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REGION I

REPORT NO. 50-244/93-08

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LICENSE NO. DPR-18

LICENSEE: Rochester Gas and Electric Corporation
1503 Lake Road
Ontario, New York 14519

FACILITY NAME: R. E. Ginna Nuclear Power Plant

INSPECTION AT: R. E. Ginna Nuclear Power Plant, Ontario, New York and Rochester Gas and Electric Corporation, Rochester, New York

INSPECTION CONDUCTED: April 12-16, May 24-28, and June 14-18, 1993

INSPECTOR: H. I. Gregg, Sr. Reactor Engineer, Systems Section, Engineering Branch, DRS — Date: 6/22/93

APPROVED BY: Dr. P. K. Eapen, Chief, Systems Section, Engineering Branch, DRS — Date: 6/22/93

Areas Inspected: Service water system valve failures and underground piping leak.

Results: The licensee's valve inspection and replacement were aggressive after identifying two locked open manual valves that had failed in the closed position. The two valves were in the closed position for an undetermined time during operation and were not identified as failed until the 1993 outage. The untimely identification and corrective action of the failed valves was identified as an apparent violation.

DETAILS

1.0 Review of Service Water Problems

1.1 Background Review

Two recent SW valve failures were identified during the licensee's inspection of March 28, 1993. An unrelated underground SW piping leak observed in the screen house basement wall was identified by the licensee on January 7, 1992. The purpose of this inspection was to assess the licensee's actions in response to the two valve failures and the underground SW piping leak.

The R. E. Ginna valve improvement program of inspection-refurbishment-replacement during the current 1993 outage included motor-operated and manual valves in the service water system (SWS). The licensee's SWS maintenance planning for the 1993 outage started in 1989, with contracted reviews. Improvement plans were documented in the licensee's correspondence of May 22 and June 13, 1991, that pointed out the need for extensive refurbishment, targeted a large number of service water valves, provided data on strategies to isolate the SWS, and detailed the planning needs of long lead obsolete valve replacements. Additional considerations such as extensive service water system reconfiguration and fuel offload to enable work to be performed on the system, refurbishment of safety system valves assigned higher priorities, extensive installations of new recirculating fan cooler heat exchangers inside containment, and need to have on-hand replacements for obsolete valve models that were ordered in 1991 were factors in the licensee's reasons for delaying service water (SW) valve repairs until the 1993 outage.

The licensee's awareness that the Crane model 101 gate valves and several other models of SW gate valves were obsolete was factored into the licensee's planned phase V valve upgrade program work to be performed in the 1993 outage. A more current Crane model 47½ XU gate valve required extensive evaluation in accordance with the Ginna commercial dedication program and were the purchased replacements.

1.2 Valve 4669 and 4738 Failures and Licensee's Actions

The inspector reviewed corrective action report (CAR) 2077 and related correspondence that documented the licensee's 1993 outage inspection finding of the valve failures and subsequent actions. The inspector also observed in-process work, the material condition of many removed valves, and the condition of in-place piping.

The CAR identified two locked open manual valves (4669 and 4738) that had stems separated from their discs with the discs in closed position, and valve 4739 (identical in design and function to valve 4738) with its stem marginally attached to the disc. The material at the disc T-slot was found entirely consumed by corrosion on valves 4669 and 4738 and almost entirely consumed on valve 4739. The valves were Crane model 101XU original installation

equipment and have been in service approximately 23 years. The stem material was 410 stainless steel and the disc material was SA 105 carbon steel with weld deposited 410 stainless on the disc seating surfaces.

Valve 4669 in series with valve 4760 are 4" locked open valves in a cross connection between the A and B headers and supply SW to the emergency diesel generators. Valve 4738 in series with valve 4739 similarly are 3" locked open valves in a cross connection between the A and B headers and supply SW to the safety injection pump thrust bearing coolers.

The licensee's staff with high level management direction was aggressive in expanding the scope of the SW valve inspection-refurbishment-replacement outage plan upon identification of the stem separation problem. The original scope of 20 valves was increased to 31 and included all Crane 101 SW valves except 4612, 4621, and 4705. The expanded work scope included replacement of 14 of 20 SWS Crane 101 valves and the refurbishment of three others. An upgraded Crane model 47½ that has a 410 stainless steel disc was the replacement valve. The remaining Crane model 101 SW valves are to be replaced in the 1994 outage. The NRC inspection report 50-244/93-06 also contains information relating to the two failed SW valves.

1.3 Safety Concern Review of Failed Valves

The inspector reviewed the safety significance of the failed valves (4669 and 4738). The inspector determined from a review of the UFSAR and the SWS drawings that there are individual flow paths to supply SW to the safety-related components (diesel generators, containment fan coolers, and pump coolers). In addition, the 14" crosstie line with normally open valves (4639 and 4756) enable the safety-related components to be supplied from either SW loop. However, the closing of valve 4739 for brief time periods up to 45 minutes during monthly SW pump surveillance tests would have isolated flow to the safety injection pump thrust bearing coolers.

The licensee had developed several documents relating to the isolation of SW flow to the safety injection pump thrust bearing; one was an engineering letter of April 9, 1993, and another was a recent telephone memorandum dated May 21, 1993, of a conversation with the pump manufacturer. These documents provided information on the safety injection pumps capability with SW flow to thrust bearing coolers isolated if safety injection pump initiation occurred. CAR 2077 action item 26 assigned to fully document justification of SW isolation to the safety injection pumps was completed with the issuance of a comprehensive design analysis report DA-ME-93-101, on June 14, 1993. The licensee's analysis concluded that during monthly SW performance testing with valves 4738 and 4739 in closed position, complete loss of SW cooling to the safety injection pump thrust bearing did not affect operability of the safety injection pumps.

