



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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KING OF PRUSSIA, PENNSYLVANIA 19406-1415

December 13, 1996

EA 96-282

Dr. Robert C. Mecredy
Vice President, Ginna Nuclear Production
Rochester Gas and Electric Corporation
89 East Avenue
Rochester, New York 14649

SUBJECT: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY -
\$100,000 (NRC Inspection Report No. 50-244/96-08)

Dear Dr. Mecredy:

This letter refers to the NRC special inspection conducted on July 22-26, 1996, and August 6-9, 1996, at the Ginna Nuclear Power Station, for which exit meetings were conducted on August 9, and October 4, 1996. The purpose of this inspection was to independently evaluate your Motor Operated Valve (MOV) program procedures, calculations, and test results (associated with NRC Generic Letter (GL) 89-10, "Safety-Related Motor Operated Valve Testing and Surveillance") that you had completed in July 1995. Based on the inspection, violations of NRC requirements were identified, as described in the inspection report that was sent to you on October 25, 1996. On November 13, 1996, a predecisional enforcement conference was conducted with you and members of your staff to discuss the apparent violations identified during the inspection, their causes, and your corrective actions.

Based on our review of the inspection findings, and information provided during the conference, two violations are being cited and are described in the enclosed Notice of Violation and Proposed Imposition of Civil Penalty (Notice). The violations involve the failure to adequately validate design inputs for the Residual Heat Removal (RHR) system core deluge valves, as well as the failure to adequately correct this condition following its identification. An outdated and unjustified 0.3 valve factor (a friction coefficient used in predicting operating thrust requirements) was assumed when calculating the performance capability of those valves. As a result, you failed to identify that the valve motor actuators were undersized, and you also failed to adequately verify that the valves would operate under design basis conditions. Further, although opportunities existed to identify and correct this condition adverse to quality sooner, you failed to do so.

The RHR core deluge valves are normally closed, 6-inch, Velan flex wedge gate valves located in the containment structure in two parallel lines that discharge into the reactor vessel. The valves are required to open upon receipt of a safety injection signal to allow the injection of water from the RHR system into the reactor vessel. The valves also serve a pressure isolation function as one of the two pressure barriers between the 2235 pounds per square inch (psi) reactor coolant system and the 600 psi-rated RHR system. Failure of these two valves to operate, when needed, would significantly degrade the ability of the

low pressure Emergency Core Cooling System to meet the core cooling requirements outlined in 10 CFR Part 50, Appendix K. By using the 0.3 valve factor in your calculations of the thrust requirements for those valves, as part of your analysis in response to Generic Letter 89-10, you did not assure that the valves were capable of performing their intended safety function.

The NRC believes that prior opportunities existed to identify and correct this condition, and to perform appropriate analysis of the valves' capabilities. For example, in April 1995, prior to June 28, 1995 (the date you committed to complete your Generic Letter 89-10 program), the NRC conducted an inspection of your MOV program. At that time, the NRC inspectors informed your staff that the design inputs for the core deluge valves needed to be justified (as noted in NRC Inspection Report 95-06) because the 0.3 valve factor being used in the calculations was unusually low compared to similar valves in the industry. Notwithstanding that prior notice, you did not adequately validate the valve design inputs, even though in-situ test results of similar MOVs at Ginna suggested valve factors as high as 0.57. Rather than consider how those test results could affect the core deluge valves, you continued to use the outdated 0.3 valve factor contained in your engineering procedures as a basis for determining that the valves would operate as intended.

In addition, when statically retesting the core deluge valves after maintenance during the April 1996 refueling outage, you identified that the valves had inadequate margin under design conditions. Specifically, you found that the amount of thrust developed in the motor actuators for these valves under degraded voltage conditions was significantly less than the amount needed to open the valves. Despite the obvious discrepancy between the required and available thrust values, you considered both RHR core deluge valves to be operable based on a 1993 "stall test" performed on one of the valves at 100% voltage which indicated that valve would develop more thrust than required. However, this conclusion was inappropriate because the stall test has not been demonstrated to be an accurate prediction of valve performance under fluid flow and degraded voltage conditions.

Notwithstanding those prior indications raising questions regarding the operability of the core deluge valves under design basis conditions, appropriate action was not taken until the NRC performed a more recent Generic Letter 89-10 MOV closeout inspection. Independent NRC calculations performed for the RHR core deluge valves indicated the valve motor actuators were undersized. As a result, you shut down the plant on August 3, 1996, and modified the valves, increasing the thrust capability.

