MOV Setpoint Control

The licensee established the methodology for the MOV setpoint documents so that all MOVs within the scope of Generic Letter 89-10 will be included. Additions to the setpoint document are incorporated via production change notices in accordance with the appropriate plant procedures. When the licensee has completed its review of all MOVs and they have been set in accordance with the Generic Letter 89-10 program, the MOV setpoint document will be controlled in accordance with Administrative Procedure FNP-0-AP-4, "Control of Plant

Documents and Records." The inspectors considered existing and planned controls for the MOV setpoint document to be acceptable.

5.2 Inservice Testing

The licensee's inservice testing (IST) program for MOVs appeared to conform to the requirements of Section XI of the ASME Code. In most cases, the program language was drawn directly from ASME Code Section XI, Subsection IWV. MOVs included in the scope of the generic letter program were not adversely affected by the IST program's relief requests for valve testing.

The licensee had deviated from the recommendations of Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," with regard to the selection of the limiting value of full stroke time for determining valve operability. This generic letter establishes a method for determining a full-stroke time limit for each valve on the basis of a reference or average stroke time for that valve. When the limit established by this method is less than the time limit designated by the plant's technical specifications (TS) or the FSAR, the generic letter states that the limit based on the valve's normal operating characteristics should be used. Instead, the licensee used the TS or FSAR limit wherever available, regardless of the valve's normal range of stroke times. When TS or FSAR limits were not available, the licensee established a limit generally in accordance with Generic Letter 89-04. In some cases the licensee established limits that considered the requirements related to components covered by the ASME Code, Section XI, and in other cases only considered system requirements. As an example, a valve with a TS stroke time limit of 60 seconds in the closed direction may actually stroke closed in 30 seconds. This valve's stroke time could increase gradually over a long period of time before any action would be required. Thus, the valve could be at a point of imminent failure while at the same time having a stroke time well within the TS or FSAR limiting value. The licensee's failure to adopt the recommendations for establishing limiting values for stroke time testing is identified as Open Item 91-201-06 in Appendix A of this report.

The team inquired as to whether the licensee trended IST results to identify sub-threshold changes in valve performance. Operations Directive 86-01 dated June 17, 1986, established a shift supervisor review to look for trends in stroke times. This review was performed each time a stroke time entry was made in the surveillance test data book. The cumulative test results for several valves showed two adverse trends, both of which had apparently been addressed by increasing the test frequency.

5.3 Maintenance

Administrative Procedure FNP-0-AP-53 describes the licensee's maintenance program. General Maintenance Procedure FNP-0-GMP-1 establishes the administrative control for the maintenance department's PM program. Electrical Maintenance Procedure EMP-1005.02 implements the program requirements for MOVs, dampers, and louvers. This procedure provides the guidance for administering the MOV program on the basis of the licensee's commitments in response to Generic Letter 89-10. The program also addresses the lessons learned from Bulletin 85-03.

Electrical Maintenance Procedure FNP-0-EMP-1501.06 provides detailed instruction for the periodic testing and maintenance of Limitorque MOVs using the MOVATS diagnostic equipment. All MOVs in the program were identified as "MOVATS Valves" on the plant's data base computer. In processing MWRs, maintenance planners indicate on the MWR that a valve is a MOVATS valve if so identified on the data base. A daily planning and scheduling office desk guide dated January 18, 1990, contained instructions to ensure that this information was included on the MWR.

Before an MOV is included in the program, it is inspected, disassembled, refurbished, and reassembled. The MOV group reviews work requests that might affect activities that have been performed on valves relative to Generic Letter 89-10. The group also is involved in determining appropriate post-maintenance work activities. Maintenance Procedure FNP-0-EMP-1501.06 contains a list of suggested post-maintenance tests for the various maintenance activities performed. Activities involving valve disassembly or replacement and packing adjustment or replacement are addressed in the maintenance procedure. The recommended post-maintenance tests focus on verifying that refurbished valve data are not adversely affected, and if so, ensure that complete calibration and baseline testing are performed.

Plant Procedure FNP-0-SOP-0.6 (Revision 4), "Limitorque MOV Lubrication and Valve Stem Inspection" provides guidance necessary to lubricate Limitorque motor operators. Surveillance Procedures FNP-1-M-050, "Master List of Surveillance Requirements," indicates the lubrication and inspection scheduling for environmentally qualified MOVs and FNP-1(2)-M-012, "Lubrication Manual," for all other MOVs. These two procedures indicate a lubrication surveillance frequency of 18 months.

