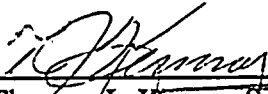


U.S. NUCLEAR REGULATORY COMMISSION

REGION I

DOCKET/REPORT NO: 50-244/94-03
LICENSE NO: DPR-18
LICENSEE: Rochester Gas and Electric Corporation
49 East Avenue
Rochester, New York 14649
FACILITY NAME: Ginna Nuclear Power Plant
INSPECTION AT: RG&E Nuclear Engineering Services Corporate Office
and the R. E. Ginna Nuclear Power Plant
INSPECTION DATES: March 21-25, 1994


INSPECTOR:



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4/7/94
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Rochester Gas and Electric's Generic Letter 89-10, Motor-Operated Valve (MOV) program has been well managed to date. With the exception of the dynamic testing, the program is on schedule for completion; Rochester Gas and Electric has submitted a February 3, 1994, request for extension of the program to complete dynamic testing.

Open items from the initial April 1992 NRC team inspection have been satisfactorily resolved by Rochester Gas and Electric, including the upgrading of the MOV program to reflect their actions (Section 2.0). Rochester Gas and Electric has also satisfactorily responded to Supplement 5 of GL 89-10, including the retesting of 21 valves.

Static and dynamic testing was observed to be performed by qualified personnel using well-written procedures. Of the total 61 MOVs in the GL 89-10 program at Ginna, 24 are considered to be risk-significant, of which 17 are testable. As of the outage during which this inspection was conducted, all MOVs in the program were scheduled to be statically tested. The testable risk-significant valves were also scheduled for dynamic testing. This portion of MOV testing meets the originally committed date of June 28, 1994.

Regarding the derivation of valve factors for double disk and flex-wedge gate valves, five of the 15 affected types have been analyzed using dynamic test results. Four of the five were shown to have actual valve factors in the range of those originally assumed (i.e., 0.12 to 0.30); one valve was determined to be 0.65. Ten other valves have been more recently dynamically tested and the data are currently being evaluated.

DETAILS

1.0 INTRODUCTION

From April 6-10, 1992, a team inspection was conducted to evaluate the adequacy of Rochester Gas and Electric's (RG&E) actions in response to NRC Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," and its supplements 1-4. NRC Inspection Report No. 50-244/92-80 documented the findings of that inspection. The team concluded that RG&E's implementation of the GL 89-10 program was consistent with the guidelines of GL 89-10 and that the administration and engineering efforts were good. The team also found the personnel involved were knowledgeable, demonstrated good technical capabilities, and integrated well with other departments and contractors. The purpose of this current inspection was to evaluate progress made in the Program at Ginna since April 1992, as well as RG&E's actions regarding Supplement 5 to GL 89-10.

2.0 UPDATE OF TABLE 1

2.1 Scope and Administration of the Program

- ◆ RG&E was to justify the exclusion of RHR valves 700, 701, 720, and 721 from Generic Letter 89-10 (Unresolved Item 50-244/92-80-001).

RG&E responded to this item in a letter (February 3, 1994) to the NRC regarding an extension for completion of the GL 89-10 program to June 28, 1995. RG&E stated that Ginna is a hot shutdown plant and the MOVs 700, 701, 720, and 721 do not need to be in the program for the following reasons: (1) the MOVs are used for normal shutdown only and do not function during a design basis accident (DBA), except to remain closed; (2) during operation (greater than 350°F), these valves are locked closed; and (3) MOVs 700 and 721 are provided with pressure interlocks that prevent opening when reactor coolant pressure is above 410 psig. The inspector verified that the exclusion of these valves meets the intent of GL 89-10, Supplement 1, response to questions 6 and 9. The inspector considers this item closed.

2.2 Design Basis Reviews

- ◆ RG&E was to review normal, abnormal, and emergency procedures to ensure that the worst-case design basis conditions are incorporated (Unresolved Item 50-244/92-80-002).

The inspectors reviewed RG&E's safety documentation relating to MOVs to ensure that the worst-case design basis for the MOV envelope was incorporated, as required by the "Motor-Operated Valve Qualification Program Plan." RG&E has performed an analysis of all safety-related MOVs to determine if the maximum postulated differential pressure for the MOVs was incorporated in normal, abnormal, and



emergency operation. The inspectors found the documentation to be technically adequate and did not have any questions regarding this item. The inspector considers this open item closed.

- ◆ RG&E was to provide technical justification for the utilization of a less conservative assumption for reactor pressure.

