



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO.81 TO FACILITY OPERATING LICENSE NO. NPF-3

TOLEDO EDISON COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

Introduction

By letter dated August 27, 1984, the Toledo Edison Company (TED) submitted an application to revise the Davis-Besse Nuclear Power Station, Unit No. 1, Technical Specifications. The application requested a revision to the withdrawal schedule for the reactor vessel material surveillance specimen capsules, deletion of references to specific irradiation capsule locations, and clarification of the surveillance requirement related to the specimens.

Discussion and Evaluation

All light-water nuclear power reactors must meet the fracture toughness requirements and material surveillance requirements for the reactor coolant pressure boundary set forth in Appendices G and H to Part 50 to Title 10, Code of Federal Regulations (see §10 CFR 50.60). Appendix H, "Reactor Vessel Material Surveillance Program Requirements", specifies, among other requirements, that the requirements of ASTM E 185, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels", must be met. Appendix H requires also that the proposed surveillance specimen capsule withdrawal schedule be approved prior to its implementation.

ASTM E 185-82 recommendations for the number of surveillance capsules and their withdrawal schedule are based on the predicted transition temperature shift at the reactor vessel inside surface. For reactor vessels with a shift greater than 200°F, the capsule program must include a minimum of five capsules. The ASTM standard prescribes the removal schedule in terms of Effective Full Power Years (EFPY) and end-of-life neutron fluence at various locations through the reactor vessel wall, except for the first capsule to be removed, which is in terms of fluence and predicted temperature shift of the encapsulated materials.

The removal schedule presently specified in Table 4.4-5 of the Davis-Besse, Unit 1, Technical Specifications is based on accumulated fluence of the irradiated capsules but the removal interval is given in terms of operating cycles. However, the relationships between accumulated fluence and operating cycle is not fixed but, rather, can be altered by other operational considerations, two major considerations being revised fuel loading schemes

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and longer operating periods between refuelings. With the beginning of Cycle 5, Toledo Edison Company intends to operate the Davis-Besse station on an 18-month cycle and is planning to utilize a low-leakage core design. Therefore, Toledo Edison Company has proposed a change to Table 4.4-5. The proposed change incorporates the ASTM E 185-82 recommended withdrawal schedule applicable to a program with a minimum required number of capsules of five. The proposed table does not give values for accumulated neutron fluence and does not reference capsule locations within the reactor vessel.

The safety evaluation prepared by Toledo Edison Company states that the specifics of the Davis-Besse surveillance program are contained in the Babcock and Wilcox Owners Group Report, BAW-1543, "Integrated Reactor Vessel Material Surveillance Program". The peak neutron fluence to be received by the Davis-Besse reactor vessel is estimated to be 1.6×10^{19} n/cm² (E>1MeV) according to BAW-1834, "Analysis of Capsule TE 1-B, the Toledo Edison Company, Davis-Besse Nuclear Power Station Unit 1 - Reactor Vessel Material Surveillance Program." This report presents the results of examination of the second capsule removed from the Davis-Besse reactor vessel at the end of the third fuel cycle. The remaining surveillance capsules will be irradiated to various neutron fluences, the highest being the estimated peak neutron fluence received by the vessel.

We have compared the expected neutron fluence to be received by each capsule in the surveillance program to that required by ASTM E 185-82 and find that the capsule withdrawal schedule identified in BAW-1543, Rev. 2, meets the intent of the ASTM specification and is acceptable.

Because Cycle 5 marks the start of 18-month operating cycles, the licensee has withdrawn the third capsule at the end of the fourth cycle. The Technical Specifications presently require removal of this capsule at the end of the fifth cycle. The proposed withdrawal schedules submitted by Toledo Edison Company in the August 27, 1984 application do not specifically identify the neutron fluence target which will determine the actual withdrawal time. We find that withdrawal of the third capsule at the end of Cycle 4 meets the neutron fluence target given in BAW-1543, Rev. 2. We also find that the withdrawal times reported for the first two capsules also meet the neutron fluence target. However, the withdrawal times for the remaining capsules are not sufficiently specific to ensure that the target neutron fluences for these capsules, as given in BAW-1543, Rev. 2, will be met. Therefore, we consider the proposed withdrawal schedule for the first three capsules only acceptable. We are withholding a determination on the schedules for the remaining capsules pending clarification by the licensee of the neutron fluence to be received by the capsules. This clarification must be submitted not later than 180 days prior to the refueling outage (transition into mode 5) prior to Cycle 6 operation.

The proposed changes to the Technical Specifications also would delete reference to capsule adder locations. This change would allow a modified capsule shuffle scheme, described in BAW-1543, Rev. 2. We have reviewed this revised shuffle scheme and find it acceptable. We also find that it is unnecessary to include this detail in the Technical Specifications.

Toledo Edison Company proposes to modify Section 4.4.9.1.2 by adding clarification that this surveillance requirements refers to surveillance specimens which are representative of the reactor vessel materials. The Davis-Besse reactor is used to irradiate other material specimens used for research purposes. The proposed change clarifies the scope of this surveillance requirement. We find the clarification acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. We have 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this 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 this amendment.

CONCLUSION

We have 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.

Dated: December 17, 1984

The following NRC personnel contributed to this Safety Evaluation:
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