



September 14, 1995

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Subject: Application for Amendment to Appendix A, Technical Specifications,
for:

Byron Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-37 and NPF-66
NRC Docket Nos. 50-454 and 50-455

Braidwood Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-72 and NPF-77
NRC Docket Nos. 50-456 and 50-457

"Fuel Assemblies"

Ladies and Gentlemen:

Pursuant to Title 10, Code of Federal Regulations, Part 50, Section 90 (10 CFR 50.90), Commonwealth Edison Company (ComEd) proposes to amend Appendix A, Technical Specifications, for Facility Operating Licenses NPF-37, NPF-66, NPF-72, and NPF-77 for Byron Nuclear Power Station, Units 1 and 2, and Braidwood Nuclear Power Station, Units 1 and 2, respectively. ComEd proposes to revise Technical Specification 5.3.1, Fuel Assemblies, to allow use of an alternate zirconium based fuel cladding, ZIRLO. Limited substitution of fuel rods by ZIRLO filler rods would also be permitted. Two editorial changes are also being proposed. The first is a proposed change to Specification 5.3.1 which clarifies that reload fuel shall be similar in physical design to the initial core loading or previous cycle loading. The second is a proposed change to Specification 5.4.1.a to refer to the Updated Final Safety Analysis Report (UFSAR), rather than the Final Safety Analysis Report (FSAR).

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The proposed changes in this license amendment request have been reviewed and approved by both On-site and Off-site Review in accordance with ComEd procedures. A detailed description and a safety analysis of the proposed changes are presented in Attachment A. The proposed changes to Appendix A, Technical Specifications, are presented in Attachment B-1 for Byron Nuclear Power Station, Units 1 and 2, and Attachment B-2 for Braidwood Nuclear Power Station, Units 1 and 2. ComEd has reviewed this proposed license amendment request in accordance with 10 CFR 50.92(c) and has determined that no significant hazards consideration exists. This evaluation is documented in Attachment C. An Environmental Assessment has been completed and is contained in Attachment D.

ComEd is notifying the State of Illinois of our application for this license amendment request by transmitting a copy of this letter and its attachments to the designated State Official.

ComEd requests that this license amendment request be processed as a Cost Beneficial Licensing Action (CBLA). Changing to ZIRLO cladding is the first phase of a transition to higher burnup fuel. Future core designs may feature longer cycles, higher capacity factors, and ultimately, higher discharge burnups. Using higher discharge burnup in the reactor core design reduces the number of fuel assemblies required per reload. ComEd will save money by paying less for fuel fabrication and by using less spent fuel storage space. In order to support the required fuel enrichment and burnups, ZIRLO cladding must be used to maintain fuel integrity. The transition cannot be made until all of the assemblies in the core have ZIRLO cladding and proper United States Nuclear Regulatory Commission (USNRC) approval of the remaining changes, such as increased discharge burnup limit, is obtained. The potential cost savings are expected to exceed \$500,000 per reload once the final phase is implemented.

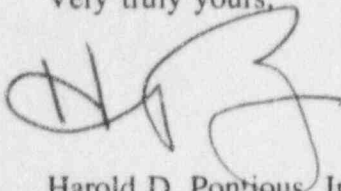
Furthermore, ComEd respectfully requests that the USNRC Staff review and approve this license amendment request no later than January 5, 1996, so that the amendment is in place prior to the receipt of new fuel with ZIRLO cladding.

To the best of my knowledge and belief, the statements contained in this document are true and correct. In some respects these statements are not based on my personal knowledge, but on information furnished by other ComEd employees, contractor employees, and/or consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

September 14, 1995

Please address any comments or questions regarding this matter to this office.

Very truly yours,



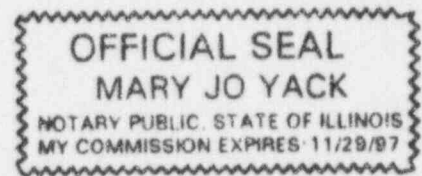
Harold D. Pontious, Jr.
Nuclear Licensing Administrator

- Attachment A: Description and Safety Analysis of the Proposed Changes
- Attachment B-1: Proposed Changes to Appendix A, Technical Specifications, for the Byron Nuclear Power Station, Units 1 and 2
- Attachment B-2: Proposed Changes to Appendix A, Technical Specifications, for the Braidwood Nuclear Power Station, Units 1 and 2
- Attachment C: Evaluation of Significant Hazards Considerations
- Attachment D: Environmental Assessment

