



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD TEN-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

REQUEST FOR RELIEF NO. 96-04 FOR

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNIT 1

DOCKET NO. 50-269

1.0 INTRODUCTION

The Technical Specifications for Oconee Nuclear Station, Unit 1, state that the inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. The applicable edition of Section XI of the ASME Code for Oconee Nuclear Station, Unit 1, third 10-year inservice inspection (ISI) interval is the 1989 Edition.

In a letter dated August 5, 1996, Duke Power Company (DPC or licensee) submitted to the NRC Relief Request No. 96-04 and requested relief under the provisions of 10 CFR 50.55a(a)(3)(ii) for its Oconee Nuclear Station, Unit 1. The licensee is seeking relief to the Code-required preservice examination on mechanical systems at the upgraded Keowee Hydro Station Units 1 and 2. The upgrade of the Keowee Project was initiated by DPC in order to improve Keowee systems in response to NRC Electrical Distribution Systems Functional Inspections and Self-Initiated Technical Audits that were performed from 1992 to 1994. Several Keowee mechanical systems have been upgraded to DPC Piping Class F as a result of the Keowee Project. Upgrading Keowee mechanical systems to DPC Piping Class F resulted in application of additional, more restrictive requirements such as those contained in the ASME Code, Section XI and 10 CFR Part 50, Appendix B. ASME Section XI requires retention of documentation of preservice examinations performed on mechanical systems in accordance with the applicable construction codes. Since Keowee mechanical systems were not originally constructed under these requirements, little or no

records of preservice examinations exist for Keowee mechanical systems. In order to provide records DPC would have to perform a new preservice examination of the affected Keowee systems and, thus, obtain the Code-required documentation. Performing new preservice examination on the upgraded Keowee systems would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety because of the following reasons: (a) reduced availability of the emergency power source for Oconee Nuclear Station; (b) preservice examinations would have to be performed on the systems prior to embedment in concrete (since much of the piping in the station have been embedded, it would not be practical to perform these inspections); and (c) the large number of joints in the system would require excessive time and resources to inspect.

2.0 EVALUATION

The Code of record for the Oconee Nuclear Station, Unit 1, 10-year inservice inspection interval is the 1989 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI. The information provided by the licensee in support of the request for relief from Code requirements has been evaluated by the NRC staff and the results of the review are documented below.

A. Request for Relief 96-04, Keowee Hydro Station Units 1 and 2

Code Requirement: ASME Code, Section XI, Paragraph IWA-6330, Construction Records requires that records are retained in accordance with the applicable construction code. Part 50 of 10 CFR, Appendix B, Criterion XVII requires that sufficient records are maintained to furnish evidence of activities affecting quality.

Licensee's Code Relief Request: The licensee requested relief from performing preservice examination on seven newly upgraded systems at the Keowee Hydro Station Units 1 and 2. The seven systems were identified as follows: (1) Keowee Hydro Station Governor Oil System (OG); (2) Keowee Hydro Station Turbine Guide Bearing Oil System (GBO); (3) Keowee Hydro Station Turbine Sump System (TS); (4) Keowee Hydro Station Turbine Generator Cooling Water System (WL); (5) Keowee Hydro Station Governor Air System (AG); (6) Keowee Hydro Station Spiral Case; and (7) Keowee Hydro Station Air Circuit Breaker Air System (AB). These systems were originally constructed under the rules of USAS B31.1.0 piping code July 1967 Edition. The spiral case was constructed under the rules of ASME Section VIII, 1965 Edition, Subsection UW. The above listed systems were subsequently upgraded and reclassified as being ASME Code, Section XI, ISI Class 3/DPC Class F systems.

Licensee's Basis for Requesting Relief: (as stated)

Reference Code Requirement that has been determined to be excessively burdensome:

USAS B31.1.0 Power Piping Code (7/67), Section 136, including Table 136.5.1. This section requires piping installations to be inspected prior to service to the extent necessary to assure compliance with engineering design, and with the material, fabrication, assembly, and test requirements of the Code.

ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition; with no addenda, Article IWA-2411, Preservice Inspection. This section requires that the preservice inspection plan comply with the adopted Code 36 months prior to the docket date of the construction permit.

ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition; with no addenda, Article IWD-2200. This section states that all examinations required by the Article, except pressure retaining components up to the first isolation valve (Item D2.10 of Examination Category D-8, Table IWD-2500-1), shall have a preservice examination prior to initial plant startup.

In accordance with 10 CFR 50.55a(a)(3)(ii), this request for relief presents the significant level of hardship, without a compensating increase in the level of quality or safety, which would be incurred as a result of performing preservice examinations for Keowee Hydro Station. IWA-2411 and IWD-2200 requirements cannot be met since Keowee Hydro Station was constructed and operated prior to the existence of ASME Section XI.

Prior to June 1992, there were no ISI Class assignments for the subject Keowee Hydro Station systems. In order to meet the requirements of USAS B31.1.0, every joint in the station would be required to be examined. Performance of preservice examinations on the Keowee mechanical systems will result in excessive burden for the following reasons:

- 1) Reduces availability of the emergency power source for Oconee Nuclear Station. The unavailable hours accrued to perform the tests would be such that NRC Station Blackout availability requirements would not be met. The systems would have to be isolated, drained, tested, and refilled to perform the test.
- 2) Accessibility for preservice examinations requires extensive destructive measures. Preservice inspections have to be performed on the systems prior to embedment in concrete. Since much of the piping in the station, as well as the spiral case, have been embedded, it is not practical to perform these inspections.

3) The large number of joints in the systems requires excessive time and resources to inspect. There are seven systems listed for this relief request. Each system listed for this relief request makes the ONS [Oconee Nuclear Station] emergency power source unavailable when the system is removed from service. Hundreds of joints would have to be inspected within 72 hour Technical Specification Limiting Conditions for Operability (LCO).

Preservice examinations were most likely performed for the Turbine Guide Bearing Oil System, the Governor Oil System, the Governor Air System, the Turbine Sump Pump System, and the Turbine Generator Cooling Water System based on the Duke Power Piping Specifications for Keowee. The specification for the hydraulic turbine and governors, KS-200, requires pressure testing of components and applicable NDE requirements such as 100% radiography of the spiral case. This documentation has not been found to date. The spiral case construction procedure calls for radiography in accordance with ASME Section VIII.

Licensee's Proposed Alternative: (as stated)

No alternate preservice examinations are proposed. The time frame involved in draining, testing, cleaning, and refilling systems normally containing oil or air to perform hydrostatic testing adversely affects availability of the emergency power source for Oconee Nuclear Station. USAS B31.1.0, 7/67 edition paragraph 137.1.2(a) states, "An initial service leak test and inspection is acceptable when other types of tests are not practical or when leak tightness is conveniently demonstrable due to the nature of the service". The reliable operation of the station for the past 24 years, the constant operator rounds which inspect for leakage (OP/O/A/2000/043, Attachment 2), and the implementation of the Inservice Inspection program in November 1995, provide assurance that the piping systems can perform adequately under the Duke Piping Class F category.

Acceptability of proposed alternate testing with respect to the level of quality and safety as well as public health and safety:

All the safety related piping systems at Keowee Hydro Station were constructed under USAS B31.1.0. The spiral case was constructed under ASME Section VIII. The piping used at Keowee Hydro Station will function as designed and is fully qualified for the conditions expected to be present at Keowee Hydro Station during and after an accident. This position is based on years of station operation without piping leakage, and load rejection testing and emergency starting which place

the spiral case and operating systems in their most demanding conditions. Considerations in this qualification include material compatibility, pressure/temperature rating, and welding personnel qualifications. For the piping systems, there is little difference in the testing requirements required by the construction codes as compared to ASME Section XI.

The piping has provided reliable service for Keowee Hydro Station for a period of 24 years. The placement of these piping systems into the ISI Class 3, Duke Power Piping Class F program will provide additional assurance with respect to the piping integrity.