No maintenance activities related to Limitorque issues, such as spring pack hydraulic lock or relaxation, were observed during the review of a summary of maintenance histories for Unit 2 valves MOV-8701A, -3764C, -8884, -3406, -3350B, -8889, and -8000A. The histories included periods before and after the MOV refurbishment activities and included no indication of a generic or unique problem.

FNP's MOV maintenance program was considered a strength by the inspection team.

5.4 Training

The training department provides site-specific and continuing training to personnel. Mechanics and electricians receive approximately 6 days of initial training on valves and valve operators. Topics of instruction include valve types and their components, valve operation, valve failures, lubrication, disassembly, assembly, and torque switch and limit switch adjustment. A 1-week retraining session is conducted each year to address problems that occur in the plant and in the industry. Information provided by the NRC also is addressed during the retraining sessions.

Personnel in the licensee's training department evaluate plant events, Institute of Nuclear Power Operations (INPO) significant event reports (SER), NRC information notices and industry information to determine the need to incorporate the information into the training program. All documentation received by

the training department for review is recorded on a "Plant/Industry Operating Event Log." This log is an internal document that the training department uses to track documents and record the disposition of the document following the review. The training department also was developing a data base for the purpose.

The training department controls to ensure that plant, industry, and NRC information affecting training is properly addressed was considered a strength by the team.

5.5 Modifications

The licensee had adequate procedures for performing plant modifications. The modifications to move the torque switch bypass to a different limit switch rotor to allow for setting of the open torque switch bypass independent from the open and closed limit switches and to change a motor to ensure that reduced voltage torque requirements for the MOV would be adequate were performed in accordance with the established procedures. Post-modification testing was specified and good communications were established between the interfacing organizations.

5.6 Industry Experience and Vendor Information

Plant Procedure FNP-0-M-028, "SEE-IN (Significant Event Evaluation - Information Notice) Procedure Manual," controls the evaluation of industry information and experience from sources such as INPO, Westinghouse, and other vendors. The Performance and Planning group is the onsite organization responsible for ensuring that information received is screened and evaluated by appropriate licensee organizations and that appropriate actions are planned.

The licensee's evaluations and implementation of eight industry issues concerning motor-operated valves selected by the team showed that the licensee is adequately implementing its SEE-IN program and taking actions to identify and correct the problems identified in the 10 CFR Part 21 notifications and the maintenance updates applicable to the plant. The licensee's evaluation of the MOV information was seen as a strength by the inspection team. Conformance with GL-83-28 was not evaluated during this inspection.

5.7 Use of Diagnostics

The thrust values established as a result of the design basis reviews were used to set the torque switch for motor-operated valves. All MOVs within the scope of the licensee's generic letter program will be baseline tested under static conditions using MOVATS diagnostic equipment to establish the torque switch settings for the required thrusts. The MOVATS equipment also will be used to set the limit switches that indicate open and close positions and for torque switch bypass. The basic methodology of MOVATS involves obtaining the stem thrust or actuator output torque by monitoring spring pack displacement.

The licensee has developed procedures to guide the use of MOVATS equipment in the field. Licensee personnel qualified to use the equipment were trained by MOVATS personnel. Documentation related to MOVATS diagnostic equipment inaccuracies stated that the overall system accuracies varied and were dependent on

the particular components used for measurements and the magnitude of the valve thrust being measured.

The MOVATS system uses several different components to determine final output thrust. The accuracies of the devices were based on National Institute for Standards and Technology traceable calibrations, except for the stem strain transducer, the stem strain ring, and the motor load unit. The overall methodology for determining the accuracy is generally based on a statistical analysis and it was unclear that any process testing was conducted to confirm the total system accuracy from the valve actuator to the MOVATS output. Furthermore, the MOVATS methodology calibrates the torque switch in the open direction by comparing spring pack displacement to the measured stem thrust. This calibration is then used to set the torque switch in the closed direction. The MOVATS methodology is based on the assumption that, for a given spring pack deflection, the delivered thrust will be the same both in the opened and the closed directions. This assumption has recently been questioned in the industry and testing has indicated that there are differences in thrust between the open and close directions.

The potential problem with the MOVATS equipment accuracy could affect the adequacy of the licensee's generic letter program because the licensee uses MOVATS for a significant portion of its program, and the total MOVATS system accuracy has not been adequately justified. This concern is identified as Open Item 91-201-07 in Appendix A to this report.

