U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-315; 50-316
License Nos:	DPR-58; DPR-74
Report Nos:	50-315/96012(DRS): 50-316/96012(DRS)
Licensee:	Indiana Michigan Power Company
Facility:	Donald C. Cook Nuclear Generating Plant
Location:	7700 Red Arrow Highway Stevensville, MI 49127
Dates:	October 21-25, 1996, and December 5, 1996
Inspectors:	A. Dunlop, Reactor Inspector J. Guzman, Reactor Inspector R. Cain, Engineering Specialist, INEL
Approved By:	W. Kropp, Chief Engineering Specialist Branch 1

EXECUTIVE SUMMARY

Engineering

- This close-out inspection of NRC's review of Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve (MOV) Testing and Surveillance," determined that the MOV program and implementation at D. C. Cook was not sufficiently complete to close-out the NRC's program review. Although a number of areas have been sufficiently addressed, the inspectors could not conclude that the licensee had completed verifying all GL 89-10 program MOVs would perform the intended safety functions under design-basis conditions. Specific issues that remain to be resolved are described in sections E1.1.b.10; E1.1.b.1.5; E1.1.b.1.9(a); E1.1.b.1.9(b); E1.1.b.1.9(c); E1.1.b.5; E1.1.b.1.6; and E1.1.b.1.9(d) of this report.

- A condition report was not initiated and a prompt operability assessment was not made when a potentially adverse condition was identified for the PORV block valves. (Section E1.1.b.1.3)

- The licensee made significant progress on the GL 89-10 program with respect to previous NRC MOV inspections. (Section E1.1.b.1)

- The number of GL 89-10 valves dynamically tested and diagnostically testing additional plant MOV's was considered a positive management position. (Section E1.1.b.2)

- The licensee's GL 89-10 Closure Summary Reports were well detailed and contained useful information in determining the MOV's design-basis capability. (Section E1.1.b.1)

Safety Assessment/Quality Verification

- The recent self-assessment in the MOV area, although limited in scope, provided some good technical findings to prepare the MOV program for closure. The use of an outside technical MOV expert was also viewed as a positive aspect to provide additional insights into this highly technical program. (Section E7.1)

Report Details

Summary of Plant Status

Unit 1 was operating at 90 percent power and Unit 2 was operating at 100 percent power during this inspection period.

III. Engineering

E1 Conduct of Engineering

E1.1 Generic Letter 89-10 Program Implementation

a. Inspection Scope (TI 2515/109)

This inspection evaluated the process for qualifying the design-basis capability of MOVs and closure of NRC's review of GL 89-10. The inspection concentrated on MOVs that were tested under static or low differential pressure (dp) conditions. A valve sample that included several program closure methods used by the licensee was selected to verify design-basis capability. The inspectors reviewed design-basis documents, thrust calculations, test packages, and engineering evaluations for the following MOVs:

1-FMO-202	Steam Generator (SG) OME-3-2 Feedwater Shutoff (S/O) Valve
1-QMO-226	East Component Cooling Pump Mini-flow to Reactor Coolant Pump Seal Water Heat Exchanger S/O Valve
2-IMO-256	Boron Injection Tank Train Inlet S/O Valve
2-IMO-910	Refueling Water Storage Tank to Chemical and Volume Control System (CVCS) Pump Suction Header Train "A" S/O Valve
2-FMO-211	Turbine-Driven Auxiliary Feedwater (AFW) Pump PP-4 Discharge to SG Control Valve
2-NMO-252	Pressurizer Power-Operated Relief Valve (PORV) Block Valve
2-IMO-270	Safety Injection (SI) Pumps Discharge Crosstie Train S/O Valve
2-IMO-326	West Residual Hear Removal (RHR) and South SI to Reactor Coolant System (RCS) Loops 2 & 3 Cold Legs S/O Valve

The inspectors also reviewed other licensee documentation used to justify program assumptions, such as stem friction coefficients and load sensitive behavior. Further, the inspectors reviewed documentation related to program issues, such as periodic verification, post-maintenance testing, and program audits.

