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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 59 TO LICENSE NO. DPR-32

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION UNIT NO. 1

DOCKET NO. 50-280

Introduction

By letters dated April 15 and May 15, 1980, Virginia Electric and Power Company (the licensee) submitted results of a steam generator inspection performed in April 1980 (during the February 19, 1980 outage) and requested a license amendment to allow six (6) months of equivalent* operation from the date of startup after the February 19, 1980 outage.

Amendment No. 55, dated February 5, 1980, authorized six (6) months of equivalent operation from October 25, 1979. Approximately 100 days of the authorized operating interval had been completed at the time the unit was shutdown on February 19, 1980 for turbine inspection and pipe stress analysis for a potential overstress condition. Startup from the February 19 outage was on May 11, 1980 and the six months equivalent operation began at that time.

Discussion

Inspection Program

The steam generator tube inspection included programs to assess the conditions associated with both the denting and wastage phenomena. For denting, tube gauging was performed using .540", .610" and .650" diameter eddy current probes in all three steam generators to assess the extent and pattern of tube denting. The gauging problem included all tubes in the tubelane region within a boundary encompassing areas of previously observed activity. In previous inspections, finite element analysis had been used to predict the extent of denting in the tubelane region for purposes of defining the gauging boundary. However, the predicted 17.5% tube hoop strain contour, which was the basis for the implemented gauging boundary in the previous inspection, is now predicted to include much of the tube bundle. Thus, the licensee elected to adjust the tubelane gauging boundary to reflect prior experience. The implemented inspection boundary, however, encompasses most of the predicted 17.5% tube hoop strain contour.

*Equivalent operation means operation of the facility with primary coolant temperature exceeding 350°F.

Gauging within the tubelane region was supplemented by additional gauging in the wedge and patch plate regions where significant activity could be expected based on plant experience at this and similarly degraded units.

Additionally, when a restricted tube was found close to the inspection boundary, the inspection was expanded in that area. Gauging was also performed on cold leg tubes in all three steam generators in conjunction with the U-bend inspection program conducted from the cold leg side.

The tubes that exhibited a 20% indication or greater from the previous Regulatory Guide inspection in the central bundle regions of all steam generators were eddy current inspected to monitor for O. D. wastage.

Inspection Results

Results of the tube gauging inspection did not indicate any increase in rate of tube restriction activity since the previous inspection in April 1979. No tubes in any of the steam generators restricted passage of the .540" eddy current probe. All tubes restricting passage of the .610" probes were adjacent to areas where denting activity was observed in previous inspections. Tubes inspected on the cold leg side in all steam generators met the gauging criteria with a .610" probe and U-bend inspections revealed no defects. One tube was identified to have leaks during hydrotesting. This tube was located at Row 24, Column 7 in the hot leg of steam generator C, and showed a slow drip under 200 to 250 psig differential. This tube was subsequently eddy current tested as well as the surrounding tubes. No tube leak had been identified in steam generator C prior to shutdown on February 19, 1980.

Plugging Program

The plugging criteria for dented tubes implemented by the licensee are the same as those discussed in the SER attached to the Order of December 3, 1977. These criteria include the plugging of (1) leaking tubes, (2) .540" and .610" restricted tubes, (3) .650" restricted tubes in the periphery of the hot leg wedge region, and (4) preventive plugging criteria to preclude tube leaks resulting from the progression of denting. Additionally, those tubes inspected for wastage in the kidney regions that exhibited

either significant wastage (not necessarily in excess of the 40% plugging limit) or some wastage in proximity to a dent of sufficient size to mask the defect were plugged.

The plugging totals for this inspection are as follows:

	Plugged this Outage		Total Plugged to Date
	Denting Related	Wastage Related	
SG A	8	3	885
SG B	18	0	662
SG C	23	2	1011

A total of 2558 or 25.1% of the steam generator tubes have been plugged to date. A plugging limit of 28% was approved by Amendment No. 49 dated May 9, 1979.

Evaluation

The April 1980 gauging and plugging program performed at Surry 1 is similar to previously implemented programs at this unit, Surry Unit 2, and Turkey Point Units 3 and 4. These gauging programs have been developed over the course of time in consultation with the NRC staff and have been determined adequate to support operation of these facilities for six effective full power months.

Whereas the predicted location of the 17.5% tube hoop strain contour provided the basis for the gauging boundary used in the April 1979 inspection, the predicted location of the 17.5% contour at the time of the April 1980 inspection encompassed much of the tube bundle. However, significant tube restriction activity remains confined to areas immediately adjacent to previous activity. Based upon our review of the gauging results, we conclude that the implemented inspection boundaries adequately bound the regions of significant tube restriction activity.

Tube restriction activity (denting) continues to occur in areas of previously observed activity at a rate consistent with that observed previously. The preventive plugging criteria implemented in April 1980 and in previous inspections has proven successful in removing from service severely restricted tubes which are the most likely candidates to develop inservice leaks. Through wall cracks which have occurred at dented locations have been small and stable (no rapid failures). The Technical Specification 0.3 gpm leakage rate limit provides adequate assurance that even if through wall cracks and leaks occur, they will be detected and appropriate corrective action will be taken before any individual crack becomes sufficiently large as to be unstable under normal operating, transient, or accident conditions. It is our evaluation that the inspection results, implemented plugging, and existing leak rate limits adequately support six equivalent months of operation from the time of the most recent inspection.

With regards to the wastage phenomenon in the central bundle region, the small number of tubes (three tubes in steam generator A and two tubes in steam generator C) plugged as a result of the inspection indicates that wastage degradation is not developing at a significant or unexpected rate. We consider that the wastage inspection in April 1980 was adequate in establishing the current extent and magnitude of wastage in the Surry Unit 1 steam generators and that with the implementated plugging criteria provides reasonable assurance that unacceptable wastage degradation will not occur during the next operating interval.

On the basis of the above evaluation, we conclude that Surry Unit 1 may operate for a maximum interval of six (6) equivalent months from the April 1980 inspection without impairment to the health and safety of the public.

Environmental Consideration

We have determined that this amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR 51.5(d)(4) that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded based on the considerations discussed above, that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: July 28, 1980