



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 53 TO FACILITY OPERATING LICENSE NO. NPF-41

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. STN 50-528

1.0 INTRODUCTION

By letter dated November 14, 1990, as supplemented December 27, 1990 and January 11, 1991, Arizona Public Service Company (APS) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, Southern California Edison Company, El Paso Electric Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority (licensees), requested changes to the Technical Specifications for the Palo Verde Nuclear Generating Station, Unit No. 1, located in Maricopa County, Arizona. The proposed changes would extend the date for the next steam generator tube eddy-current examination from July 1991 until the next scheduled refueling outage (February 1992) but not later than 32 months since the last inspection (not beyond March 1992).

2.0 DISCUSSION AND EVALUATION

The steam generators were last examined in July 1989, during the unit's second refueling outage. All of the tubes in both steam generators were eddy-current tested. There are approximately 11,000 tubes in each steam generator. The types of tube problems that were found were summarized by the licensee as follows:

- lower eggcrate wear
- minor dents and dings
- minor denting around the flow distribution baffle
- possible loose parts indications
- minor batwing and vertical strip wear

Based on the results of the inspection, 12 tubes in steam generator 1 and 7 tubes in steam generator 2 were plugged. All degradation was the result of mechanical wear; no corrosion degradation was detected. The mechanical wear is due to vibration associated with normal plant operation.

The unit resumed full power operation in July 1990 about one year after the eddy-current inspection. During this period of time while in shutdown, the steam generators were not subject to the types of mechanical wear found during the July 1989 inspection because the steam generators were not in operation.

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The inspection schedule currently in the technical specifications is based on Regulatory Guide 1.83, "Inservice Inspection of PWR Steam Generator Tubes". This calls for an inspection between 12 and 24 months since the last inspection. Thus, the next inspection would be due no later than July 1991, which is 24 months after the July 1989 inspection.

The licensee proposes to defer this inspection on a one-time basis until February 1992, which would coincide with the unit's third refueling outage. In any case, the licensee would limit the calendar period to 32 months, maximum, which would extend to March 1992. The requested time extension corresponds to the time Unit 1 was shutdown during the extended 1989 outage.

From the standpoint of mechanical tube wear, this proposal is within the normal operating period of 24 months between inspections. The unit was shutdown for about 12 months of this period. Therefore, under the licensee's proposal, the operating time would be about 20 months, well within the 24 months allowed in Regulatory Guide 1.83 and the current technical specifications.

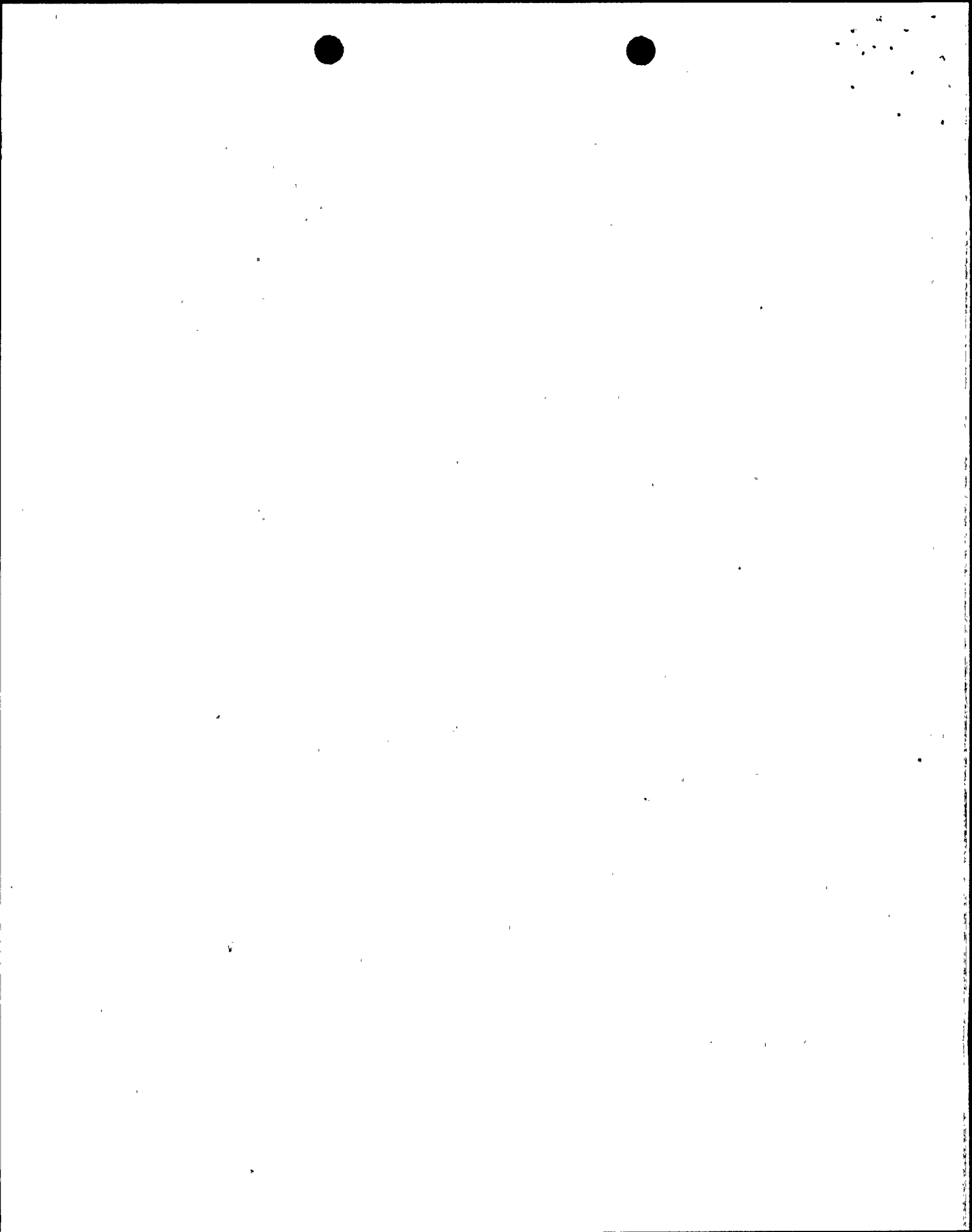
The licensee reports that wear indications consist of cold leg corner wear, central cavity batwing wear, and eggcrate and vertical support wear. For the first two types, it has been the licensee's practice to plug all tubes in these regions with any measurable wear since the discovery of this wear pattern. This resulted in seven tubes being plugged.