b. Observations and Findings

b.1 MOV Design-Basis Capability Verification

The inspectors noted that the licensee's GL 89-10 Closure Summary Reports were well detailed and contained useful information in determining the MOV's design-basis capability. The licensee had made significant progress on the GL 89-10 program with respect to previous NRC MOV inspections. In general, the licensee's design-basis calculations to verify valve capability were considered adequate. However, the justifications for several assumptions used for certain valves or valve group calculations were not adequately supported. Based on these concerns, the inspectors were not able to conclude that the licensee had completed verifying all GL 89-10 MOVs were capable to meet the design-basis requirements. As a result, the NRC's review of the licensee's GL 89-10 MOV program will remain open pending additional support information.

b.1.1 MOV Sizing and Switch Settings

The licensee's thrust calculations utilized the industry's standard thrust equation to determine thrust requirements for rising stem gate and globe valves. The applied stem friction coefficient (SFC) was either the measured value recorded during a static test, or 0.174 when the stem factor was not measured. If the static test value was less than 0.15, it was generally increased to 0.15. These values were used to convert thrust into torque when torque was not measured. Applied valve factors were based on licensee testing or best available industry data, such as data from other utilities and the Electric Power Research Institute's (EPRI) Performance Prediction Methodology (PPM). A factor of 15% was added to the closed target thrust to account for the effects of load sensitive behavior and 5% to account for degradation of stem factors. Equipment errors, such as torque switch repeatability and diagnostic system accuracies, were combined in a square root sum of the squares methodology and used to adjust the upper and lower required thrust, where appropriate. Overall, the design basis capabilities of the GL 89-10 valves were acceptable, except as noted in the following paragraphs.

b.1.2 Valve Factors

The licensee Valve Factor (VF) Technical Paper divided MOVs into 24 groups. The grouping was based on valve type, size, manufacturer, and pressure class. The licensee used in plant-testing, industry data, the EPRI PPM, or a combination of all of these to justify the VF applied to the valves in a particular group. Industry data was further screened for flow, temperature, and pressure to ensure the data would be applicable to the licensee's MOVs.

Generally, if the valves in a group could not be practicably tested, the licensee would use the thrust obtained from application of the EPRI PPM to back calculate a VF. Further, the licensee reviewed several industry data points to confirm the EPRI PPM results. Once this review was complete, the licensee used the more conservative of the two methods. Overall, for the majority of valve groups, the assumed VF was adequately justified. There were several valve groups, however,

that had minimal justification for the applied VF. These are discussed below and in paragraph E1.1.b.1.3 of this report.

(a) Valve group "BAAC" was 8" Aloyco 300# ball-socket gate valves, which used a VF of 0.71 based on a single industry test data point. The inspectors stated that a single data point was insufficient to justify the VF for the entire group. The lowest thrust margin for the valve group in the open safety direction, however, was 178 percent. The inspectors considered the large calculated margin to be adequate for program closure.

(b) Valve groups GL10 and GL11 were 4" Rockwell and Conval 1500# Y-Globe valves, which used a VF of 1.1 based on EPRI testing that indicated VFs between 0.9 and 1.1 for globe valves. The inspectors stated that other globe valves tested in the industry had indicated valve factors higher than 1.1. Valve group GL11 had 47 percent available margin in the closed direction and could support an available VF of 1.65, which was considered adequate for program closure. However, in valve group GL10, the most limiting MOV had a 6 percent available margin in the closed direction and could only support an available VF of 1.17. The inspectors considered the margin for these MOVs to be low. However, based on use of a guide-based area term that was used to calculate required thrust, the settings for the group were considered adequate for program closure.

The licensee indicated they would attempt to find additional data to support the use of the applied VFs for these valve groups.

b.1.3 Operability of the Power-Operated Relief Valve (PORV) Block Valves

The inspectors were concerned with the operability of four pressurizer PORV block valves based on the use of a 0.4 VF while two PORV block valves were using a 0.51 VF. The licensee has 6 PORV block valves, three for each unit, which were 3" Velan 1500# flex-wedge gate valves. The licensee had applied the EPRI PPM in October 1996 and back calculated a required VF of 0.51. The 0.51 VF was considered by the licensee to be conservative because EPRI Velan Valve #13, tested under similar conditions (blowdown, hign temperature), showed a VF of 0.34 in the closed direction. Two MOVs on Unit 2 (2-NMO-152 and -153), which were modified during the last refuel outage, could support the 0.51 VF. The modification was not performed on the third Unit 2 valve due to lack of parts during the outage. However, MOVs 1-NMO-151, -152, -153, and 2-NMO-151 used a VF of 0.40 that the licensee considered adequate based on the EPRI test results.

