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Licensee: Rochester Gas And Electric Corporation

Facility Name: R.E. Ginna Nuclear Power Plant

Inspection At: Ontario, New York

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Inspection Summary: See the Executive Summary

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Table 1 - Summary of Licensee Actions to Resolve Inspection Findings
Appendix A - Persons Contacted

EXECUTIVE SUMMARY

The Nuclear Regulatory Commission (NRC) conducted a team inspection at the R.E. Ginna Nuclear Power Plant on April 6 - 10, 1992, to assess the programs developed by the licensee in response to NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." This team inspection was accomplished in accordance with NRC Temporary Instruction (TI) 2515/109, "Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance." The generic letter and its Supplements (1, 2, 3 and 4) provided recommendations to the licensees for the development of adequate programs to ensure operability of safety-related motor-operated valves (MOVs) during design basis conditions.

The team observed strengths in the licensee's management support to the MOV program and in the area of diagnostic test capabilities. The licensee's initiative in utilizing a multi-channel torque thrust cell diagnostic system was noteworthy. The personnel involved with the program demonstrated excellent knowledge and technical capabilities and interfaced well with other organizations to support the motor-operated valve program. The licensee has developed an effective training program including refresher training for diagnostic testing. The licensee's MOV program meets the schedule recommended in Generic Letter 89-10.

The licensee has performed differential pressure testing for several safety-related MOVs in the program and has scheduled the performance of additional differential pressure testing in the upcoming outage. Upon completion, twenty tests will have been conducted to cover forty-eight MOVs. The exclusion of four residual heat removal valves from the scope of the program, failure to review design basis worst case conditions as relied upon in normal, abnormal, and emergency procedures, and an inadequate margin in setting the torque switches for power-operated relief valve block valves 515 and 516 were some of the concerns identified. The licensee acknowledged the concerns listed in Table 1 and agreed to review these concerns for resolution.

There were no violations or deviations identified during this inspection. The team concluded that, with few a exceptions, the licensee has developed a motor-operated valve program consistent with the recommendations in Generic Letter 89-10.

1.0 INTRODUCTION

On June 28, 1989, the NRC staff issued Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," which requested that licensees and construction permit holders establish a program to ensure that switch settings for motor-operated valves (MOVs) in safety-related systems are selected, set and maintained properly. 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 the public workshops. In Supplement 2 (issued on August 3, 1990) to Generic Letter 89-10, the staff stated that inspections of programs developed in response to the generic letter would not begin until January 1, 1991. In response to concerns raised by the results of NRC-sponsored motor-operated valve tests, the staff issued Supplement 3 to Generic Letter 89-10 on October 25, 1990, which requested that boiling water reactor licensees evaluate the capability of motor-operated valves used for containment isolation in the steam lines to the high pressure coolant injection system and reactor core isolation cooling system, in the supply line to the reactor water cleanup system, and in the lines to the isolation condenser as applicable. On February 12, 1992, the staff issued Supplement 4 to Generic Letter 89-10 excluding considerations be made for inadvertent operation of MOVs from the scope of Generic Letter 89-10 for Boiling Water Reactors. The generic letter also recommended that each licensee with an operating license complete all design-basis reviews, analyses, verifications, tests and inspections that have been instituted within five years or three refueling outages, whichever is later, from the date of the generic letter (June 28, 1989).

The NRC inspection team used Temporary Instruction (TI) 2515/109 (dated January 14, 1991), "Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance," to perform this inspection. The inspection focused on Part 1 of the temporary instruction (TI), which involves a review of the program being established by the licensee in response to Generic Letter 89-10.

2.0 THE LICENSEE'S GENERIC LETTER 89-10 PROGRAM

Rochester Gas And Electric Corporation (RG&E) provided their response to Generic Letter 89-10 for R.E. Ginna Nuclear Power Plant in a letter to the Nuclear Regulatory Commission (NRC), dated December 28, 1989. The letter stated that Ginna would comply with the Generic Letter recommendations.

The team reviewed the licensee's response to the generic letter and the program details with licensee personnel. The inspection results related to each aspect of Generic Letter 89-10 are described below.

2.1 Scope and Administration of the Program

The program administration was reviewed to assure that the licensee has an adequate program plan and schedule and has delineated responsibilities to complete the Generic Letter 89-10 program commitments.

The Ginna Nuclear Power Plant program plans to address Generic Letter 89-10, "Motor-Operated Valve Qualification Program Plan," Revision 0, which was issued on February 1, 1989, documented the licensee's MOV program description. It adequately described the program responsibilities assigned to licensee organizations and the requirements to be employed in the development of calculations. Mechanical Engineering has the overall responsibility for coordination of program implementation and ensuring that the MOV program complies with the intent of Generic Letter 89-10. An Electrical Preventive Maintenance (PM) Analyst has been assigned from Maintenance to coordinate the efforts of the affected working groups. These groups include plant and corporate engineering, operations, maintenance, training, and contractors. In addition, the PM Analyst provides the technical oversight of licensee and contractor activities with respect to MOVs.