Subsequent to the inspection, you conducted significant additional testing and re-analyses of the valves and concluded that the valves were, in fact, operable prior to the modifications in August 1996. You noted at the enforcement conference that this conclusion was based on considerable reanalysis and testing of the valves' capabilities. For example, dynamometer testing of the previously installed motors was recently performed, and this testing demonstrated a motor output capability in excess of the design rating. In addition, in-situ testing indicated that, at this time, the actual stem friction coefficients for these valves were lower than previously assumed. After factoring these

empirical findings and other more realistic assumptions into your calculations, including re-analysis of the dynamic design pressures during an accident scenario, you concluded that these valves were capable of opening in a design basis condition. Notwithstanding your contentions, the NRC maintains that uncertainty exists as to whether these valves would have opened in a design basis event prior to the modifications made after your shutdown in August 1996, although further NRC review is not warranted since the modifications have been completed.

In any case, the NRC is concerned that you had not performed an adequate analysis and verification of the valves' capabilities prior to August 1996, despite the indications, as noted herein, that improved analysis was warranted. Given the regulatory significance and duration of these problems, and the significant impact on plant safety if these valves would not function as intended, the violations described in the Notice have been categorized in the aggregate as a Severity Level III problem in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. These findings demonstrate the importance of management taking appropriate action to assure that (1) design inputs for safety-related components are adequately analyzed, and appropriately verified; and (2) indications of adverse conditions, including inadequate analysis, are promptly identified and corrected.

In accordance with the Enforcement Policy, a base civil penalty in the amount of \$50,000 is considered for a Severity Level III violation or problem. Your facility has been the subject of escalated enforcement action within the last two years (namely, a Severity Level III violation without a civil penalty was issued on January 13, 1995, for violations of 10 CFR Part 26 (EA 94-254). Therefore, the NRC considered whether credit was warranted for *Identification and Corrective Action* in accordance with the civil penalty assessment process in Section V1.B.2 of the Enforcement Policy. Credit is not warranted for *Identification* because the violations were identified by the NRC. Credit is warranted for *Corrective Actions* because your corrective actions, once the violations were identified by the NRC, were considered prompt and comprehensive. These actions, which were discussed during your presentation at the conference, include, but are not limited to: (1) with respect to the specific core deluge valves, replacement of the motor, changing of the gear ratio, and plans to drill the wedges during the 1999 full core offload; (2) verifying that the design inputs for the remaining valves in the Generic Letter 89-10 program were valid; (3) modifications to other MOVs in the Generic Letter 89-10 program during the current outage, including, as needed, drilling of discs, change out of motors, rebuilding of actuators, and changing of gear ratios; (4) revision to the Generic Letter 89-10 program manual to ensure that expectations concerning MOV testing are fully understood and testing is performed in a consistent manner; (5) training of your engineering staff to ensure more critical assessments of your design inputs; and (6) evaluation of Quality Assurance oversight of the MOV program.

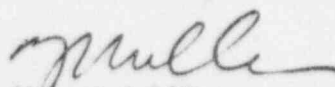
Therefore, to emphasize the importance of proper analysis of design inputs, and prompt correction of adverse conditions, and in accordance with the civil penalty assessment process, a base civil penalty in the amount of \$50,000 would normally be issued in this case. However, I have been authorized, after consultation with the Director, Office of

Enforcement, and the Deputy Executive Director for Nuclear Reactor Regulation, Regional Operations and Research, to exercise discretion and increase the civil penalty amount to \$100,000 in this case. The NRC is taking this discretionary action because of: (1) the fact that the condition existed for an extended duration, with prior opportunities for identification of the problem; and (2) the unacceptability of your staff not taking appropriate steps to verify adequate design margin for the valves, given the importance of the RHR core deluge valves to plant safety and despite the NRC questioning the validity of using a 0.3 valve factor in April 1995, which demonstrated that there was substantial uncertainty with respect to the valves' operability.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. In your response, you should also address your actions to ensure that opportunities to identify existing problems are promptly recognized so that appropriate corrective actions are taken. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be placed in the NRC Public Document Room (PDR).

Sincerely,



Hubert J. Miller
Regional Administrator

Docket No. 50-244
License No. DPR-18

Enclosure: Notice of Violation and Proposed Imposition of
Civil Penalty

cc w/encl:

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