The inspectors had the following concerns with this justification. Information from the NRC Safety Evaluation (SE), dated March 15, 1996, of the EPRI Topical Report TR-103237, "EPRI Motor-Operated Valve Performance Prediction Program," Sections II.B.2.a (page 9) and II.B.2.c (page 17), discussed that EPRI did not precondition the valves tested in-situ and that guide rails in two valves manufactured by Velan experienced plastic bending under the high flow conditions. Based on the SE information and the lack of specific in-plant dynamic test data, the

EPRI PPM information should have been considered the best applicable data once the licensee had performed the EPRI PPM runs.

As a result of the inspectors' concerns, the licensee recalculated the required thrusts for four unmodified MOVs based on current torque settings and a 0.51 VF. The revised calculations determined MOV 2-NMO-151 was capable of supporting the 0.51 VF. MOVs 1-NMO-151 and -153 could only support the 0.51 VF when rate of loading (ROL) and stem lube degradation were reduced or removed from the calculation. This condition was documented on a condition report (CR) with an associated operability determination. The inspectors reviewed the operability determination and considered it acceptable until the valves could be modified at the soonest available opportunity. MOV 1-NMO-152, however, could not support a VF of 0.51 with the current torque switch setting. Based on the results of these calculations and discussions with the inspectors, the licensee declared MOV 1-NMO-152 inoperable and initiated a CR. The licensee performed the required Technical Specifications (TS) actions when the MOV was declared inoperable.

Based on the inspectors' review of this issue, the licensee should have addressed the 0.51 VF from the EPRI PPM for the PORV block valves with respect to valve operability. Plant Managers Instruction (PMI) 7030, "Corrective Action," Revision 22, was the licensee's primary mechanism by which degraded and potentially nonconforming conditions were evaluated. PMI-7030 required the originator to initiate a CR for known or suspected adverse conditions or events (step 6.9.a). PMI-7030 also defined an adverse condition/event as "A non-conformance, deficiency, deviation, discrepancy, or adverse trend of items, services and/or administrative systems that, if left uncorrected, could adversely impact safety, quality, or operability" (step 5.1). The failure to initiate a CR and perform a prompt operability assessment following the identification of a potentially adverse condition from the EPRI PPM information is considered a violation (50-315/96012-01(DRS); 50-316/96012-01(DRS)) of TS 6.8.1.

The licensee stated that the three PORV block valves for Unit 1 were scheduled for modifications in the upcoming February 1997 outage to verify the valves' design-basis capabilities. The Unit 2 MOV was scheduled for the same modification during the Fall 1997 refueling outage. The licensee also stated the modifications would be added to the forced outage list if an outage of sufficient duration occurred prior to the refuel outages. The licensee stated these modifications would allow the valves to support the use of a 0.51 VF with sufficient margin. This will be considered an inspection followup item (IFI) (50-315/96012-02(DRS)) pending completion of the Unit 1 modifications and inspector review of the obtained margins.

b.1.4 Load Sensitive Behavior

The inspectors reviewed the licensee's Technical Report 0012-00204-R02, "Rate Of Loading," Revision 0, which was used to perform a statistical analysis of load sensitive behavior (LSB). The statistical evaluation was performed for three data sets; gate and globe valves combined, gate valves only, and globe valves only. The LSB mean plus 2 standard deviations results were 20.1%, 20.8%, and 18.7%, respectively.