The licensee's MOV Program Plan includes an evaluation for recovery from mispositioning of MOVs as defined in Generic Letter 89-10. However, the licensee stated the program review includes those MOVs subjected to design basis conditions during either normal operation or abnormal events only as described in Chapter 15 of the Ginna Station Updated Final Safety Analysis Report (UFSAR) only. Mispositioning is discussed further in Section 2.2, "Design Basis Reviews" of this report.

Piping and instrumentation diagrams, emergency operating procedures, technical specifications and the updated final safety analysis report were reviewed to verify that the valves recommended in GL 89-10 were included in the program. The inspectors verified on a sampling basis that the safety related MOVs in the reactor coolant, residual heat removal and safety injection systems had been included in the program. However, review of the residual heat removal system indicated that the licensee had excluded four MOVs which serve as isolation valves for reactor coolant piping without adequate documented justification. These valves are designated as RHR valves 700, 701, 720, and 721. These valves are part of the licensee's In-Service Testing (IST) program, but were not considered to be part of the Generic Letter 89-10 program. Licensee personnel stated that these valves were deenergized during power operations and were only relied upon for system pressure integrity due to Ginna being considered a Hot Shutdown plant. RG&E did agree to review the exclusion of these valves from the Generic Letter 89-10 program. The team considered this issue to be unresolved pending further NRC review. (Unresolved Item 50-244/92-80-001)

The team noted that a feedback mechanism exists in the program description for evaluating the impact of design basis test results of the previous methodology used to determine MOV capability, thrust requirements, and switch settings. The feedback process utilizes an MOV Field Request (MFR) and nonconformance report (NCR) where appropriate.

2.2 Design-Basis Reviews

Item "a" of the Generic Letter 89-10 and Generic Letter 89-10, Supplement 1, Question 16, recommends that licensees review and document the design-basis for the operation of each motor-operated valve within the program for such parameters as:

1. Differential Pressure
2. Flow
3. Valve Orientation
4. External Factors
5. Ambient Temperature
6. Fluid Temperature
7. Minimum Voltage

Rochester Gas & Electric (RG&E) had completed their review for differential pressure, flow, and fluid temperature in Design Analysis NSL-5080-0002, EWR 5080, "Design Analysis, Ginna Station, GL 89-10 MOVs," Rev. 2, dated March 24, 1992. This analysis documented the expected worst-case differential pressures for MOVs which are required to function during accident scenarios identified in Chapter 15 of Ginna's UFSAR. Differential pressures were also developed for certain MOVs as part of the licensee's Inspection and Enforcement Bulletin (IEB) 85-03 program. These differential pressure values were documented in Design Analysis EWR 4348, "Ginna Station Motor Operated Valves IEB 85-03," Rev. 0, dated April 30, 1986, Section 6.

In Section 1.0 of NSL-5080-0002, the licensee had taken exception to the definition of "design basis events" as stated in footnote 2 of GL 89-10. Specifically, RG&E only included those MOVs required to function during the accident scenarios documented in the UFSAR's Chapter 15 and did not consider MOVs associated with Appendix R, Station Blackout, and other external or natural phenomena to be part of their generic letter program. Further, dynamic normal operational conditions that are more severe than those discussed in Chapter 15 of the UFSAR were not addressed.

The licensee had not conducted a review of the normal, abnormal, and emergency procedures to ensure that the design basis for the MOVs envelope the worst-case conditions under such operation as required by Section 2.1.2 of EWR 5111, "Motor-Operated Valve Qualification Program Plan," Rev. 0, dated February 1, 1992. The licensee indicated that these reviews would be done, but only for procedures related to the UFSAR's Chapter 15 accident scenarios. Because this issue is related to the licensee's definition of design basis events, the team considered this issue to be unresolved pending licensee's review of the normal, abnormal, and emergency procedures and assurance that the worst case conditions from such operation are incorporated in the design basis for the MOVs. (Unresolved Item No. 50-244/92-80-002)

In general, the licensee used conservative assumptions for determining differential pressure. However, the inspectors noted that the licensee utilized a less conservative assumption regarding reactor pressure. For example, the power-operated relief valve (PORV) block valves utilized the nominal pressure of 2235 psig even though the PORV has a lift setpoint of 2335 psia and a reset point of 2315 psia without documenting the technical justification. The licensee agreed to review this matter for resolution.

While the licensee had addressed flow and temperature considerations for functions related to the closed direction, neither parameter had been considered for the opening direction. Question 16 of Supplement 1 of GL 89-10 states that the effects of factors such as flow should be addressed analytically together with the most conservative differential pressure to ensure that design basis conditions are adequately accounted in the test program. The licensee stated that the maximum flows achievable in existing system alignments would be used in design-basis differential pressure tests for both directions, as applicable, and that the acceptability of the flow obtained will be addressed in the documented resolution of test results.