APPENDIX A

Inspection Findings

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-01

FINDING TITLE: Effects of High Temperatures on Motor-Torque and Actuator-Thrust Capabilities

DESCRIPTION OF CONDITION:

The licensee indicated that a few MOVs would be required to operate after an accident in environments where sustained elevated temperatures could exist. However, no specific analysis or testing had been performed to establish what effects the postulated high temperatures would have on motor-torque and actuator-thrust capabilities. A preliminary review of the equations calculating motor torque showed that under locked-rotor conditions, available motor torque for an ac motor would decrease with increasing stator resistance. Motor stator resistance would increase with increases in temperature. Actuator efficiencies also could be affected by changes in temperature. Although increases in temperatures could negatively affect motor actuator capabilities, the magnitude of this effect has yet to be quantified.

REQUIREMENTS OR GENERIC LETTER PROVISION:

Question 16 to Supplement 1 of Generic Letter 89-10 states that the effects of factors such as high ambient temperature should be addressed analytically as part of the design basis review process.

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-02

FINDING TITLE: Demonstration of the Applicability of Test Data From Other MOVs

DESCRIPTION OF CONDITION:

In its efforts to demonstrate the capability of certain MOVs to operate under their design basis conditions, the licensee has applied data to those MOVs from the design basis tests of other MOVs at FNP that the licensee considered physically identical. Recent operating experience and research results have revealed that MOVs appearing identical can have completely different performance characteristics. The licensee has not demonstrated that the data from tests of MOVs at FNP are applicable to other MOVs. For the short term, the licensee committed to perform a detailed comparison of the diagnostic traces obtained during static testing of the MOVs. For the long term, the licensee committed to obtain information from a program being developed by the Electric Power Research Institute (or other sources) to determine whether the MOVs have similar performance characteristics that allow the application of test data between them.

REQUIREMENTS OR GENERIC LETTER PROVISION:

The staff's response to Question 26 in Supplement 1 to Generic Letter 89-10 states that licensees will need to justify the applicability of test data from one MOV to another and provides guidance on the factors to be considered in demonstrating the applicability of test data between MOVs.

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-03

FINDING TITLE: Demonstration of the Applicability of the Required Thrust Estimates from the MOVATS Data Base and Vendor Calculations

DESCRIPTION OF CONDITION:

In its effort to demonstrate the design basis capability of some MOVs, the licensee used estimates for minimum required thrust for those MOVs based on test results from the MOVATS data base and vendor calculations. Despite the wide range of performance characteristics of MOVs under various conditions, the data base prepared by the MOVATS manufacturer for gate valves combines valve sizes, manufacturers, and operating conditions. Further, the licensee is aware that the MOVATS data base and vendor calculations do not always provide a conservative estimate of thrust requirements. The licensee has not demonstrated that minimum thrust requirements estimated from the MOVATS data base or vendor calculations are conservative for MOVs at FNP.

REQUIREMENTS OR GENERIC LETTER PROVISION:

The staff's response to Question 28 in Supplement 1 to Generic Letter 89-10 states that test data from other facilities or from industry organizations may be used to demonstrate the capability of an MOV under design basis conditions, if justified. The staff indicates the factors that should be considered in providing this justification.

The staff's response to Question 20 in Supplement 1 indicates that confidence in the vendor thrust equation has been reduced by recent research results and operating experience. In light of the uncertainties surrounding the vendor thrust equation, the staff indicates that selection of a valve factor assumed to be conservative might not be adequate.

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-04

FINDING TITLE: Correction to MOV Setpoint Data Sheets

DESCRIPTION OF CONDITION:

The licensee's setpoint data sheets for each MOV within its generic letter program (1) did not clearly indicate the bases for the minimum and maximum thrust limits (2) were not updated to include MOVATS' latest estimates of the accuracy of its equipment, and (3) did not specify the maximum thrust limits for certain MOVs being reevaluated.

REQUIREMENTS OR GENERIC LETTER PROVISION:

The staff's response to Question 26 in Supplement 1 to Generic Letter 89-10 indicates that licensees should account for instrument inaccuracies when using diagnostic equipment in applying test data between MOVs. The consideration of MOV diagnostic equipment inaccuracies is applicable to other uses of that equipment as well.

The staff's response to Question 30 in Supplement 1 states that the parameters measured by diagnostic equipment should be capable of providing information to assist licensees in demonstrating that the MOV will operate under design basis conditions.