The inspector reviewed the SW valve corrective maintenance history and determined there were two prior instances of stem separations from discs due to severe disc corrosion. These occurrences were valve 4675 in May 1990 and valve 4690 in April 1992. Both valves were the Crane model 101 type and were in the nonsafety-related portion of the SWS. No plant incident reports were written because the valves were nonsafety-related. Based on interviews with engineering and management personnel the inspector determined that although there was no documentation that established why the safety-related valves were considered satisfactory at that time, there was discussion concerning similar valves in the safety-related portions of the SWS. Acceptable and consistent SW pump performance tests, unchanged normal operating parameters, and the two loop SWS configuration capability to withstand a single failure and not render SWS inoperable were some of the licensee's reasons why the safety-related valve repairs could be made in 1993.

The inspector also reviewed the current maintenance requirements and determined there were no periodic preventive maintenance required inspections of SWS valve internals. Motor-operated valves require stroke testing on a quarterly or monthly basis and diagnostic testing on a periodic basis. Manual valves have no requirements for stroke testing.

Failure to promptly identify the failed condition of valves 4669 and 4738 is contrary to 10 CFR 50, Appendix B, Criterion XVI, requirements to promptly identify and correct nonconformance conditions and is an apparent violation (EI 50-244/93-08-01).

1.4 Observations of In-Process Work

The inspector observed the removal of Crane model 101 valves 4013, 4027, 4028, and 4675. Each of these valves had significant amounts of silt build-up in the valve inlets and in the piping at the valve inlet. The valve internals and bodies had significant corrosion deposits and the discs and body guides were badly corroded. The stems were found to be undamaged once the external corrosion product was removed from the stem T-slot area. The exposed piping viewed by the inspector had build-up of corrosion product type nodules of approximately 1/8" to 3/8" on all internal surfaces; however, there did not appear to be any wall thinning at the exposed pipe cuts. The inspector observed a significant number of other removed SW valves and internals and assessed their material condition as poor.

The inspector noted that engineering had taken actions to improve silt removal by extending flush times at the auxiliary feedwater pump valves, realigning the flush flow path to the turbine driven auxiliary feedwater pump valves, and submittal of an EWR to increase the drain line size.

1.5 Service Water Leak in Screen House

The inspector reviewed the nonconformance report NCR 92-001 and subsequent correspondence relating to the licensee's identified underground SW leak in the screen house. The interim use justification dated January 14, 1992, provided basis for continued operability, hypothesized on possible leak locations, and presented generalized measures to identify significant leakage increases. The NCR interim use expiration was June 30, 1993. A request for the second interim use extension through June 30, 1994, was issued on March 18, 1993. The licensee's basis for the second extension included the earlier measures. Additional reasons for the extension were to institute measures to locate, quantify and assess the leak and to develop an adequate repair plan. The licensee's EWR 5405 to permit robotic viewing of the SW underground piping was also delayed until the 1994 outage due to the higher priority containment recirculation fan cooler installations performed in the 1993 outage. The licensee has installed an elapsed time counter on the screen house sump pump and has determined the leak to the sump to be approximately 1 gpm. Additionally, auxiliary operators on their 8 hour tours log the elapsed time on the counter and are required to notify management of any significant time change indicating increased leak rate.

1.6 Conclusions

The licensee's SW valve improvement program was aggressively expanded after the failures of valves 4669 and 4738 were identified during 1993 outage. However, the licensee was unaware for some period of time that these two locked open valves had failed in closed position and measures to identify and correct defective SW valves was not timely considering the two identical failures of Crane model 101 valves discovered in May 1990 and April 1992.

2.0 Management Meetings

Licensee management was informed of the scope and purpose of the inspection at the beginning of the inspection. The inspection was continued with an additional site visit on May 24-28, 1993, to reconfirm licensee's actions on earlier valve failures and other service water issues, and on June 14-18, 1993, to review the licensee's design analysis that assessed the safety injection pump operability. The findings of the inspection were discussed with the licensee management at the April 16, 1993, May 28, 1993, and June 18, 1993, exit meetings. The licensee acknowledged the inspection findings. Attendees at the exit meetings are listed in Attachment 1.

ATTACHMENT 1

Persons Contacted

Rochester Gas and Electric Corporation

+S. Adams, Technical Manager
J. Bettle, Preventive Maintenance Engineer
+R. Bryan, Station Engineer
B. Carrick, Sr. Mechanical Engineer
+*J. Cook, Technical Manager
*J. Fischer, Maintenance Planning and Scheduling Manager
+N. Goodenough, Maintenance Corrective Action Analyst
G. Herrick, Maintenance Analyst
*T. Harding, Modification Control Engineer
J. Janney, Project Manager, MOVATS
x+R. Jaquin, Licensing Engineer
+S. Lawlor, Associate Mechanical Engineer
*N. Leone, Quality Improvement Specialist
*R. Marchionda, Superintendent Support Services
+*R. Mc Mahon, Quality Control Engineer
x+T. Newberry, Sr. Mechanical Engineer
*R. Ploof, Technical Engineer
+*W. Rapin, Modification Support Engineer
+T. Schuler, Operations Manager
+*J. St. Martin, Corrective Action Coordinator
*J. Wayland, Reactor Engineer
x*P. Wilkens, Manager Nuclear Engineering Services
*J. Widay, Plant Manager, R. E. Ginna
*G. Wrobel, Manager, Nuclear Safety and Licensing

U.S. Nuclear Regulatory Commission

x*T. Moslak, Senior Resident Inspector
+E. Knutson, Resident Inspector

* denotes those present at the exit meeting on April 16, 1993.
+ denotes those present at the exit meeting on May 28, 1993.
x denotes those present at the exit meeting on June 18, 1993.