The licensee's design basis reviews did not address seismic considerations that may arise when MOV thrust settings are increased. The licensee plans to complete this task and incorporate this information in the design basis documents.

The inspectors reviewed the licensee's design analysis EEA-06001 and verified that the thermal overload devices (TOLs) were adequately addressed in the MOV Program. At Ginna TOLs are bypassed in most of the safety-related motors. The TOLs that remain in the circuit were adequately sized and these resistances incorporated in the degraded voltage calculations.

The licensee had performed degraded voltage calculations to determine the expected worst case voltage at the terminals of the MOVs. Minimum voltage was calculated in accordance with Ginna Design Analysis EEA-06001. The calculations utilized a computer model and considered impedances of MOV power cables and the effects of accident temperatures, potential voltage drops across thermal overload heaters, and utilized a conservative factor of locked rotor current for determining minimum voltages available. For DC MOVs, the design minimum voltages expected at terminals of the vital batteries and the end of life battery voltages were considered in determining design minimum voltage as documented in licensee calculation EEA-09004.

However, the inspectors noted that the licensee's design basis document, NSL-5080-0002, failed to address the applicability of degraded voltage considerations for MOVs 825 A and B, and 871 A and B. Licensee personnel stated that this was an inadvertent omission from the document and that degraded voltage considerations would be included for these valves.

The inspector independently verified the calculations for minimum motor terminal voltages during the inspection. The team concluded that the methodology for determining MOV capabilities under degraded voltages for both AC and DC MOVs required to function during accident scenarios was conservative.

2.3 Diagnostics Systems

The Motor-Operated Valve Analysis and Test System (MOVATS) diagnostic equipment was used to set the torque switches and perform diagnostic evaluations for motor-operated valves addressed in the Generic Letter 89-10 program. All safety related valves have been evaluated using MOVATS equipment under static conditions to provide baseline information. Additionally, many safety-related valves have been tested under differential pressure conditions. Some of these differential pressure tests have utilized a torque thrust cell (TTC) device that measures thrust directly. However, for other valves where positioning of the TTC is not physically possible, measuring devices such as stem strain rings and stem strain transducers are used in conjunction with load cells and a thrust measuring device (TMD) for measuring spring pack displacement. The team observed that the licensee is actively evaluating and implementing recent diagnostic testing information and technologies into the MOV program.

The licensee has received official notification from MOVATS regarding the diagnostic system inaccuracies and their impact on the MOVs at Ginna. At the time of this inspection, the licensee was evaluating the above information using the guidance provided by Nuclear Management and Resources Concil, Inc. (NUMARC), and MOVATS Engineering Report No. 5-2. The licensee's preliminary evaluation identified 42 MOVs may be impacted by the MOVATS diagnostic system inaccuracies.

The licensee stated that the motor-operated valve diagnostic systems vendor equipment validation results, as reported by the Motor-Operated Valve User's Group (MUG) have and will continue to be reviewed and the inaccuracies from such reports and test data will be incorporated in Ginna's MOV program for acceptance criteria where appropriate. The licensee has incorporated equipment inaccuracies when setting torque switches using MOVATS equipment. The licensee also stated that MOVs in the Generic Letter 89-10 program will be reviewed for operability as the diagnostic equipment inaccuracies become available from actual tests or industry equipment validation tests. Actions, if required, will be taken as appropriate.

2.4 MOV Switch Settings and Setpoint Control

Item "b" of Generic Letter 89-10 recommended that licensees review and revise as necessary, the methods used for selecting and setting all motor-operated valve switch settings.

The licensee's methodology for selection and setting of motor-operated valve switches is provided in Rochester Gas & Electric Mechanical Engineering Design Guide, Proc. No. MDG-22, "Safety-Related MOV Thrust Calculations," Rev. 0, dated March 9, 1992. The licensee had completed thrust calculations for approximately 30 MOVs that will be tested during the next outage. Licensee personnel stated that the balance of MOV calculations will be completed prior to testing.

A standard industry equation was used for determining the required minimum thrust for gate and globe valves. The worst case differential pressures identified in each MOV's design-basis calculation were applied in sizing and setting the MOVs for opening and closing capability, where applicable. A 0.50 valve factor was identified for the Anchor Darling parallel disk PORV block valves. However, the licensee was assuming less-conservative 0.20 and 0.30 valve factors for other parallel disk and flex-wedge gate valves, respectively, without justification. Upon identification of this concern by the inspector, the licensee agreed to review this matter for resolution. The licensee used a 1.10 valve factor assumption for globe valves. The licensee used the nominal valve diameter to determine the disk area term when orifice diameter was not available.

