



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 178 TO FACILITY OPERATING LICENSE NO. DPR-40
OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN STATION, UNIT NO. 1
DOCKET NO. 50-285

1.0 INTRODUCTION

By application dated July 15, 1996, as supplemented by letters dated September 3, 1996, October 22, 1996, October 24, 1996, and application dated August 23, 1996, Omaha Public Power District (OPPD) requested changes to the Technical Specifications (Appendix A to Facility Operating License No. DPR-40) for the Fort Calhoun Station, Unit No. 1 (FCS). The requested changes would permit use of fuel with ZIRLO cladding and allow use of fuel made of depleted uranium (oxide).

The September 3, 1996, and October 22, 1996, supplemental letters provided additional clarifying information and the October 24, 1996, letter provided correcting information that did not change the initial no significant hazards consideration determination published in the Federal Register on July 31, 1996 (61 FR 40026) and August 30, 1996 (61 FR 45995).

2.0 EVALUATION

2.1 Use of Zirlo Fuel and Limited Substitutions

The licensee proposed to change Technical Specification 4.3.2, "Reactor Core and Control," for FCS to permit use of fuel with ZIRLO cladding. NRC staff safety evaluations (SEs) for WCAP-12610-P-A dated July 1, 1991, regarding VANTAGE+ (ZIRLO) fuel assemblies, and October 9, 1991, regarding large and small break loss-of-coolant accident (LOCA) analyses for ZIRLO fuel approve the use and analyses of ZIRLO fuel in PWR plants. The October 9, 1991, SE states that ZIRLO may be used co-resident with Zircaloy in LOCA analyses without penalty to either fuel type because of the similarity of the material properties of the two cladding materials, provided that the fuels are of the same features and closely similar dimensions. Further, 10 CFR 50.46 explicitly references applicability to fuel with ZIRLO cladding. Therefore, the inclusion of VANTAGE+ (ZIRLO) fuel in the FCS core is acceptable and analytical methods which are acceptable for zircaloy are also acceptable for ZIRLO in the FCS core.

The SE approving the specific Westinghouse 10 CFR 50 Appendix K model for application to FCS, dated March 26, 1992, was based on the model described in WCAP-13027-P, "Westinghouse ECCS Evaluation Model for Analysis of CE-NSSS." In that SE the staff limited its acceptance of large break (LB) LOCA events to the analyses provided by the licensee, dated September 30, 1991, and did not accept the model for generic application or for further use. This limitation was based on a code stability problem in the system thermal/hydraulic calculation and concern that the problem might introduce significant error in some future applications. This same model was referenced in the licensee's July 15, 1996, submittal.

By letter dated September 3, 1996, the licensee responded to the staff's request for additional information (RAI) dated August 6, 1996. The response addressed the code stability concern which was the basis for the limitation imposed in the staff SE dated March 26, 1992. The licensee indicated that the July 15, 1996, analyses were performed with the 1992 model, but that the system calculation had not been changed and that only the fuel analysis portion of the calculation was performed to reflect the inclusion of ZIRLO fuel. The fuel analysis code (LOCBART) performs its calculations with input from the system analysis code, but provides no feedback to the system code. Therefore, while calculations for FCS by the system code might be affected by some changes in plant configuration or operation, the system calculations would not be affected by the change to ZIRLO cladding, as indicated in the October 9, 1991, SE. Since the system calculation which was approved is unaffected by the change in cladding material, and only the fuel calculation is affected, the staff determined that the model used for the LOCA analysis calculations for the core containing ZIRLO-clad fuel is essentially the same as the model approved in the March 26, 1992, SE. The analyses provided by the licensee in support of this application (July 1996) adequately accounts for ZIRLO materials in VANTAGE+ assemblies, including the thermal and mechanical design features and hydraulic properties of the fuel. Therefore, the staff finds the 1996 analyses acceptable with the same limitation as placed on the 1992 model.

The staff finds the specific July 15, 1996, analyses based on the LOCA analysis models to be in accordance with the requirements of 10 CFR 50.46 and 10 CFR 50 Appendix K, as discussed in this section.

The licensee also proposed to change TS to allow that limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. This change is consistent with NUREG-1432, "Combustion Engineering Standard Technical Specification," Revision 1, April 1995, and incorporates the guidance of Generic Letter 90-02, Supplement 1, "Alternative Requirements for Fuel Assemblies in the Design Features Section of Technical Specifications." The SL provided flexibility in the repair of fuel assemblies containing damaged and leaking fuel rods by reconstituting the assemblies. The number and location of filler rod substitutions are limited to configurations for which applicable NRC approved codes and methods are valid and that have been shown by test or analyses to comply with all fuel safety design bases. To

satisfy generic fuel design criteria as described in the Standard Review Plan, the filler rods require thermal-hydraulic, neutronic, and mechanical analyses to demonstrate that inclusion of the filler rods in fuel assemblies with the specific configurations and core locations chosen for a specific fuel cycle is acceptable with respect to overall fuel performance and safety considerations. The proposed TS change complies with the guidance in GL 90-02, Supplement 1, will allow safe core configuration, and is acceptable.

2.2 Use of Depleted Uranium

By letter dated August 23, 1996, the licensee proposed a change to TS 4.3.2 to allow the use of depleted uranium in fuel rods near the exterior of the core to reduce neutron leakage to the reactor pressure vessel. The licensee's submittal stated that a similar amendment was approved for the Palisades Plant. The staff finds this acceptable since the use of depleted uranium will (1) decrease radiation induced pressure vessel embrittlement effects, (2) will not introduce any new kind, or additional amount of, fission product material relative to the use of slightly enriched fuel, and (3) will not affect the reactor safety limits, limiting conditions of operation or other operating limits.

2.3 Westinghouse Topical Reports WCAP-12610-P-A and WCAP-13027-P

The licensee also proposed to change Technical Specification 5.9.5, "Core Operating Limits Report," to add the Westinghouse Topical Reports, WCAP-12610-P-A, "VANTAGE + Fuel Assembly Report," June 1990, and WCAP-13027-P, "Westinghouse ECCS Evaluation Model for Analysis of CE-NSSS," July 1991, to the listed references of NRC approved analytical methods to determine core operating limits. WCAP-12610 provides an approved technical basis for including ZIRLO fuel in PWR cores based on its similarity to Zircaloy. WCAP-13027 provides a methodology, specific to FCS LBLOCA analyses dated September 30, 1991, and July 15, 1996, to perform safety analyses as a basis for FCS Core Operating Limit Report specifications. Use of an NRC approved methodology ensures that values of cycle-specific parameters are established consistent with all applicable limits of the plant safety analysis addressed in the Updated Safety Analysis Report. The licensee's use of WCAP-12610-P-A and WCAP-13027-P was approved with limitation as discussed in Section 2.1 of this safety evaluation. Therefore, the staff finds the reference to WCAP-12610-P-A, "VANTAGE + Fuel Assembly Report," June 1990, and WCAP-13027-P, "Westinghouse ECCS Evaluation Model for Analysis of CE-NSSS," July 1991, in TS 5.9.5 to be acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Nebraska State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 40026 and 61 FR 45995). This amendment also relates to changes in recordkeeping and reporting, accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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