RG&E used conservative assumptions for determining the differential pressure. The pressurizer Power-Operated Relief Valve (PORV) block valves (MOV 515/516) are open during power operation. These valves are not used for any FSAR Chapter 15 overpressurization accident events. They are used for recovery from a steam generator tube rupture (SGTR) or small break loss of coolant accident (SBLOCA). The only reason to close these block valves would be to isolate a leaking or failed-to-close PORV. The pressure drop is small when the valve is closed to isolate a leaking PORV because the PORV would hold most of the pressure and there would be very little flow. The closing pressure would be greatest when the block valve is used to isolate a stuck open PORV. The PORV would have opened due to high pressure, or if the valve opened to depressurize the reactor coolant system (RCS). Ginna Station Abnormal Pressurizer Pressure Procedure AP-PRZR.1, Rev. 5, directs the reactor operator to close the pressurizer block valve once RCS pressure is reduced to below normal operating pressure. The inspectors reviewed the procedure and found it consistent with the analysis. At the point the operator would close the MOV, the differential pressure across the valve would be within the design analysis. RG&E documented the pressurizer block valve technical setpoint justification in the design analysis NSL-5080-0002 EWR 5080 report. The inspectors reviewed the design analysis and found the valve to be assumed to close at normal operating pressure. The inspector had no further questions regarding this item.

- ◆ RG&E was to incorporate seismic considerations into design basis documents.

RG&E's design basis for the MOV qualification program was within the design criteria document prepared for the Engineering Work Request (EWR) 5111. Within the document, the requirements for the seismic upgrade program (EWR 2512) are identified as the criteria to achieve acceptable seismic loading. All existing and replacement valves are subject to seismic analysis to ensure acceptable seismic loading for both existing and replacement valves. Additionally, the piping system in which each MOV resides has been seismically analyzed and all replacements that are performed require a reanalysis. Furthermore, all increases in the torque switch setting are programmatically verified not to exceed the seismically-analyzed valve thrust limit. The inspectors verified that seismic considerations were addressed in accordance with design criteria analysis EWR 2512, Revision 5.

- ◆ RG&E was to implement degraded voltage considerations for MOVs 825A and B and 871A and B into RG&E's design basis document NSL-5080-0002.

MOVs 825 A/B safety injection pump suction are permanently connected to the refueling water storage tank (RWST). Both MOVs are normally open during normal operation with their associated breakers racked out and locked. Therefore, these two valves no longer have the Generic Letter 89-10 safety function requirement.

MOVs 871 A/B safety injection group crossover valves are normally open during normal operation. Therefore, the closing voltage is associated with operation during load sequencing (on the Diesel Generator) due to their transition on a safety injection signal. RG&E has implemented degraded voltage for 871 A & B into design calculation NSL-5080-0002. The inspectors reviewed the analysis and found it to be technically adequate and in agreement with GL 89-10 for both voltage and differential pressure considerations.

2.3 MOV Switch Settings and Setpoint Control

- ◆ RG&E was to justify the use of 0.20 and 0.30 valve factors for parallel disk and flex wedge gate valves.

RG&E has utilized their feedback mechanism to evaluate the use of 0.20 and 0.30 valve factors for parallel disk and flex wedge gate valves. Of the five MOVs of this type tested, RG&E is satisfied that the valves are operational and within the valve factors originally assumed. RG&E will continue to implement the MOV program's feedback process to validate assumed valve factor values, while reviewing pertinent industry information (EPRI studies) for inclusion into the MOV program. Ten additional valves were dynamically tested in this outage. In one case reviewed by the inspector, RG&E utilized a higher valve factor of .50 because the valve (pressurizer isolation PORV) cannot be tested dynamically. The inspectors considered this action in keeping with GL 89-10.

- ◆ RG&E was to justify the use of 0.15 stem friction for actuators.

RG&E's feedback process showed that the valve stem factor of 0.15 was not adequate and, therefore, raised it to .20. This factor has been validated as acceptable (at this time) because the testing performed to date validates the assumption of .20. RG&E considered data scatter, dynamic versus static results, and flow isolation versus torque switch trip actual values. RG&E utilized the highest of each of these values to feedback into their MOV program. RG&E will continue to upgrade this factor using the feedback process and industry information.

- ◆ RG&E was to review the methodology for differential pressure and flow testing, then incorporate rate of loading effects.