The licensee's actuator capability calculations utilized a less conservative assumption of 0.15 for stem friction coefficient without documented justification. The assumption of 0.15 as the stem friction coefficient may not be valid unless specific maintenance, lubrication, and frequency requirements are implemented to ensure the continued high efficiency of torque to thrust conversion. The licensee agreed to review this matter for resolution.

The licensee added an additional safety factor (25%) to account for rate of loading effects for MOVs in the generic letter program that were not considered practicable to dynamically test. Rate of loading effects require MOVs to have higher available thrust during high differential pressure conditions than during static conditions. The inspectors noted that the licensee had not addressed the rate of loading effects for partial differential pressure and/or flow testing. The licensee agreed to review the methodology for testing under partial differential pressure and flow conditions and incorporate the necessary margins in this methodology as appropriate.

The inspectors also noted that RG&E's generic letter program did not formally identify a feedback process where an evaluation of differential pressure test results would be used to determine available thrust margins. However, the licensee did evaluate the apparent margin between thrust at the torque switch trip and the thrust required to overcome differential pressure as part of their existing dynamic test program. If a test was conducted at less than design basis conditions, thrust results were extrapolated to 100% worst case conditions prior

to making this comparison. An operability review was also performed as a part of this evaluation. The licensee's existing program did not adequately assure that the margin between the required and available thrusts is adequately evaluated and verified through in situ testing or comparison. The licensee agreed to resolve this matter.

The licensee determined the maximum allowable thrust based on structural limits, motor undervoltage capability, and spring pack capability. The licensee included an adjustment in the structural limit and motor undervoltage capability calculations to account for diagnostic equipment inaccuracies, while ultimate spring pack capability was evaluated during tests. Actuator ratings are also adjusted to account for additional thrust due to inertia.

The licensee used the open limit switch to control the opening of all generic letter rising stem MOVs. The open limit switch was set at approximately 95% of the open stroke. Torque switch bypass was in effect for the first 30% to 35% of the open stroke to prevent high unseating loads from prematurely stopping valve operation. For the closing direction, all rising stem MOVs utilize the torque switch to control motor operation to ensure adequate seating of the valve. Butterfly MOVs are controlled in both directions with the position limit switches.

The inspectors reviewed several thrust calculations, including those for the PORV block valves, MOVs 515 and 516. For these Anchor Darling 3 inch parallel disk gate valves, the licensee had assumed a valve factor of 0.50. Because these valves are difficult to test at design basis conditions, the licensee was including a 25% thrust margin to account for rate of loading effects. The licensee determined that these MOVs would not have adequate margin to close if a design basis pressure of 2235 psig is required. The licensee was developing an action plan to resolve this concern for these MOVs. This item is unresolved pending the licensee's resolution of this concern. (Unresolved Item 50-244/92-80-003)

The licensee's method to control torque switch settings was reviewed. Work packages documenting the as-left thrust and torque switch conditions have been kept on file by the Electrical PM Analyst. As part of the implementation of the generic letter program, the licensee is developing a new setpoint control program that includes an electronic database. Licensee personnel indicated that this system will include a quality assurance review and approval process to ensure that MOV switch settings are controlled in accordance with the facility's quality assurance program requirement.

2.5 Motor-Operated Valve Testing

Item "c" of the generic letter recommended that licensees test motor-operated valves in situ under their design-basis differential pressure and flow conditions. If testing in situ under those conditions is not practicable, the NRC permits a two-stage approach for demonstrating motor-operated valve capability. With the two-stage approach, a licensee would evaluate the capability for the motor-operated valve using the best data available and develop applicable test data within the schedule of the generic letter.

The licensee has performed static testing on safety-related valves since 1989, and dynamic testing since 1990. At the time of this inspection, 12 differential pressure (dp) tests have been completed and 8 more were scheduled to be completed prior to startup from the 1992 outage. For those valves where in situ full flow and dp tests are not practicable, the licensee indicated that partial flow and partial dp tests would be conducted as part of the two stage approach. As stated in the February 28, 1992 letter to the NRC, the licensee intended to test only one of the valves in a parallel train of identical valves. The team observed that this was not consistent with the GL recommendations to test all safety-related valves where practicable. The licensee acknowledged this observation and stated that the program description will be changed to clarify that all valves will be tested where practicable. This change will be officially documented in a letter to the NRC.

Currently, the licensee has no formal guidance for review of dp test results. However, the licensee has stated that a test specification document will be developed by August 1, 1992, to control review and evaluate test results for validation of basic assumptions such as stem friction coefficient and equipment inaccuracies.

This feedback mechanism will be incorporated into the MOV Program Plan, EWR 5111.

The licensee has demonstrated a proactive effort in the dynamic testing on motor-operated valves. This testing program for MOVs was viewed by the team as a program strength.