The staff's response to Question 44 in Supplement 1 indicates that the NRC inspectors should be able to verify that an appropriate analysis was performed and that licensees should justify all assumptions.

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-05

FINDING TITLE: Implementation of Recommendations for Annual Assessment of MOV Failures

DESCRIPTION OF CONDITION:

There were no formal procedural controls to specify the process for management review and implementation of recommendations stemming from the annual assessment of MOV failures. Procedure FNP-0-EMP-1005.4 provides the guidelines for the assessment and requires the assessment report and its recommendations be reviewed and approved by the Maintenance Engineering Support Group Supervisor and maintained as a preventive maintenance task record. The copy of the 1990 assessment report reviewed by the NRC team was attached to a memorandum to file. The Maintenance Engineering Support Group Supervisor had signed off on the report; however, no specific actions had been taken regarding the assessment recommendations.

REQUIREMENTS OR GENERIC LETTER PROVISION:

Criterion XVI of Appendix B to 10 CFR Part 50 requires that the cause of and corrective actions for significant conditions adverse to quality shall be documented and reported to appropriate levels of management.

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-06

FINDING TITLE: Limiting Values for MOV Stroke Time Testing

DESCRIPTION OF CONDITION:

To select the limiting value of full stroke time in its inservice testing (IST) program, the licensee used the technical specifications (TS) or final safety analysis report (FSAR) value even if the normal stroke time for the MOV was much shorter. This approach is contrary to good engineering practice because the TS and FSAR may address the system performance requirements rather than the component characteristics.

REQUIREMENTS OR GENERIC LETTER PROVISION:

Position 5 of Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," states that the full stroke time limit should be based on the reference stroke time for the MOV, the TS limit, or the safety analysis, whichever is more conservative.

FINDING CATEGORY AND NUMBER: OPEN ITEM 91-201-07

FINDING TITLE: Establishment of MOVATS Accuracy

DESCRIPTION OF CONDITON:

The licensee uses MOVATS diagnostic equipment to determine the torque switch settings for the required minimum thrust values. However, the overall system accuracy of the MOVATS test equipment has not been confirmed.

REQUIREMENTS OR GENERIC LETTER PROVISION:

The staff's response to Question 26 in Supplement 1 to Generic Letter 89-10 indicates that licensees should consider instrument inaccuracies when using diagnostic equipment in applying test data between MOVs. The consideration of MOV diagnostic equipment inaccuracies is applicable to other uses of that equipment as well.

The staff's response to Question 30 in Supplement 1 states that, where MOV diagnostic equipment is used, the parameters measured by the equipment should be capable of providing information to assist licensees in demonstrating the capability of the MOV.

APPENDIX B

An exit meeting was held on February 15, 1991, to discuss the inspection with the licensee. Individuals who attended the meeting are identified below.

Alabama Power

B. Badham, S.P. Engineer
W. R. Bayne, Chm, Supt.
S. Casey, System Perf. Supervisor
R. L. Rederico, Valve Engineer
R. Hill, Assistant General Manager, Plant Support
D. N. Morey, General Manager Nuclear Plant
M. D. Pilchen, Valve Engineer
E. Stephenson, SEE-IN Coordinator
M. Stinson, Assistant General Manager, OPS
D. Tedin, Technical Training Supervisor
J. J. Thomas, Manager Maintenance [illegible]rtment
B. R. Yance, Supervisor Maintenanc [illegible]gineer Support

U.S. Nuclear Regulatory Commission
S. T. Hoffman, Project Manager, NRR
J. Jacobson, Team Leader, NRR
W. D. Lanning, Branch Chief, Special Inspection Branch, NRR
G. F. Maxwell, Sr. Resident Inspector, FNP
M. M. Morgan, Resident Inspector, Farley
T. G. Scarbrough, Sr. Mechanical Engineer, EMEB, NRR
E. J. Sullivan, Section Chief, EMEB, NRR
J. Yerokum, Reactor Engineer, Region I
A. F. Gibson, Director, Reacter Safety Division, Region II
E. H. Girard, Reactor Inspector, Region II
D. M. Verrelli, Chief Project Branch 1, Region II
M. P. Huber, Reactor Inspector, Region III
C. J. Paulk, Reactor Inspector, Region IV
M. F. Runyan, Reactor Inspector, Region IV

Southern Company Services

C. R. Lynch, Senior Engineer
M. G. Edison, Sr. Specialist Nuclear Engineer and LIC
S. L. Gates, Senior Specialist