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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RESOLUTION OF INFORMATION NOTICE 91-66

TOLEDO EDISON COMPANY

CENTERIOR SERVICE COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter dated May 28, 1992, Toledo Edison Company, the licensee for the Davis-Besse Nuclear Power Station, requested written concurrence from the NRC that the basis of the previous NRC approval of License Amendment Number 120 Remains valid. The Amendment, which was issued April 13, 1989, allowed the storage of fuel assemblies with enrichments up to 3.8 weight percent (w/o) U-235 in the Davis-Besse spent fuel pool.

The criticality analysis for fuel storage in the Davis-Besse spent fuel pool was performed by the Babcock & Wilcox Fuel Company (BWFC) using the KENO Monte Carlo computer code. Subsequent to this analysis, the NRC issued Information Notice (IN) 91-66 which identified the existence of a temperature dependent discrepancy between KENO and CASMO calculations. CASMO is a transport theory code which is also widely used by nuclear industry for fuel storage calculations. The cause of the discrepancy has been attributed to the processing of the thermal scattering data when generating neutron cross sections for KENO. Based on this, Toledo Edison performed a review of the BWFC analyses and found that the previously calculated final values of k-eff were too low and, therefore, nonconservative.

2.0 EVALUATION

The previous BWFC Davis-Besse Fuel storage criticality calculations were intended to be representative of the water temperature which produced the highest (most conservative) value of k-eff. Due to the discrepancy mentioned above and described in IN 91-66, this temperature was erroneously determined to be 90°F and 240°F, the maximum possible temperature that could exist in the spent fuel pool storage racks, was determined to be +0.00650 Δk.

Although Davis-Besse Technical Specifications require a minimum boron concentration of 1800 ppm in the pool water during refueling and plant procedures require verification of this minimum boron concentration every 7 days during

nonrefueling operations, the Davis-Besse spent fuel pool criticality analyses assumed no soluble boron, as required by Standard Review Plan 9.1.2. However, in addition to the boron dilution, the analyses also included the reactivity effect of a dropped fuel assembly horizontally on top of the vertical stored fuel assemblies. The assumption of two simultaneous accidents (dilution and dropped assembly) are beyond (more restrictive) than regulatory requirements and the NRC allows each to be considered separately.

The magnitude of the reactivity penalty associated with the dropped assembly accident was determined to be approximately 0.016 Δk. Since the temperature penalty magnitude mentioned previously was 0.00650 Δk, removal of the dropped fuel assembly accident penalty more than offsets the temperature penalty that must be applied to compensate for the KENO cross section error. Therefore, the staff concludes that the Davis-Besse spent fuel pool design remains safe and continues to meet the NRC acceptance criterion of k-eff no greater than 0.95 for all normal and accident conditions.

3.0 CONCLUSION

Based on an evaluation of the discrepancies indicated in NRC IN 91-66, as described above, the staff concludes that the Davis-Besse spent fuel pool design continues to meet the NRC acceptance criterion.

Principal Contributor: L. Kopp

Date: September 9, 1992