2.6 MOV Maintenance and Post Maintenance Testing

The licensee's MOV program plan, EWR 5111, includes requirements for preventive maintenance (PM) and corrective maintenance (CM). The PM program requires the MOVs to undergo inspection, maintenance, refurbishment and static and dynamic baseline diagnostic testing. Frequency of PM is based on the environmental qualification (EQ) program commitments, regulatory requirements, industry and vendor recommendations, and output from the Ginna Station Reliability Centered Maintenance (RCM) program historical data review. Frequency of major PM and testing of actuators was verified to be once each three years for EQ MOVs, once each five years for non EQ safety-related MOVs, and once each ten years for non safety-related MOVs. The PM for stem lubrication and actuator grease is performed once each two years.

Complete valve internals disassembly overhauls are typically done on a ten year frequency with some on a five year frequency because of prior history. Actuator refurbishment and valve overhaul are also planned and implemented at the same time whenever possible. Repacking of valves is on a five year cycle or less and packing adjustment is on a 12, 24, or 36-month frequency dependent on accessibility and prior history.

During the mid to late 1980's, this licensee was one of two host facilities that participated with the Electric Power Research Institute in developing a comprehensive reliability centered maintenance program. The R.E. Ginna RCM program covered 21 selected plant systems and their safety-related components including MOVs. The program reviewed all prior equipment historical data and provided a systematic basis to assign maintenance intervals. This program is a living program and actual operating experience is reflected in RCM updating and changes to the PM tasks and intervals.

The team noted that Ginna had instituted a comprehensive MOV valve maintenance program as a result of the RCM program and the general valve improvement program that were implemented in the 1988 outage. Twenty-seven MOV actuators were completely refurbished during each of the outages since 1989. At the end of the 1992 outage, only 7 out of 118 MOVs, those in the service water system, remain to be refurbished. These seven MOVs will be refurbished during the 1993 outage when the reactor will be defueled and the entire service water system is scheduled for overhaul. During the initial implementation of RCM and valve program activities, the licensee's review of GL 89-10 and Information Notices caused significant changes to be made to the MOV maintenance program including considerable use of diagnostic testing. The benefits of early involvement in the RCM and valve improvement programs were evidenced in fewer MOV failures and an effective base to plan and implement GL 89-10.

The PM work order requirements reviewed by the team were determined to be fully proceduralized for both actuator and valve maintenance and for diagnostic testing. The licensee's M-64 series of maintenance procedures for actuator removal and installation, motor actuator maintenance, and MOVATS testing clearly described each of the task and included cautionary notations, drawings of parts and requirements for acceptance. The procedural task steps also required final verification of performance upon work completion.

The licensee's CM routine was also reviewed by the team. Corrective maintenance for MOV actuators was performed in accordance with procedure No. 1007, Electric Preventive Maintenance and Diagnostic Testing of Motor Operated Valves. Repair and replacement of mechanical components of ASME Code class valves was performed under ASME Section XI requirements. Repacking and packing adjustment was performed under the valve improvement program under EWR 4859 and specific valve packing procedures M-1020, M-37.116 and M-37.116.1 that fully controlled this generally prevalent problem issue. Corrective maintenance requires a failure analysis and post corrective maintenance testing that could include a motor load test, partial baseline test, full baseline test, and differential pressure test.

The Work Order (WO) packages for PM on valve 704B (WO 9240732) and for CM on valve 9629A (WO 9023578) were reviewed. The work packages were readily available and included the necessary requirements for task completion. The as-found determinations of the need to replace electrical wire lugs on valve 704B, evaluation of the bent wire lugs, and justification for interim use of valve 9629A indicated craft and PM analyst attentiveness and a

maintenance philosophy of effective performance and documentation. An observation made by the team was that while the procedural requirements led to verification of valve performance after work completion, these two work orders and the work procedures did not clearly specify post maintenance testing requirements.

Specific review was made of the packing adjustment methodology used during valve maintenance. It was determined that valve packing adjustment and valve packing procedures effectively describe the task. It was noted that these tasks are fully controlled and required review of reference packing gland torque, and recording of as-found, and as-left gland torque.

Lubrication of valve stems was evident during walkdown observations. The MOV Qualification Program Plan calls for lubrication of valve stems with Neolube #2, however, use of Felpro N5000 was observed being placed on main feedwater angle globe valves 3976 and 3977 being overhauled on April 8, 1992. From additional observations of other valve stems, it appeared that the Felpro N5000 had also been applied to other valve stems in the plant. The inspector independently verified that Felpro N5000 was a qualified and acceptable lubricant that was used in the past and that changeover to use Neolube #2 was not yet fully completed. (Procedure M-64.0 still calls for stem lubrication with Felpro N5000.) The team had no further questions regarding the type of stem lubrication.