The licensee used a 15% bias margin for LSB and added a 5% bias margin for stem factor degradation. These were added directly to increase the minimum required thrust. Equipment accuracies and torque switch repeatability were combined in a square root sum of the squares methodology and then used to increase the minimum required thrust. The licensee compared this methodology to the methodology of adding the statistical LSB bias and the 5% bias for stem factor degradation with the random LSB combined in a square root sum of the squares methodology with torque switch repeatability and diagnostic accuracies. The licensee's methodology bounded all cases except when the value of torque switch repeatability was 5% and diagnostic accuracies were less than 7%. In this case, the licensee used a 16% direct bias for LSB to bound these values. Based on the licensee's test data, the LSB values used in the design-basis calculations were considered acceptable.

b.1.5 Stem Friction Coefficient

The inspectors reviewed Technical Report 0012-00204-R01, "As-Left Stem/Stem Nut Coefficient Of Friction," Revision 0, which was a statistical study of the stem/stem nut coefficient of friction (SFC) for static test data. The licensee performed two studies, one which included all the test data and one which excluded those values less than 0.04 (which were considered suspect compared to industry experience). The study, which included all the data, resulted in a mean value of 0.097 and a mean value with 2 standard deviations of 0.178. The study, which excluded the values below 0.04, had a mean value of 0.102 and a mean value with 2 standard deviation of 0.174. The licensee used the measured static SFC, generally rounded up to 0.15, if the measured value was less than 0.15. For those MOVs where torque was not measured, a value of 0.174 was used for the SFC.

The inspectors had two concerns with the licensee's methodology. Industry and NRC sponsored test data has shown that dynamic SFC values (measured at flow isolation) were generally higher than the values measured during static testing. The licensee performed a second statistical evaluation using the dynamic torque and thrust values from torque switch trip. The SFC values for this study indicated a mean of 0.104 and a mean value with 2 standard deviations of 0.174. The inspectors discussed with the licensee that the values of SFC may still be higher at flow isolation verses torque switch trip values. The inspectors noted that changes in SFC from static values to dynamic values should be accounted for in the closing direction by the licensee's LSB margin.

The inspectors' second concern was related to the potential change in SFC in the open direction due to dynamic conditions. In this direction, there was no added LSB margin to account for the change in SFC. The licensee performed an evaluation for the inspectors which compared the motor operator open capability to the minimum required thrust using the measured SFC and a 15% direct bias for LSB. No operability concerns were identified at this time, since the MOVs appeared to have sufficient margin using this methodology.

Based on several issues concerning open motor capability values with respect to SFC, further licensee review and subsequent evaluation by the NRC will be required

for program closure. The licensee needs to: provide the methodology and justification to address open motor capability when the appropriate SFC is taken into account; for all valves with an open safety function, provide the valves capability margin using the proposed methodology; and provide assurance that this issue will continue to be addressed during the periodic verification program (i.e., program or procedure revision).

b.1.6 Open Unseating Forces

During an April 1996 MOV inspection, inspectors identified that the open unseating force was not accounted for and compared to the operator's capability or structural limits. Subsequent to this inspection, the licensee had compared the static unseating forces to operator thrust and valve structural limits and to the dynamic test data for MOV open capability (at degraded voltage and high ambient temperature, as appropriate). No concerns were noted with these evaluations. The inspectors noted, however, that the licensee had not completed the review of the static unseating forces compared to the operator's torque capability. Based on this finding, the licensee compared the static open unseating force to the operator's thrust capability and identified MOVs 2-QMO-451 and -452 (volume control tank to CVCS pumps isolation valves) had a potential overtorque condition. These valves have high speed actuators and with an unseating torque which would slightly exceed the motor capabilities torque if the valves were opened at degraded voltage. Since these MOVs do not have an open safety function, there was not an operability concern. The resolution of the potential overtorque condition was being addressed by CR-1780.