- cc: H. J. Miller, Regional Administrator - RIII
 G. F. Dick Jr., Byron Project Manager - NRR
 R. R. Assa, Braidwood Project Manager - NRR
 H. Peterson, Senior Resident Inspector - Byron
 S. P. Ray, Acting Senior Resident Inspector - Braidwood
 Office of Nuclear Facility Safety - IDNS

Signed before me

on this 14th day of September, 1995



by Mary Jo Yack
Notary Public

ATTACHMENT A

DESCRIPTION AND SAFETY ANALYSIS OF PROPOSED CHANGES TO APPENDIX A, TECHNICAL SPECIFICATIONS, OF FACILITY OPERATING LICENSES NPF-37, NPF-66, NPF-72 AND NPF-77

Description of the Proposed Changes

Commonwealth Edison (ComEd) proposes to revise Technical Specification 5.3.1, Fuel Assemblies, to allow use of an alternate zirconium based fuel cladding, ZIRLO, for Byron and Braidwood. Limited substitution of fuel rods by ZIRLO filler rods would also be permitted. Editorial changes are also proposed. The marked up Technical Specification page for each station indicating the proposed changes is provided in Attachment B. A discussion of the proposed changes follows.

Description and Bases of the Current Requirement

Technical Specification 5.3.1 requires fuel rods to be clad with Zircaloy-4. Fuel rods may be substituted by filler rods consisting of Zircaloy-4 or stainless steel, or by vacancies if justified by a cycle specific reload analysis.

The fuel system is designed so that (a) the fuel system will not be damaged as a result of normal operation and anticipated operational occurrences, (b) fuel damage during postulated accidents would not be severe enough to prevent control rod insertion when it is required, and (c) core cooling will always be maintained, even after severe postulated accidents and thereby meets the related requirements of Title 10, Code of Federal Regulations, Part 50, Section 46 (10 CFR 50.46); 10 CFR 50, Appendix A, General Design Criteria 10, 27 and 35, 10 CFR 50, Appendix K; and 10 CFR 100.

Description and Bases of the Requested Revision

ComEd proposes to revise Technical Specification 5.3.1 to allow fuel rods to be clad with ZIRLO. The proposed change also allows fuel rods to be substituted by filler rods consisting of ZIRLO if justified by a cycle specific reload analysis.

The change is consistent with 10 CFR 50.44 and 10 CFR 50.46. The change is also consistent with NRC approved topical report, WCAP-13060, "Westinghouse Fuel Assembly Reconstitution Evaluation Methodology," which meets the intent of Supplement 1 of Generic Letter (GL) 90-02, "Alternative Requirements for Fuel Assemblies in the Design Section of Technical Specifications." NUREG-1431, "Standard Technical Specifications for Westinghouse Plants," specifically includes ZIRLO as an acceptable cladding material.

A proposed editorial change to Specification 5.3.1 clarifies that reload fuel shall be similar in physical design to the initial core loading or previous cycle loading. Specification 5.4.1.a is revised to reflect the Updated Final Safety Analysis Report (UFSAR), rather than the Final Safety Analysis Report (FSAR).

Impact of the Proposed Changes

In Federal Register Volume 57, Number 169, dated August 31, 1992, the United States Nuclear Regulatory Commission (USNRC) published amended regulations to reduce regulatory burden on nuclear licensees. The USNRC revised the acceptance criteria in 10 CFR 50.44 and 10 CFR 50.46 relating to evaluations of emergency core cooling systems and combustible gas control applicable to Zircaloy clad fuel to include ZIRLO clad fuel. ZIRLO is a preferred cladding material since it provides a significant improvement in corrosion margin and fuel integrity. The USNRC noted that the revision to include ZIRLO as an acceptable zirconium based cladding material along with Zircaloy will reduce the licensee burden but will not reduce the protection of the public health or safety. The change eliminates the need to obtain exemptions in order to use fuel cladding material not presently addressed in the regulations.

An analysis of the safety implications is provided in a USNRC letter to Westinghouse, dated July 1, 1991, "Acceptance for Referencing of Topical Report WCAP-12610, 'Vantage+ Fuel Assembly Reference Core Report' (TAC NO 77258)." The report supports the following conclusions:

- (1) The mechanical design bases and limits for the ZIRLO clad fuel assembly design are the same as those for the previously licensed Zircaloy-4 clad fuel assembly design, except those for clad corrosion.
- (2) The neutronic evaluations have shown that ZIRLO clad fuel nuclear design bases are satisfied and that key safety parameter limits are applicable. The nuclear design models and methods accurately describe the behavior of ZIRLO clad fuel.