During walkdown observations, it was noted that many of the MOVs had new and deeper actuator switch cover housings. Followup determined that maintenance was performed to upgrade the limit switches from two to four rotor type and deeper switch cover housings were needed to accommodate the new switches. Valve 4614, a 10" Rockwell butterfly valve, had the new switch cover housing and also had a new motor. Further review determined that the new motor replaced a failed motor during the 1991 outage. These walkdown observations were useful in providing the team specific MOV samples to be evaluated in several of the inspection areas. The inspected MOVs were in good condition.

The team concluded that the licensee has a comprehensive maintenance program for MOVs. The Ginna RCM program was an extensive and effective effort that has produced good results. RCM was made a living program and is a maintenance mainstay. The early program implementation of RCM, valve improvement and MOV refurbishment provided an effective base for evaluation and implementation of the NRC GL 89-10 recommendations. Maintenance performance was effective, however, one team observation pointed to the need for work order and procedural clarification of post maintenance testing.

2.7 Periodic Verification of MOV Capability

Item "d" of the generic letter recommended that licensees prepare or revise procedures to ensure that adequate motor-operated valve switch settings are established and maintained throughout the life of the plant. Paragraph "j" of the generic letter recommended surveillance intervals be commensurate with the safety function of the motor-operated valve as well as its maintenance and performance history. The surveillance interval in no case should exceed 5 years or 3 refueling outages. Further, the capability of the motor-operated valve has to be verified if the motor-operated valve is replaced, modified, or overhauled to an extent that the test results are not representative of the motor-operated valve performance.

The licensee has completed procedures to establish and maintain MOV switch settings. In their program description, EWR 5111, Revision 0, the licensee states that periodic testing will be performed as scheduled surveillances for the remaining life of the plant. The frequency of periodic testing would be based on the priority assigned to the specific MOV in accordance with procedure M-1007, "Electrical PMs and Diagnostic Testing of MOVs." The periodic verification frequency for environmentally qualified actuators is once every three years and once every five years for non-environmentally qualified safety related actuators. This is based on industry and vendor recommendations as well as Ginna historical data as presented in the Reliability Centered Maintenance (RCM) Program.

The licensee stated that periodic testing will be conducted with the MOV in the as-found condition to capture performance data representative of service degradation. This data would then be incorporated into the Preventative Maintenance Program and subsequently in the RCM Program. The licensee's periodic testing consists of the reverification of operability by static diagnostic testing using MOVATS equipment following preventative maintenance activities. It is noted that baseline signatures have been performed on all but eight safety-related MOVs and retesting will take place following overhauls or extensive corrective maintenance. Testing of the eight remaining valves is scheduled to be completed prior to startup following the 1994 outage.

The team determined the licensee demonstrated a good understanding of the periodic verification requirement and was implementing a periodic verification program consistent with the GL 89-10 recommendation.

2.8 MOV Failures, Corrective Actions, and Trending

Item "h" of the generic letter recommended that licensees analyze each motor-operated valve failure and justify corrective action. The results and history of each as-found deteriorated condition, malfunction, test, inspection, analysis, repair, or alteration were recommended to be documented and maintained. This motor-operated valve information was recommended to 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 motor-operated valve operability.

Prior MOV failure history was reviewed from the Nuclear Plant Reliability Data System (NPRDS), maintenance work order history and prior Reliability Centered Maintenance (RCM) records of valve failures. It was evident that the MOV failures were sizably reduced after the programs of refurbishment, valve improvement and RCM were implemented. The total history of 13 MOV problems in the past five years revealed that eight occurred in 1988 prior to the licensee's expanded maintenance program efforts and there were only five occurrences after the implementation of the expanded program. Of the recent occurrences, none were due to similar failure causes.

The team reviewed the licensee's documentation concerning the failure and replacement of the motor on MOV 4614, a 10" Rockwell butterfly valve. This valve was undergoing actuator refurbishment in the 1991 outage and during no load bench testing of the motor that was removed from the actuator, intermittent stalling occurred. Failure of the motor was documented on a discrepancy report and nonconformance report NCR-91-153, that was also followed by a 10CFR Part 21 evaluation. In-house evaluation of the problem identified a short in the motor windings thought to be caused by the disassembly or normal aging. Further, the motor was sent to the vendor for root cause determination. At the time of the failure, the exact motor replacement could not be made and interim use of another motor was evaluated and justified by the licensee's engineering staff. The interim use justification included an engineering evaluation, vendor interface, a 10CFR 50.59 safety evaluation, and review of past failure history to assure this was an isolated problem. The licensee's actions and documentation were deemed appropriate and the team also noted that there was a work order to be implemented for the like kind motor replacement during this outage.

