UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ROCHESTER GAS AND ELECTRIC CORPORATION

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

1.0 INTRODUCTION

On May 24, 1983, Rochester Gas & Electric Corporation (the licensee) informed the staff of difficulties experienced during the removal of a steam generator tube for examination. The particular tube sample removed was the portion of the tube, R34C54, between the tubesheet and first support plate. The portion of the tube removed, had eddy current indications which were detected during the Fall 1982 and Spring 1983 inspections, and were located at the tube roll transition termination point.

The licensee reported that in attempting to pull the tube, there was evidence that the tube had not been cut but had experienced plastic deformation along its length. The staff was concerned about the licensee's tube removal procedures and possible damage to adjacent tubes, especially in the U-bend region and requested that the licensee provide a full report of the event. In response to the request, the licensee submitted a letter report dated June 10, 1983.

2.0 DISCUSSION AND EVALUATION

The tube cutting equipment was identical to that successfully used for removal of tubes on the periphery of the "B" Steam Generator during the Spring 1982 outage. The first attempt to pull tube R34C54 was unsuccessful in that no movement was observed. Following a second cutting cycle, tube pulling began and tube movement was observed. A force of approximately 24,000 pounds was required to initially pull the tube. After the tube started moving, a force of approximately 8000 pounds or less was required for the pull. Spring back of the tube was observed each time when jacking pressure was released until 21 1/4" had been pulled. A 17 1/4" section of tubing was cut. Subsequent fiberoptic inspection of R34C54 was inconclusive as to the cause of the problem.

Following the attempted tube pull, when it became apparent that the tube might not be cut, an eddy current inspection of the tube to be removed and 6 adjacent tubes was undertaken to determine whether R34C54 was cut and, if not, to ascertain whether any damage had been done to adjacent tubes. The multifrequency inspection used the same techniques and frequencies as was used for all Ginna inspections. A standard 0.720 inch diameter probe was used to inspect from the hot leg side up through the U-bend and down at least past the 5th support plate on the cold leg side. Rather than use a smaller diameter probe

for the sleeved tube, the 0.720 inch probe was inserted from the cold leg side and the tube was inspected from the cold leg side up through the U-bend and down past the 1st support plate on the hot leg side to the top of the sleeve.

Downward movement of the tube was suspected because a 0.700 inch probe was used to inspect the tube above the 6th support plate. The 0.720 inch probe would not pass through the tube above this location. The inspection revealed no change in the signals at support plate locations and no significant tube thinning was identified.

The eddy current inspection of R34C54 indicated that it had been cut only 40% to 70% throughwall. From the eddy current results, the original points at which the tube passed through the support plates were identified (areas of magitite buildup). Based on the change in location of the points it was determined that the tube had been plastically deformed nearly uniformly over its entire hot leg side from above the 6th support plate up to the U-bend. The deformation was such that the tube length was increased by 27 inches over its initial length of 60 inches. There was no abnormal necking down of the tube.

The tube immediately below the pulled tube, R33C54, was affected by the pulled tube only in a section immediately above the 6th support plate. This presumably was caused by the contact of R34C54 with R33C54 directly underneath it at the U-bend. The 0.700 inch probe was required in order to inspect the tube above the 6th support plate indicating some deformation in that area. R33C54 was subsequently plugged.

No other tubes in the vicinity of R34C54 gave eddy current indications of physical contact. The eddy current inspection technique is capable of detecting any contact between tubes as is evidenced by its capability to inspect sleeved tubes.

Following the eddy current inspection, R34C54 was cut at a location approximately 4 inches below the first support plate and was removed by hand in three pieces. Dimensional measurement of the four sections of tubing showed a uniform reduction in the outside diameter from the original 0.875 inches to approximately 0.855 inches. No reduction was seen in the lowest 13 1/2" inches of tubing since the pulling techniques was designed to preclude any stretching of that portion of the tubing. No visual signs of tube damage were apparent.

The sections of tubing removed from R34C54 were sent to a laboratory for examination. The licensee indicated that a copy of the laboratory report will be provided to the staff.

The integrity of the support plates was also investigated. The initial pulling force of approximately 23,760 pounds and the force of approximately 8000 pounds which was applied while the tube was being stretched through the six hot leg side support plate locations is consistent with forces which have been required for previous secondary side tube pulls in which tubes were pulled through all six support plates. Fiberoptic inspections of the bottom of the first support plate at locations of other pulls conducted during other outages, showed no effect on the support plate integrity as a result of forces applied in the tube pulling. In addition, the current eddy current inspections gave no evidence of adverse interactions of the tube with the support plates.

3.0 CONCLUSION

As a result of the review of the available information, the staff concludes that following the identification of problems encountered during the tube pull the licensee had taken appropriate actions and conducted adequate inspections to provide reasonable assurance that the integrity of the steam generator has not been compromised.

4.0 ACKNOWLEDGMENT

H. Conrad contributed to this evaluation.

Dated: July 28, 1983