Random tube wear has been observed in the eggcrate and vertical support areas. The licensee has adopted a 30% through-wall plugging limit for these areas, based on a 500 day operating cycle*, to ensure that wear would progress to a maximum of 40% during the operating cycle, which is the plugging limit contained in the technical specifications. The licensee's requested extension falls within the 500 day operating cycle assumed in this analysis.

Using this 30% plugging limit for this area resulted in 5 tubes being plugged. All had indications between 30 and 36%. Thus, using this limited data, no tubes fell outside the wear model used by the licensee, and all tubes were removed from service before the technical specification plugging limit of 40% was reached. This licensee's program for controlling tube wear in these areas appears to be acceptable.

The foreign objects (3) that have been identified have had the surrounding tubes plugged. Inspection of nearby unplugged tubes for one object during the most recent inspection revealed no damage caused by the foreign object and it is apparently stable and locked in place. The other two were discovered during the most recent inspection. As with the first object, the licensee will be examining tubes nearby in future inspections. This is acceptable.

*The licensee clarified this to mean a 500 effective full-power day operating cycle.



The other aspect of extending the inspection interval involves possible corrosion which might have taken place during the extended shutdown. Steam generator chemistry control was well maintained during this period, with the steam generators under wet-layup conditions. There was an extended period of time, however, (ten months) when maintenance of the nitrogen overpressure was not possible so as to allow work on the atmospheric dump valves. Also, steam generator sampling was discontinued for two months while the wet-layup recirculation line was out of service to repair a valve in this line. The licensee requested the steam generator manufacturer to evaluate the impact of these two periods on corrosion in the steam generator. This review concluded that no corrosion mechanisms should have been initiated which would require examination prior to the next refueling, as proposed. During the period of time that the nitrogen blanket was removed, all other wet-layup chemistry specifications were maintained (pH 9.8 to 10.2; hydrazine 75-200 ppm; sodium, chloride and phosphate less than 1 ppm) except for one day when the pH was 9.7. The one day that the pH was out of range would not have any effect on the steam generator tube corrosion. After the sampling line was returned to service, the steam generator chemistry was found to be acceptable, thus demonstrating that proper chemistry was maintained throughout the period that sampling was not possible.

In reviewing the data from the July 1989 inspection (report dated October 25, 1989), the licensee found that two tubes having through-wall defects of 92% and 87% were inadvertently not plugged following the initial pre-service inspection conducted in August 1981. As a result of this discovery, the NRC staff requested the licensee to provide an explanation as to how this occurred and to provide a description of the quality assurance measures in place today to ensure that the defective tubes are identified and plugged.

In a supplemental letter dated January 11, 1991, the licensee provided the requested information. APS states that the cause of the error was due to not having the data independently verified. Present requirements include independent review of the data as well as independent verification that tube plugs have been placed in the correct locations. This is acceptable.

Based on the foregoing, the NRC staff finds the licensee's proposal to defer the next steam generator inservice inspection until the next refueling outage (February 1992) but not later than 32 months since the last inspection (not later than March 1992) is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

The amendment involves changes with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, or changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.



4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: January 16, 1991

