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MAIER,J.E. Rochester Gas & Electric Corp.
RECIP.NAME RECIPIENT AFFILIATION
CRUTCHFIELD,D. Operating Reactors Branch 5

SUBJECT: Discusses results of eddy current fiber optics,video & visual insps.Burst in inactive tube in B-steam generator inlet probably caused by reduction in wall due to wear & pressurization from primary side through leaking plug.

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TITLE: Ginna (50-244) Steam Generator Tube Failure

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[illegible] Rochester Gas & Electric Corp.
RECIP.NAME RECIPIENT AFFILIATION
[illegible] Operating Reactors Branch [illegible]

SUBJECT: Discusses results of [illegible] current taken of [illegible]
[illegible] in [illegible] tube [illegible]
[illegible] reduction in wall [illegible]
[illegible] side through [illegible]

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JOHN E. MAIER
Vice President

TELEPHONE
AREA CODE 716 546-2700

October 6, 1982

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Steam Generator Inspection
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Crutchfield:

Section 7.4 of Rochester Gas and Electric's Steam Generator Evaluation Report dated April 26, 1982 described the plans for an intermediate steam generator inspection outage. Eddy current, fiber optics, video, and visual inspections have been performed in both steam generators during this outage which began September 25, 1982. The secondary side video inspections have revealed no changes since plant operation resumed in May, 1982 in the appearance of any periphery tube except R39C69, an inactive tube in the B-Steam Generator inlet. The present video inspection shows a 1 1/4 inch long axial burst in this tube. The bottom of the burst is located approximately 3 1/2 inches above the top of the tube sheet. The burst is facing outward toward the shell of the steam generator. R39C69 is an inlet, or hot leg, periphery tube which was originally plugged in January, 1976 for defects at the top, and just below, the top of the tubesheet. The eddy current examination at the time sized the defects as 56% through wall. As indicated in our Steam Generator Evaluation Report, the February, 1982 video inspections showed OD wear marks measuring approximately 5 inches long by 3/8 inch wide on this tube. The wear marks start at the lower end of the tube near the top of the tube sheet. The present video inspection shows no change in this wear pattern.

The most probable cause of the burst in R39C69 is a reduction in wall due to wear and subsequent pressurization from the primary side through a leaking plug. A review of plant operations during the period from May 1982 to this shutdown, and analytical cal-

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culations, shows the most probable time for the burst to have occurred as the primary hydro test during startup in May. This is a routine test performed in accordance with plant Technical Specifications following each opening of the primary system. During this test, the primary to secondary pressure differential is approximately 2200 psi.

The video inspection of R39C69 shows a relatively large wear area. Calculations based on the size of this wear area show that the wall could have been sufficiently reduced to result in a burst failure. As reported in our April 26, 1982 Steam Generator Evaluation, a large, flat foreign object was found in the B-Steam Generator. The size, location, and wear marks associated with this foreign object are consistent with the wear found on the hot leg side of R39C69. This tube was plugged in January 1976 using Westinghouse explosive plugs. These plugs have a history in other plants of small leakage occurring over time due to stress corrosion cracking. The variation of secondary system activity at Ginna between May and September 1982 is consistent with industry experience with leaking plugs of this type. A very small leak rate of approximately 3 cc per minute has been observed during this operating period. Prior to the January 1982 outage, primary to secondary leakage was approximately 1 cc per minute.

We believe that the analyses and tests described in our April 26, 1982 report demonstrate the structural integrity, in the absence of foreign objects, of a tube in the present condition of R39C69. Nevertheless, to provide physical verification of the failure mechanism we plan to remove the degraded section. This section of tubing, located between the tubesheet and first support plate on the hot leg side, will be removed by drilling out the explosive plug, cutting the tube from the primary channel head, and removing the pieces through access ports on the secondary side. The removed hot leg plug will be replaced with a seal welded plug. The associated cold leg plug will be repaired in a similar manner. The plug removal and repair procedure will allow draining of any water in the tube.

A review of the B-Steam Generator video inspection results shows two other periphery tubes (R39C68 and R39C70) with wear patterns similar, although smaller, to R39C69. These tubes are also previously plugged tubes without thru wall defects, repaired with Westinghouse explosive plugs. Although there is no evidence that these plugs are leaking, they will be preventatively repaired also. The secondary video inspections show no other periphery tubes in either the A or B-Steam Generators with the type of OD wear that we believe contributed to the burst of R39C69. Lastly, in the absence of foreign objects, there is no mechanism to cause similar wear in the future.

During the planned multifrequency eddy current examination of the Ginna Station Steam Generators, indications of crevice intergranular attack were found in the A and B-Steam Generators. The results of the examination of the A-Steam Generator inlet (hot leg) indicated one tube with a crevice intergranular attack (IGA) indication above the plugging criteria. This was the first indication of IGA in the A-Steam Generator.

The results of the examination of the B-Steam Generator inlet revealed the following crevice intergranular attack indications:

a. Twenty eight tubes with indications above the plugging criteria.

b. Two tubes with stress corrosion cracking indications of 27% through wall.

c. Two tubes with absolute signals of significant enough magnitude to indicate corrective action is prudent.

These thirty two tubes in the B-Steam Generator and the one tube in the A-Steam Generator have been plugged using Westinghouse mechanical plugs. The results of the B-Steam Generator examination are consistant with the previous intergranular attack plugging history, which caused us to plug fifty eight tubes and sleeve sixteen tubes in the past three years. Twenty eight of these seventy four tubes were preventatively plugged or sleeved to provide assurance that primary to secondary leakage could be avoided between refueling outages.

Our next steam generator inspection will be performed during our refueling outage, currently scheduled for mid-March 1983. The steam generator program during that outage will be comparable to that conducted this outage. This includes complete eddy current and visual inspections as well as water lancing. In addition, we plan to commence a preventative sleeving program during that outage, as described during the Design Review Board meeting of September 15 and 16, 1982.

A detailed report of the scope and results of the inspections will be submitted in the near future in accordance with our Technical Specification reporting requirements.

Very truly yours,

John E. Maier