



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 151 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

1.0 INTRODUCTION

By application dated May 31, 1990 as supplemented on December 17, 1990, Toledo Edison Company, the licensee, requested an amendment to Facility Operating License NPF-3 for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). The proposed amendment would change the expiration date of the license from March 24, 2011 to April 22, 2017.

2.0 DISCUSSION

Section 103.c of the Atomic Energy Act of 1954 provides that the license is to be issued for a specified period not exceeding 40 years. The Code of Federal Regulations at 10 CFR 50.51 specifies that each license will be issued for a fixed period of time, to be specified in the license, not to exceed 40 years from the date of issuance. Section 50.57 of 10 CFR Part 50 allows the issuance of an operating license pursuant to 10 CFR 50.56 for the period specified in 10 CFR 50.51 after the construction of the facility has been substantially completed, in conformity with the construction permit and when other provisions specified in 10 CFR 50.57 are met. The current term of the license for DBNPS is 40 years commencing with the issuance of the construction permit. Accounting for the time that was required for plant construction, this represents an effective operating term of only approximately 33 years and 11 months. Consistent with Section 103.c of the Atomic Energy Act of 1954 and 10 CFR 50.51, 50.56, and 50.57 of the Commission's regulations, the licensee, by its application dated May 31, 1990, seeks an extension of the operating license term for DBNPS such that the fixed period of the license would be 40 years from the date of issuance of the operating license. This will extend the expiration date of the operating license to April 22, 2017.

The impact of the additional radiation exposure to the facility operating staff and the impact on the general population in the vicinity of DBNPS are addressed in the NRC staff's Environmental Assessment dated December 21, 1990.

### 3.0 EVALUATION

The licensee's request for extension of the operating license is based on the fact that the authorized 40-year service life was considered during the design and construction of the plant. This does not mean that some components will not wear out during the plant lifetime. However, the reactor coolant system components and support systems are analyzed for the integrated effects of radiation damage and cyclic loading (with added margin) which could reasonably be expected to occur in a 40-year lifetime. Surveillance and inspection programs have been implemented in accordance with the ASME Code for Inservice Inspection and Inservice Testing of Pumps and Valves and Technical Specification requirements to provide assurance that any unexpected degradation in plant equipment will be identified and corrected. The specified provisions and requirements for ASME Code testing are set forth in 10 CFR 50.55a.

The design of the reactor vessel and its internals considered the effects of 40 years of operation at full power and a comprehensive vessel material surveillance is maintained in accordance with 10 CFR Part 50, Appendix H, which ensures that the fracture toughness requirements of Appendix G of 10 CFR Part 50 are met. As stated in Section 5.4.7 of the Updated Safety Analysis Report (USAR), reactor vessel surveillance capsules are periodically removed for Charpy V-notch and tensile strength tests. This is performed as described in Babcock and Wilcox Topical Report, BAW-1543, Rev. 2, "Integrated Reactor Vessel Materials Surveillance Program," which the NRC staff approved in 1985. The schedule for reactor vessel surveillance capsule removal is contained in Section 3/4.4.9 of the DBNPS Technical Specifications.

As discussed above, the useful life of the DBNPS was considered to be 40 years. As part of the submittal, the licensee listed numerous references from the USAR/FSAR which reflect that the design of DBNPS systems, structures and components was in accordance with ASME code requirements for applications subjecting these systems, structures and components to thermal and loading cycles that are anticipated for the 40-year service life of the plant.

The Code of Federal Regulations at 10 CFR 50.61 specifies fracture toughness requirements for protection against pressurized thermal shock (PTS) events. Section 50.61 defines screening criteria which establishes a threshold where actions to reduce susceptibility to PTS events must be taken. Toledo Edison's letter to the NRC dated January 20, 1986 (Serial Number 1236) assesses the DBNPS with respect to 10 CFR 50.61. The letter estimated that the plant could operate for 111 effective full power years (140 calendar years assuming an 80% capacity factor) before reaching the screening criteria. The staff has completed its review of the PTS assessment on DBNPS and issued the resulting

safety evaluation in the letter dated January 9, 1987. The staff concluded that the PTS screening criteria would not be reached at 32 effective full power years (40 years of operation at 80% capacity factor) at DBNPS. Based on the vessel exposure to date, it will not be possible to accumulate a total of 32 effective full power years of operation at the DBNPS before the proposed license expiration date.