Not performing the code required preservice examinations does not decrease the level of public safety, or any level of quality, associated with the operation of the systems at Keowee. The inservice reliability and increased level of planned inservice inspections provides an acceptable level of assurance for future operation.

NRC Staff Evaluation: The staff has reviewed the information provided in DPC's letter dated August 5, 1996, in support of its Request for Relief No. 96-04, for Oconee Unit 1. DPC requested that seven mechanical systems at the Keowee Hydro Station be exempt from the required ASME Code preservice inspection examination because compliance with the Code requirements will result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The seven systems were identified as follows: (1) Keowee Hydro Station Governor Oil System (OG); (2) Keowee Hydro Station Turbine Guide Bearing Oil System (GBO); (3) Keowee Hydro Station Turbine Sump System (TS); (4) Keowee Hydro Station Turbine Generator Cooling Water System (WL); (5) Keowee Hydro Station Governor Air System (AG); (6) Keowee Hydro Station Spiral Case; and (7) Keowee Hydro Station Air Circuit Breaker Air System (AB). These systems were originally constructed under the rules of USAS B31.1.0 piping code July 1967 Edition. The spiral case was constructed under the rules of ASME Section VIII, 1965 Edition, Subsection UW. These systems were subsequently upgraded and reclassified as being ASME Code, Section XI, ISI Class 3/DPC Class F systems.

The upgrade of the Keowee Project was initiated by DPC in order to improve Keowee systems in response to NRC Electrical Distribution Systems Functional Inspections and Self-Initiated Technical Audits that were performed from 1992 to 1994. Upgrading the Keowee mechanical systems to DPC Piping Class F resulted in application of additional, more restrictive requirements such as those contained in the ASME Code, Section XI and 10 CFR Part 50, Appendix B. ASME Section XI requires retention of documentation of preservice examinations performed on mechanical systems in accordance with the applicable construction codes.

Since the Keowee mechanical systems were not originally constructed under these requirements, little or no records of preservice examinations exist for these systems. In order to provide records DPC would have to perform a new preservice examination of the affected Keowee systems and thus obtain the code-required documentation. Performing new preservice examination on the upgraded Keowee systems would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety because of the following reasons: (a) reduced availability of the emergency power source for Oconee Nuclear Station; (b) preservice examinations would have to be performed on the systems prior to embedment in concrete (since much of the piping in the station have been embedded), it is not practical to perform these inspections; and (c) the large number of joints in the system would require excessive time and resources to inspect. In addition, the seven piping systems have been incorporated into the Oconee Nuclear Station Unit 1 ISI program.

The piping systems are now classified as DPC Piping Class F, ISI Class 3 and all repairs, replacements, and modifications on these systems will be in accordance with the USAS B31.1.0, July 1967 Edition. The inservice examinations and testing will be done in accordance with ASME Section XI, 1989 Edition. Further, the spiral case, which was constructed under ASME Section VIII rules, is now classified also as DPC Piping Class F, ISI Class 3. Replacements, repairs, and modifications conducted on the spiral case will be conducted in accordance with ASME Section VIII, 1965 Edition. The inservice examinations and testing will be done in accordance with ASME Section XI, 1989 Edition. The implementation of ASME Code, Section XI, rules is in effect at this time.

3.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that the Code examination requirements are impractical for the seven Keowee systems included in Request for Relief No. 96-04, for Oconee Unit 1. The examinations that were performed during the construction of the systems, the reliable operation of the station for the past 24 years, and the implementation of the Inservice Inspection program in November 1995 provide reasonable assurance of adequate structural integrity and safety.

The staff concludes that the upgraded piping systems at the Keowee Hydro Station can perform adequately under the ASME Code, Section XI, Class 3/Duke Piping Class F category and imposing the Code requirements on the facility would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety and, therefore, relief is granted, pursuant to 10 CFR 50.55a(a)(3)(ii) as requested.

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