Although the licensee had modified the dynamic test procedure acceptance criteria, the static test procedure acceptance criteria was not modified to address open unseating forces. A revision to the static test acceptance criteria to address the MOVs unseating force versus the operator and valve structural limits, and operator capability needs to be completed prior to program review closure.

b.1.7 Linear Extrapolation

The inspectors reviewed Technical Report 0012-00192-R02, "Justification For Linear Extrapolation Of Gate and Globe Valve Dynamic Test Data," Revision 0. The licensee used the EPRI study and data to justify the position of linear extrapolation from 30 percent dp to 100 percent design-basis dp, with the exception of blowdown conditions. The inspectors noted that the lowest percent dp extrapolated was 61 percent of design-basis dp. Further, the licensee noted that dp loads less than 3000 lb-force may yield VFs that were inaccurate and misleading. The Technical Report, however, did not mention a minimum allowed value of dp (an absolute value, not a percentage) to ensure that all linear extrapolations would be meaningful. This was a minor procedure issue that the licensee stated would be corrected. The inspectors considered the licensee's linear extrapolation methodology to be acceptable.

b.1.8 Torque Switch Repeatability

The licensee's application of margin for torque switch repeatability was acceptable for program review closure. Torque switch repeatability values of 5%, 10% and 20% based on torque switch setting and actuator torque were appropriately applied following Limitorque guidance.

b.1.9 Butterfly Valve Testing

Approximately two-thirds of all program butterfly valves (43 out of 66) had been dynamically tested. Based on this test information, the licensee's verification of design basis capability of butterfly valves was near completion, pending completion of analyses adjusting butterfly valve structural limits. While the majority of the licensee's butterfly valves exhibited substantial capability margin, several assumptions used in the capability verification equations could not be verified by the inspectors and close-out of GL 89-10 program review was pending submittal of additional information and NRC review of the following issues:

(a) To allow a means of comparing valves and determining a dynamic effect load to apply to static test results, the licensee used a seating/unseating factor which was based on the bearing equation described in EPRI's Application Guide for Motor-Operated Butterfly Valves. Essentially, the seating/unseating factors were determined by solving for the bearing μ described in the Application Guide. These seating/unseating factors were used the same way as valve factors are used for gates and globe valves. For non-dp tested valves, the seat/unseat factors were based on the seat/unseat factors obtained from dp tested valves in the same group. However, as discussed in the section II.B.4.b of the NRC's SE of the EPRI MOV PPM Topical Report, EPRI testing revealed several areas where the Application Guide needed improvement or correction. EPRI was revising the Application Guide and plans to include new information on various issues, including the treatment of bearing torque. During the inspection, the NRC inspectors were informed that based on discussions with engineers involved with the Application Guide revision, the planned changes to the Application Guide did not affect the methodology. In view of the uncompleted revision to the Application Guide, the NRC requested a formal response on the impact of the changes on the bearing equation and whether any proposed changes impacted the methodology.

(b) For symmetrical butterfly valves, the licensee assumed closing hydrodynamic loads were negligible, and therefore, were not included when comparing actuator capability verse required seating torque. The basis for this assumption was based on the January 1993 EPRI Application Guide, page 3-47. However, the NRC could not confirm whether information generated during development of the EPRI butterfly valve model consistently supported this assumption and requested a formal response on this issue.

(c) The NRC also requested, upon completion of the ongoing analyses, a summary tabulation detailing the structural and weak link margins for all program butterfly valves.

(d) The licensee's method for extrapolating tested torque to design basis conditions used a linear method based on differential pressure if the peak dynamic torque occurred at less then 15 degree open disc angle. If the peak dynamic torque occurs at greater than a 15 degree open disc angle, extrapolation was performed based on flow rate squared. The review of the white paper justifying this position will be completed with review of the submittals discussed above.

The inspectors requested that the licensee submit information on items (a)-(c) above, for NRC review. The inspectors informed the licensee that the NRC's GL 89-10 program review closure will be contingent upon receipt and NRC review of these plans.

b.1.10 Marginal Valves

The inspectors noted that a number of valves in the GL 89-10 program were considered marginal based on design-basis calculations. In view of evolving industry issues, such as the use of run versus pullout efficiencies, the inspectors were concerned with the adequacy of several of the licensee's MOVs with less than 10 percent margin. Although 16 valves were scheduled for margin improving modifications, there were no established plans for the other marginal valves. The inspectors requested that prior to program closure, the licensee submit any plans to address the licensee's marginal valves.

b.2 Program Scope Changes

A total of 34 valves were removed from the program since the Part 2 inspection. Thirty-two were removed based on Supplement 7 to GL-89-10, mispositioning. The remaining two were balance-of-plant (BOP) valves that were not required to be in the program scope. Although removed from the program, these valves had been diagnostically tested, and in some cases were scheduled for a design change to increase the valves' capability.