RG&E has revised the MOV, "Qualification Program Plan and MDG-22," and "Design Guide," to accommodate the calculation of MOV-required thrust. The program now requires the addition of a thrust margin of up to 25% to compensate for load-sensitive behavior. This additional thrust margin is performed for each MOV, regardless of whether a full differential pressure (DP) or flow test can be performed. When an MOV can only be partially DP or flow tested, the maximum additional margin, up to 25%, is added to the target thrust without exceeding any thrust limits.

- ◆ RG&E was to verify the margin between thrusts required and thrusts available through *in situ* testing or comparison.

RG&E now has a formal feedback process that evaluates the margin between the required and available thrusts. The inspector reviewed documentation showing this comparison, which assures that the required and available thrusts are evaluated and verified both through *in situ* testing and comparison after testing.

- ◆ RG&E was to resolve the inadequate margin to close PORV block valves 515 and 516. (Unresolved Item 50-244/92-80-003)

MOVs 515 and 516 (Pressurizer Relief Stop Valves) were retested during the 1992 outage (after the team inspection concluded) using the Torque Thrust Cell (TTC) for direct measurement of stem torque and thrust. The evaluations performed after the inspection indicate that the valves were operable, utilizing the older method thrust measuring device (further discussed in section 3.0). The results of the testing performed in 1992 shows that the valves performed within the design criteria under static conditions. Dynamic testing is not possible on these valves without incorporating extraordinary methods. Due to the retesting and the satisfactory results, RG&E has determined that the MOVs have adequate margin to close.

2.4 Motor-Operated Valve Testing

- ◆ RG&E was to provide clarification of program description to test, where practicable, all valves under full differential pressure and flow.

RG&E has developed a motor-operated valve program to ensure the operation of motor-operated safety-related valves meet the criteria of NRC Generic Letter 89-10. Each MOV is evaluated as to whether it must function during and following a design basis event per the provisions of Generic Letter 89-10. Those with safety-related functions are subject to the analysis, setup, testing, and maintenance requirements. Other MOVs may be included to the extent practicable to ensure prudent maintenance and testing. The inspectors reviewed a program plan that defined the technical,



operational, testing, and administrative requirements necessary to implement the program. The technical staff were knowledgeable of MOV programs, and the plan has been implemented with recommendations from Generic Letter 89-10.

- ◆ RG&E was to develop formal guidance for review of differential pressure test results.

RG&E has developed a test specification (ME305, Revision 1) for performance of differential pressure (DP) testing of motor-operated valves. Upon completion of diagnostic testing, each MOV is verified to be capable of performing its intended safety function under maximum pressure conditions using an operability checklist from procedure EWR 5080. This may include extrapolation of flow and DP to 100%. The maximum operating differential pressure that each MOV must overcome in the safety-related direction of operation has been determined for both the open and closed direction; the test specification then provides the procedural steps and acceptable criteria for DP testing in both directions. The inspectors reviewed the above differential pressure testing requirements and found them to be technically adequate and a reasonable evaluation of test data for purposes of operability.

3.0 GL 89-10 SUPPLEMENT 5 DISCUSSION

RG&E responded to NRC GL 89-10, Supplement 5, dated June 28, 1993, on September 28, 1993, within the 90 days allowed by the supplement. In the letter, RG&E addressed the following requested actions: (1) reexamine the MOV program to identify measures taken or planned to be taken to account for uncertainties in the valve operating thrust to ensure MOV operability without limiting their evaluation to specific examples and reconsider any additional information reasonably available to them; and (2) an evaluation of their schedule to consider the new information and to respond to that information.

RG&E specifically addressed all valves previously tested using the ITI-MOVATS diagnostic equipment. They stated their reliance on the TMD (Thrust Measuring Device) to estimate closing stem thrust by calibrating spring pack deflection, with the open direction thrust measured using the load cell. As a result of relying solely on the TMD load cell, RG&E conducted a review of all MOVs previously tested and concluded (at that time) that 21 valves did not meet the acceptance criteria for operability. The 21 valves were evaluated for corrective action using nonconformance reports grouped into four categories:

Category 1

MOVs that had already been scheduled for retest during the spring 1992 outage:

Ten MOVs were identified in this category; all but two were successfully retested and found to be operable. The two exceptions were evaluated by engineering design analysis, and the degraded voltage stall thrust calculations showed that the valves would function under reduced voltage conditions.

