



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. NPF-3

TOLEDO EDISON COMPANY

DAVIS-BESSE UNIT 1

DOCKET NO. 50-346

INTRODUCTION

By letter dated January 11, 1988, Toledo Edison Company proposed a revision to the steam generator tube surveillance requirements in the Technical Specifications (TS's). The proposed change would define a third, special interest group of tubes (i.e., group A-3) in TS paragraph 4.4.5.2.b. The proposed change would give Toledo Edison Company the option of inspecting all tubes in this region and not having to apply the results of these inspections in determining whether the inspection results for the overall steam generator fall into Categories C-1, C-2, or C-3 as defined in TS paragraph 4.4.5.2.

The Toledo Edison Company provided additional information by letter dated April 14, 1988 to support the requested change. This included the results of the most recent inspection of the Davis Besse steam generators (in 1986) and an assessment of the degradation mechanism which the proposed TS change is intended to address.

DISCUSSION

Steam generator inspections performed in 1986 revealed 57 tubes in Steam Generator A with eddy current indications $\geq 20\%$ of the tube wall thickness. Thirteen of these tubes exhibited indications exceeding the 40% plugging limit. With one exception which will be discussed later, the affected tubes were tightly clustered around the untubed center region. Inspections in Steam Generator B revealed only one tube with a $> 20\%$ indication. This indication was also located at the center region of the bundle. The indications found were typically located between the third and sixth support plates, some were located at higher elevations ranging to the upper tube sheet. Many of the affected tubes contained multiple indications which tended to be localized over relatively short lengths. Toledo Edison Company has characterized the indications as being of relatively small amplitude, similar to what would be expected for pitting.

Although the specific degradation mechanism has not been established firmly, Toledo Edison Company believes the likely mechanism is pitting. This is based on their review of the history of Davis-Besse steam generator chemistry

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conditions. Toledo Edison Company believes that the presence of oxygen initiated the pitting. This condition may have resulted from a one-time service water injection into the steam generators during the June 9, 1985 loss-of-feedwater event at Davis-Besse. Toledo Edison Company states, however, that secondary water chemistry control has been excellent which should mitigate further pitting activity.

The proposed TS change is based on the premise that the subject degradation mechanism is confined to a localized region of the steam generator. The proposed change would permit Toledo Edison Company to inspect all tubes within a special interest group intended to encompass the region where the subject degradation mechanism is occurring. The area outside the special interest group would continue to be inspected in accordance with existing TS requirements, and results from the special interest group would have no bearing on the level of sampling to be performed outside the special interest group.

EVALUATION:

Technical Specification requirements concerning the need for supplemental inspection samples are dictated by the number of degraded tubes (i.e., tubes with indications $\geq 20\%$) and defective tubes (i.e., tubes with indications $\geq 40\%$) found during initial sample inspections. A special interest group methodology to address a specific degradation mechanism such as that suspected by Toledo Edison Company is justified provided there is reasonable assurance that the special interest group boundary encompasses all tubes which potentially are degraded or defective due to the subject degradation mechanism.

With one exception, the staff review has confirmed that degraded and defective tubes found to date at Davis-Besse which involve the subject degradation mechanism are bounded by the proposed special interest group. The one exception involves tube R73-C52 in steam generator A which exhibited a 51% indication about 1.4 inches below the sixth tube-support plate. The staff is not aware of any evidence to suggest that this indication is not due to the subject degradation mechanism. Apart from tube R73-C52, there are a small number of other tubes located outside the proposed special interest group which contain $\geq 20\%$ indications and which may also involve the subject degradation mechanism. This suggests the possibility that unless Toledo Edison Company is successful in arresting the subject degradation mechanism, this degradation may eventually lead to degraded and defective tubes in the general population of tubes outside the proposed special interest group.

The staff has concluded that the proposed change to the Technical Specifications to incorporate the subject special interest group is acceptable subject to certain clarifications. Per discussions with the licensee, it was agreed that the third special interest group would not be applied beyond the fifth refueling outage. The staff will consider a permanent change to the Technical

Specification upon submittal of an application to amend the license which adequately addresses the following clarifications:

1. The boundary of the special interest group shall be expanded as necessary to bound all degraded and defective tubes associated with the subject degradation mechanism identified during previous inspections or the current inspection. As a minimum, defective tubes should be bounded by at least five tubes in the row-wise and column-wise directions. Degraded tubes should be bounded by at least two tubes in the row-wise and column-wise directions.
2. Outer diameter (OD) indications should be considered to involve the subject degradation mechanism unless it can be reasonably established that they involve a different mechanism such as, for example, fatigue cracks, damage from loose parts, fretting/wear at support plate, etc.

Regarding item 2, it is the staff position that an OD indication cannot be assumed not to involve the subject degradation mechanism simply on the basis that it is located far from the area where the bulk of the indications are located.

The staff notes that it is not clear that even if the third special-interest group were applied beyond the fifth refueling outage that significantly reduced levels of inspection sampling would result over the long term. This observation is based on the premise that degraded and defective tubes due to OD corrosion may eventually occur in locations throughout the bundle rather than being restricted to the center of the bundle and along the open tube lane as is presently the case. It will be very difficult to justify a criterion for treating OD corrosion indications in the general tube population differently from OD corrosion indications of the type seen to date.

4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact has been prepared and published in the Federal Register on (53 FR 27579). Accordingly, based upon the environmental assessment, the Commission has determined that the issuance of this amendment will not have a significant effect on the quality of the human environment.

5.0 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 this 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: July 22, 1988