Valve 9701A, a 3" Fisher globe valve, was observed with a trouble tag 0010313, dated April 1, 1992, that stated, "Excessive noise when open and close." Based on discussions with cognizant licensee personnel, the noise was thought to be caused by the stem packing. Review of maintenance records determined that the valve was repacked a year ago and recent diagnostic testing on April 3, 1992, indicated satisfactory performance. Verification was made that a work order had been written (WO #9200680) and the team had no further questions.

An earlier corrective action, that of loose terminations on SMA-type torque switch contact blocks identified in 1988, was reviewed by the team. The licensee's immediate corrective action was to tighten all torque switch terminations. Subsequent actions replaced this style torque switch under the actuator refurbishment program and included PM requirements to check tightness. Corrective action also included root cause and potential generic problem considerations.

Trending of MOV failures is accomplished through the licensee's RCM living program and avoidance of repetitive type failures was a prime objective of RCM. Corrective action reports and all MOV maintenance are reviewed by the PM analyst. The failure mode is documented and previous failures of that particular MOV are re-evaluated and a

determination is made for improved maintenance specification, changes to PM frequency or a modification to the MOV or the system. An example of a recent accepted RCM recommendation was the increased diagnostic test frequency for MOVs 896A and 896B because of packing leakage and industry notifications.

The licensee actions in addressing failures, corrective actions and trending has been effective and appropriately documented. PM analyst review of all MOV failures and their updating and re-evaluation of failure causes has contributed to reduced failures.

2.9 Motor-Operated Valve Training

The team evaluated the licensee's motor-operated valve training courses, training facilities, and training staff qualifications. The licensee's training program is Institute of Nuclear Power Operations (INPO) accredited and specifies initial as well as refresher training. This training integrates classroom and hands-on training with on-the-job training. The program outlines specific course requirements for electrical and mechanical maintenance personnel involved with motor-operated valves.

Limitorque operators are maintained and tested by licensee electricians and mechanics and contractor personnel who have completed a one week motor-operated valves training course taught by a contractor. Both licensee and contractor personnel who assist in valve maintenance and testing are tested prior to conducting work on motor-operated valves. The training organization has contracted with MOVATS and Power Safety to provide those personnel training. Training includes understanding Limitorque operation, techniques for identifying valves performance, and evaluation of test results. Training conducted by contractors is audited by the licensee on a periodic basis. A formal refresher training course, in accordance with procedure EO183L, is conducted on a quarterly basis for review of MOVATS diagnostic test system and procedure based training in accordance with Ginna procedure M-64.1.2, "Periodic Surveillance and Minor Maintenance of Limitorque Motor Operated Safeguards Valves."

The team toured the site training center and facility for motor-operated valve refresher training. The MOV training aids used for conducting diagnostic testing were good. Lesson plans reviewed for basic MOV theory and Limitorque actuators exhibited comprehensive objectives and good detail. The instructor demonstrated a firm understanding and interacted effectively with plant and contractor personnel. This established a good interface between the PM Analyst responsible for MOVs and the maintenance training organization. Based on the above, it was concluded that the licensee's MOV training program is effective.

2.10 Industry Experience and Vendor Information

The team reviewed the licensee's vendor information program to assess its effectiveness in disseminating industry data into the various areas of the MOV program. The licensee's disposition of selected NRC Information Notices on MOVs and vendor information updates

was reviewed and verified through documentation review and physical inspection of selected valves. The implementation of the process was reviewed for selected Limitorque 10CFR Part 21 Notifications, Limitorque Maintenance Updates, and MOVATS Users Technical Notes.

Plant walkdown demonstrated refurbishment of Limitorque valves did incorporate corrective action and/or inspection for latest vendor problems. A review of the maintenance procedures indicated that the licensee has incorporated the current industry maintenance related guidelines.

The Operating Experience Assessment Program (OAP) Procedure No. A-1404, Revision 12, controls the process for evaluating documentation associated with NRC documents, industry experience and vendor information. All the 10CFR Part 21 and Limitorque Maintenance Updates selected were identified in the system; however, the MOVATS Users Technical Notices were not included in the Operating Experience Assessment Program. The OAP coordinator has the responsibility for incorporating information into the Operating Experience Assessment Program. MOVATS was providing its Users Technical Notices directly to the maintenance staff without routing through the OAP coordinator. This caused this vendor information to be omitted form the Operating Experience Assessment Program. Review of the current MOVATS Users Technical Notices found no critical information that had not been properly incorporated into the applicable station procedures even though the documents had not gone through the OAP coordinator. The licensee acknowledged the fact and agreed to ensure copies of future notices will be sent to the OAP coordinator for proper review.

The team concluded that the licensee has established a program to review and incorporate vendor information and industry experience.

2.11 Schedule

In Generic Letter 89-10, the staff requested that licensee's complete all actions initiated to satisfy the generic letter recommendations by June 28, 1994, or three refueling outages after December 28, 1989, whichever is later. The licensee has committed to a schedule to complete the full implementation of the MOV program by the 1994 refueling outage. This is consistent with Generic Letter 89-10 recommendations.