Category 2

MOVs that were not scheduled for retest but had a potential for exceeding a thrust limit:

Six MOVs were identified as having the potential for exceeding the thrust limits of the valve, actuator, or motor and, due to scheduling difficulties, could not be retested during the 1992 refueling shutdown. These MOVs were evaluated by Engineering Design Analysis, and the results confirmed that sufficient margin was available to verify that the thrust limits for each MOV were not exceeded utilizing the existing MOV torque switch settings.

Category 3

MOVs that were not scheduled for retest but had a potential for inadequate thrust:

Three MOVs were identified as having the potential of not being able to develop sufficient thrust to overcome the affects of design-basis, accident differential pressure and, due to scheduling difficulties, could not be retested during the 1992 refueling shutdown. These MOVs were evaluated using the results of differential pressure testing conducted in 1991 and were found to have been operable.

Category 4

Block valves for PORVs:

The two block valves for the power-operated relief valves were evaluated as a special case, even though they were retested using the TTC during the 1992 outage. As a result of retesting, it was determined that no increase in torque switch setting (thrust) was needed and no thrust limits were exceeded. These two MOVs, therefore, were determined to have been operable.

In summary, RG&E concluded that the results of retesting using the more accurate diagnostic equipment or further evaluation by Engineering Design Analysis provided the basis to conclude that the twenty-one MOVs were operable after having been set up using the TMD.

The inspector reviewed the nonconformance reports and the supporting documentation and concluded that the testing and evaluation performed by RG&E was in accordance with GL 89-10 standards.

RG&E currently employs the ITI-MOVATS System 3000 Data Acquisition. As part of this data acquisition system, RG&E currently employs the torque thrust cell (TTC), stem strain ring (SSR), stem strain transducer (SST) load cell, and the thrust measuring device (TMD). This system no longer relies on estimating closing stem thrust by calibrating spring pack deflection, with the open direction thrust measured using the load cell. RG&E has found the accuracy of the TTC to be reliable and repeatable. Once thrust data is obtained using the

TTC, a feedback process is employed to verify the assumptions made in the original target thrust calculation with regard to valve and stem factors. Errors introduced by the installation of the TTC are also appropriately accounted for in accordance with recent vendor guidance. RG&E has identified certain MOVs that cannot accept the installation of the TTC. In these cases, every effort is being made to employ diagnostic equipment whose accuracy is more reliable than the TMD.

RG&E has satisfactorily responded to Supplement 5 to GL 89-10 and has retested all but 2 of the 21 valves discussed earlier. Of the two remaining valves, one has been removed from the program, and the other has not been tested with the new TTC device because, due to the location of the valve, it cannot be easily disassembled to attach the device. The valves tested did show that they were operable and in accordance with the evaluations performed. The RG&E MOV program has been updated to reflect Supplement 5 concerns.

4.0 PLANT WALKDOWN

The inspectors made tours of the Ginna Nuclear plant, including the control room, emergency diesel rooms, safety injection and residual heat removal (RHR) rooms, and other portions of the primary auxiliary building to observe work in progress, housekeeping, and cleanliness. No unacceptable conditions were found.

5.0 TESTING OBSERVATIONS

The inspectors witnessed the static and dynamic testing of MOV 738A. The tests were performed by qualified personnel using well written procedures. The inspectors witnessed four static tests: two in the open direction, and two in the closed direction. The dynamic tests were witnessed in the open and closed directions.

6.0 PRESSURE LOCKING (PL) AND THERMAL BINDING (TB)

RG&E obtained contract services to perform a study of pressure locking and thermal binding of MOVs 852A and B (Residual Heat Removal Loop inlet to Reactor Vessel). The study concluded these valves will not be subject to pressure locking or thermal binding. RG&E, with the help of the contractor, is currently investigating safety-related gate valves within their facility to identify those subject to PL or TB. The results of this study were not available at the end of this inspection.



7.0 EXIT MEETING

At the conclusion of the inspection on March 25, 1994, the inspector met with RG&E representatives denoted below and summarized the scope and preliminary results of the inspection. RG&E acknowledged the inspection findings as detailed in this report, and had no additional comments.

All of the initial April 1992 NRC team's inspection findings were satisfactorily resolved. The RG&E response to Supplement 5 of Generic Letter 89-10 was thorough, and integrated into the MOV program at Ginna. RG&E has submitted a request for an extension of the committed Program completion date to complete dynamic testing. Static testing is projected to be completed at the end of the outage that was ongoing at the time of this inspection, and all identified high risk MOVs will have been dynamically tested at that time.

Persons Contacted

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*Denotes those present at the entrance meeting held on March 21, 1994.

+Denotes those present at the exit meeting held on March 25, 1994.