Aging analyses have been performed for all safety-related electrical equipment in accordance with 10 CFR 50.49, "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants," identifying qualified lifetimes for this equipment. These lifetimes have been incorporated into plant equipment maintenance and replacement practices to ensure that all safety-related electrical equipment remains qualified and available to perform its safety-related function regardless of the overall age of the plant. An NRC Region III inspection of the DBNPS environmental qualification program was conducted from February 24 through 28, 1986 with a followup inspection conducted from August 4 through 7, 1986. The results of the inspection were documented in the Inspection Report Number 50-346/86-024. The inspection report concluded that, although some deficiencies were identified, the licensee has implemented a program to meet the requirements of 10 CFR 50.49. By letter dated December 19, 1986, the NRC transmitted the inspection report to the licensee and documented that the licensee later informed the staff that all the Potential Enforcement/Unresolved Items from the inspection were corrected. At this time, all open items from the inspection have been closed.

NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," dated March 17, 1988 requested that Toledo Edison provide assurance that programs have been implemented at the DBNPS to ensure that boric acid corrosion does not lead to degradation of the reactor coolant pressure boundary and the reactor coolant boundary will have an extremely low probability of abnormal leakage, rapidly propagating failure or gross rupture. Toledo Edison responded in a letter dated May 27, 1988 (Serial Number 1527) that several programs and procedures are in place at the DBNPS which will ensure compliance with the requirements set forth in Generic Letter 88-05.

NRC Generic Letter 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning," dated May 2, 1989 requested Toledo Edison to provide information to allow the staff to assess whether the DBNPS reactor would continue to operate safely if erosion/corrosion were to significantly degrade high energy carbon steel piping and components. In a letter dated July 14, 1989 (Serial Number 1679), Toledo Edison indicated that an erosion/corrosion control program had been implemented at the DBNPS starting on April 19, 1988 which included piping system analytical computer codes, procedures for piping integrity evaluation, data analysis and corrective actions to ensure that the integrity of high energy carbon steel piping systems is maintained.

The staff has reviewed Toledo Edison's responses to Generic Letters 88-05 and 89-08 and found that these responses satisfactorily addressed the Generic Letters' concerns on pipe erosion and corrosion for the service life of the plant. The staff expects Toledo Edison to adhere to the programs and procedures currently in place at the DBNPS to alleviate and/or correct age-related piping degradation until the proposed license expiration date. Any new concerns on the DBNPS piping system degradation will be addressed by the staff and the licensee similarly in a complete and expeditious manner.

In NRC Bulletin No. 88-11, "Pressurizer Surge Line Thermal Stratification," the staff required all pressurized water reactor (PWR) licensees to evaluate the effect of thermal stratification on the pressurizer surge line (PSL). Toledo Edison responded in its letter dated June 2, 1989 which stated that a bounding analysis performed by Babcock & Wilcox Owners Group (B&WOG) is applicable to the DBNPS and indicated that the PSL may not satisfy the ASME Section III Code criteria for the operating life of the plant when the effects of thermal stratification are taken into account. The staff reviewed this response and transmitted its evaluation to Toledo Edison in its letter dated August 7, 1990. The staff concluded that there was sufficient margin based on a conservative analysis that the DBNPS can be safely operated for another 57 heat-up and cooldown cycles. This issue will continue to be evaluated using actual temperature data in the PSL taken during the last DBNPS restart in July 1990. Moreover, the transition from a 12-month fuel cycle to an 18-month fuel cycle should significantly increase the operating lifetime of the PSL. While this issue is not yet resolved, its ultimate resolution will not be affected by the proposed license extension. Conversely, the grant of the requested license extension will not affect the ultimate resolution of this issue and, in any event, the fact that the issue has not yet been resolved will not impact on the safe operation of the facility for the extension period in that it is presently anticipated that resolution of this issue will be achieved well before the proposed extension period from the year 2011 to 2017 takes effect.

Based on the above, it is concluded that the extension of the operating license for the DBNPS to allow a 40-year service life from issuance of the operating license is consistent with the prior staff conclusions in its safety analysis in that all issues associated with plant aging have already been addressed, and, for purposes of this extension, have been resolved or will be resolved well before the extension period takes effect. Accordingly, the staff finds that the proposed extension of the expiration date of Facility Operating License No. NPF-3 for the DBNPS to be acceptable.

#### 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 December 27, 1990 (55 FR 53216). 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 ~~approval~~ <sup>license</sup> will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: December 31, 1990