With the removal of these valves, the program scope for both units consisted of 220 MOVs: 104 gates, 50 globes, and 66 quarter-turn (butterfly) valves. Included in the scope were 12 BOP valves, which was considered a positive aspect of the MOV program. From this scope, the licensee was able to dynamically test 120 MOVs, which was considered a program strength. An additional positive aspect was the position to perform diagnostic testing of MOVs not included in the GL 89-10 program.

b.3 Periodic Verification (PV) of Design-Basis Capability

The licensee planned to statically test all program MOVs on an initial 3 fuel cycle period with increased frequencies for valves in high ambient temperatures or in harsh environments. Dynamic testing of program valves that are testable and meaningful was planned taking into consideration margin and risk. However, as of the date of the inspection, the licensee did not have a schedule or actual numbers of valves to be dynamically tested.

The NRC staff will review the PV program in greater detail following the licensee's submittals in response to GL 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves." As stated in the Generic Letter, consideration of the benefits (such as identification of decreased thrust output and increased thrust requirements) and potential adverse effects (such as accelerated aging or valve damage) when determining appropriate PV testing for each program valve needs to be considered.

b.4 Post-Maintenance Verification/Testing (PMT)

Post-maintenance verification/testing requirements documented in Section 6 of the Motor-Operated Valve Program Description, Revision 5, were reviewed and found acceptable for program closure by the inspectors. One program revision was required to resolve the IFI discussed in Section E8.1 of this report concerning testing requirements after valve packing adjustments. The licensee adequately established static and dynamic test requirements following MOV maintenance and modifications.

b.5 MOV Trending and Corrective Actions

The inspectors determined that the licensee's trending program appeared capable of tracking and evaluating data to maintain MOV design-basis capability. The licensee's MOV coordinator maintained a database that contained baseline diagnostic test results that would be used to evaluate valve performance during the PV program. The licensee's condition report process and the maintenance rule will assist the tracking and trending of repetitive problems or to initiate reviews of other MOVs for similar problems.

Overall, the reviewed MOV-related CRs generated over the last two years indicated that MOV failures were appropriately reviewed and dispositioned. However, the inspectors were concerned that actions had not been completed on the resolution of potential MOV overloading due to handwheel operation. Recent industry MOV failures, as well as a CR for MOV 2-ICM-311, reemphasized that certain MOVs, such as those with SMB-00 operators with a 4.38:1 handwheel ratio, can develop manual loads that readily approach valve or operator limits. Although guidance to evaluate MOV handwheel loads was given in Limitorque SEL-11 and EPRI Application Guide NP-6660-D, the licensee had not fully addressed this issue.

CR 96-0687 was generated in April 1996 as a result of licensee identification that Operations had manually "hand wheeled" MOV 2-ICM-311 into the seat with enough force to exceed the torque switch settings. The inspectors reviewed the CR and determined that, besides identification of susceptible MOVs, little progress had been made in resolution of the CR. Further, the existing procedural requirements, which require that excessive force not be used during manual operation, were insufficient. Of concern to the inspectors were the many valves in the preliminary review that indicated maximum handwheel rim pull forces as low as 10 pounds. Additionally, the CR investigation due date had been extended twice and was overdue by three months as of the week of the inspection.

The inspectors requested that the licensee submit plans on resolution of this issue for NRC review. The inspectors informed the licensee that the NRC's GL 89-10 program review closure will be contingent upon receipt and NRC review of these plans.

b.6 NRC Information Notice (IN) 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire"

IN 92-18 identified the potential for loss of remote shutdown capability during a control room fire. Due to potential hot shorts caused by a control room fire, various MOVs controlled from the remote shutdown panel could go to a stall condition, since the control signal would not be available to stop power to the motor. This could cause valve and/or operator degradation that could result in the loss of safe shutdown capability.