3.0 WALKDOWN

During a motor-operated valves walkdown inspection of several MOVs, it was noted that the valve stems were clean and adequately lubricated. The motor-operated valve cleanliness was generally good. Exceptions to this was in regard to the service water valves located in the intake structure building. However, these service water valves are scheduled to be refurbished during the upcoming 1993 outage.

Also noted, while touring the Standby Auxiliary Feedwater Building, was a loose power cable conduit connection at the MOV motor housing of MOV 9629B. The licensee took immediate corrective action by initiating a maintenance request to tighten the power cable conduit connection.

The general condition of the MOVs throughout the plant was good.

4.0 CONCLUSION

The licensee has taken measures towards establishing an MOV program that is consistent with the guidelines of NRC Generic Letter 89-10. The inspection team observed that the administration and engineering efforts set forth for the program were good. Personnel involved with the program were knowledgeable, demonstrated good technical capabilities, and interfaced well with both other departments and contractors.

The licensee has taken a proactive and effective approach for testing MOVs by utilizing improved diagnostic techniques and completing differential pressure testing for several valves. The licensee's program schedule is consistent with the recommendations of Generic Letter 89-10.

5.0 UNRESOLVED ITEMS

Unresolved items are matters for which more information is required to ascertain whether they are acceptable, violations or deviations. Three unresolved items are discussed in Sections 2.1, 2.2, and 2.4 of this report.

6.0 EXIT MEETING

The inspectors met with those denoted in Appendix A on April 10, 1992, to discuss the preliminary inspection findings as detailed in this report. The licensee acknowledged the inspection findings and agreed to review the items listed in Table 1 for resolution and further improvement of the MOV program.

TABLE 1

Licensee Plans and Commitments for Further Program Improvements

	Reference Paragraph
Section 2.1 Scope and Administration of the Program	
• Justify exclusion of RHR valves 700, 701, 720, and 721 from Generic Letter 89-10 Program (Unresolved Item 50-244/92-80-001)	4
Section 2.2 Design Basis Reviews	
• Review of normal, abnormal, and emergency procedures to ensure worst case design basis conditions are incorporated (Unresolved Item 50-244/92-80-002)	4
• Technical justification for the utilization of a less conservative assumption for reactor pressure	5
• Incorporation of seismic considerations into design basis documents	7
• Implement degraded voltage considerations for MOVs 825 A and B and 871 A and B into NSL-5080-0002	10
Section 2.4 MOV Switch Settings and Setpoint Control	
• Justify use of 0.20 and 0.30 valve factors for parallel disk and flex-wedge gate valves	3
• Justify use of 0.15 for stem friction coefficient for actuators	4
• Review methodology for differential pressure and flow testing and incorporate rate of loading effects	5
• Verification of margin between thrust required and thrust available through in situ testing or comparison	6

• Resolution of inadequate margin to close for PORV block valves 515 and 516 (Unresolved Item 50-244/92-80-003)	9

Section 2.5 Motor Operated Valve Testing

• Clarification of program description to test where practicable all valves under full differential pressure and flow	2
• Development of formal guidance for review of differential pressure test results	3

APPENDIX A

Persons Contacted

Rochester Gas And Electric Corporation

* J. Baker, Electrical PM Analyst
J. Bettle, PM Engineer
M. Burneir, Design Manager, Bell Engineering
* B. Carrick, Mechanical Engineering
* D. Ciesielski, Engineer, Electrical Maintenance
* M. Clark, Engineer, NS&L
* J. DiBiase, Electrical Engineer
* L. Dipzinski, Mechanical Engineer, Bell Engineering
* R. Eliasz, Sr. Nuclear Engineer
C. Forkell, Manager, Electrical Engineering
* G. Graus, Lead Electrical Engineer
* T. Harding, Modifications Support Coordinator
* M. Lilley, Manager, Nuclear Assurance
* R. Marchionda, Superintendent, Support Services
* K. Muller, Mechanical Engineering
* W. Prokop, Manager, MOVATS
* J. St.Martin, Corrective Action Coordinator
* J. Summers, Engineer, Electrical Maintenance
G. Voci, Manager, Mechanical Engineering
* J. Widay, Plant Manager
* P. Wilkens, Department Manager, Nuclear Engr. Services
* G. Wrobel, Manager, Nuclear Safety & Licensing

Nuclear Regulatory Commission (NRC)

* Dr. P: K. Eapen, Chief, Systems Section
E. Knutsen, Resident Inspector - Ginna
* J. Linville, Branch Chief, DRP
* T. Moslak, Sr. Resident Inspector - Ginna

* Denotes present at exit meeting held at R.E. Ginna Nuclear Power Plant, April 10, 1992.