- (3) The thermal and hydraulic design basis for the ZIRLO clad fuel is unchanged.
- (4) The methods and computer codes used in the analysis of the non-loss of coolant accident (LOCA) licensing basis events are valid for ZIRLO clad fuel, and all licensing basis criteria will be met.
- (5) The large break LOCA evaluation model was modified to reflect the behavior of the ZIRLO clad material during a loss of coolant accident. It is concluded that the revised evaluation model satisfies the intent of 10 CFR 50.46 and Appendix K of 10 CFR 50. There is no significant impact on typical large break LOCA analysis results for the ZIRLO model revisions.

In addition, bounding large break LOCA rod heatup cases were evaluated for Byron and Braidwood and all acceptance criteria were met, including those in 10 CFR 50.46. Adequate margin to the peak clad temperature limit of 2200 °F is maintained.

The effect of ZIRLO on a locked rotor transient at Byron and Braidwood is minimal since the licensing basis for this transient precludes fuel failure. That is, fuel failure is only assumed when departure from nucleate boiling (DNB) occurs. If fuel failure occurs, the effect of ZIRLO could be more prominent. The effect of ZIRLO need not be considered in the transient analysis since DNB will not be reached. Sensitivity analyses performed by Westinghouse demonstrate that the impact on peak cladding temperature and metal-to-water reaction on the locked rotor transient results is insignificant.

The rod control cluster assembly (RCCA) ejection event was analyzed at hot full power and hot zero power. The analysis demonstrated that any consequential damage to the core or the reactor coolant system would not prevent long term core cooling and that off site dose would remain within the guidelines of 10 CFR 100. WCAP-12610 includes results of sensitivity analyses performed by Westinghouse that demonstrate that the impact of ZIRLO on RCCA ejection event analyses results in an insignificant change in both the fraction of fuel melted at the hot spot as well as the peak fuel stored energy.

WCAP-13060 delineates the methodology used to evaluate applicable design criteria associated with reconstituted fuel assemblies that have solid filler rods replacing uranium filled fuel rods. Evaluations and analyses of fuel assembly reconstitution will be performed on a cycle specific basis whenever reconstituted fuel assemblies are used in the reactor core. The WCAP included proposed Technical Specification changes based on the conclusions in the WCAP and on the guidelines of GL 90-02.

Fuel configuration, size, enrichment and cladding material shall be limited to those designs that have been analyzed with applicable USNRC-approved codes and methods, and shown by test or cycle specific reload analyses to comply with all fuel safety design bases. The use of ZIRLO fuel cladding or filler rods will be justified by a cycle specific reload analysis, in accordance with USNRC approved applications of fuel rod configurations. The justification of the core analysis methods must address the effect on core-wide analyses of permissible core configurations with the reconstituted fuel.

Changing to ZIRLO cladding is the first phase of a transition to higher burnup fuel. Future core designs may feature longer cycles, higher capacity factors, and ultimately, higher discharge burnups. Using higher discharge burnup in the reactor core design reduces the number of fuel assemblies required per reload. ComEd will save money by paying less for fuel fabrication and by using less spent fuel storage space. In order to support the required fuel enrichment and burnups, ZIRLO cladding must be used to maintain fuel integrity. The transition cannot be made until all of the assemblies in the core have ZIRLO cladding and proper NRC approval of the remaining changes, such as increased discharge burnup limit, is obtained. The potential cost savings are expected to exceed \$500,000 per reload once the final phase is implemented.

Schedule Requirements

ComEd is planning to load fuel with ZIRLO cladding during the Braidwood Unit 2 Cycle 5 Refuel Outage (A2R05), and the Byron Unit 1 Cycle 7 Refuel Outage (B1R07), currently scheduled to begin on March 22, 1996, and March 29, 1996, respectively. Therefore, ComEd respectfully requests that the USNRC Staff review and approve this license amendment request no later than January 5, 1996, so that the amendment is in place prior to the receipt of new fuel with ZIRLO cladding.

Identification and Discussion of Any Irreversible Consequences

There were no irreversible consequences identified. The UFSAR will be revised to include ZIRLO fuel cladding.