The MOV control circuits use a double break scheme around the open/close valve contact. In most cases this was provided by both limit/torque switch contacts and remote/alternate transfer switch contacts. For the above, two hot shorts of the correct polarity and conductors must occur to operate a valve. The licensee's response to IN 92-18 was recently reviewed by regional engineering inspectors and is discussed in Inspection Report No. 50-315/96010; 50-316/ 96010. The inspectors had reviewed the electrical design of the Appendix R valves for both units and concluded that the licensee met the intent of the IN.

c. Conclusions

The failure to perform an operability determination on the PORV block valves when new information became available was considered a violation for failure to document a potentially adverse condition and perform an operability determination. This was a significant concern, considering the previous issues identified by the NRC in this area.

Although a majority of the significant issues related to the MOV program have been resolved, a number of issues relating to the design-basis capability of program valves remain open. Therefore, the NRC's GL 89-10 program review will remain open pending completion and submittal of these open issues as discussed in the details of this report. Aspects of the program adequately completed for program review closure included program scope, requirements for post maintenance testing, trending, and corrective action program.

E7 Quality Assurance in Engineering Activities

E7.1 Licensee Self-Assessment Activities

The inspectors reviewed a recent MOV self-assessment. Although narrow in scope, the self assessment identified several good technical issues. The use of an outside MOV expert was considered beneficial to improving the MOV program.

E8 Miscellaneous Engineering Issues (92902)

E8.1 (Closed) Inspection Followup Item 50-315/93006-04; 50-316/93006-04: Packing adjustment PMT requirements did not include diagnostic verification to confirm that assumed packing thrust design loads were not exceeded. The licensee's position had been that if the original packing gland nut torque was not exceeded during the packing adjustment, the packing load would not exceed the value which had been determined to be acceptable during the previous diagnostic test. Although various tests had been conducted in an attempt to validate this position, the relatively small amount of data did not support use of this position across all program MOVs. Further, the position was weakened with on-site examples of increased packing loads due to improper maintenance that had resulted in cocked packing glands resulting in higher packing loads (the nuts had been retorqued to the original torque). In view of this, the licensee committed to revise the process and, for all program MOVs, will diagnostically verify, subsequent to packing adjustments, that packing loads did not adversely affect thrust requirements. This item is closed.

E9 Updated Final Safety Analysis Report (UFSAR) Commitments

E9.1 Review of UFSAR Commitments

The inspectors reviewed the applicable sections of the UFSAR that related to the inspection areas discussed in this report. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures and/or parameters.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on October 25, 1996. The inspectors re-exited with members of licensee management on December 5, 1996. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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INSPECTION PROCEDURE USED

TI 2515/109 Safety-Related Motor-Operated Valve (MOV) Testing and Surveillance

ITEMS OPENED and CLOSED

Opened

50-315/96012-01(DRS); 50-316/96012-01(DRS)	VIO	Failure to initiate a condition report and perform a prompt operability determination for the PORV block valves
50-315/96012-02(DRS); 50-316/96012-02(DRS)	IFI	Modifications not completed for the PORV block valves

Closed

50-315/93006-04; 50-316/93006-04	IFI	PMT requirements following packing adjustments

LIST OF ACRONYMS USED

AFW	Auxiliary Feedwater
BOP	Balance-of-Plant
COF	Coefficient of Friction
CR	Condition Report
CVCS	Chemical and Volume Control System
dp	Differential Pressure
EPRI	Electric Power Research Institute
GL	Generic Letter
HPCI	High Pressure Coolant Injection
IFI	Inspector Followup Item
IN	Information Notice
INEL	Idaho National Engineering Laboratory
LER	Licensee Event Report
LCO	Limiting Condition for Operation
LSB	Load Sensitive Behavior
MOV	Motor Operated Valve
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
P&ID	Piping & Instrumentation Diagram
PDR	Public Document Room
PMI	Plant Manager Instruction
PMT	Post Maintenance Testing
PORV	Power-Operated Relief Valve
PPM	Performance Prediction Methodology
PV	Periodic Verification
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHR	Residual Hear Removal
ROL	Rate of Loading
S/O	Shutoff
SE	Safety Evaluation
SFC	Stem Friction Coefficient
SG	Steam Generator
SI	Safety Injection
SSC	Structure, System, or Component
TI	Temporary Instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VF	Valve Factor
VIO	Violation