Burnup Credit for LWR Fuel

REAFFIRMED

August 7, 2020

ANSI/ANS-8.27-2015 (R2020)

ANSI/ANS-8.27-2015

An American National Standard

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Burnup Credit for LWR Fuel

Secretariat
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American National Standard

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Foreword

(This foreword is not a part of American National Standard “Burnup Credit for LWR Fuel,” ANSI/ANS-8.27-2015.)

Burnup credit is a term commonly used to account for an overall negative reactivity effect resulting from irradiation. In order to apply burnup credit, there needs to be both supporting analyses and implementation steps (such as procedures, burnup assignments, and verification techniques).

Including burnup credit in the design and operation enables much improved flexibility (e.g., wider range of acceptable fuel) and efficiency (e.g., higher loading capacities), as compared to spent fuel system designs based on unirradiated fuel without credit for fixed burnable absorbers. These advantages have encouraged burnup credit to be applied in the nuclear criticality safety evaluation of storage, transportation, and disposal systems containing irradiated fuel. The scope of this standard is restricted to burnup credit for commercial light water reactor fuel applications.

Burnup credit requires evaluation of the effect of irradiation on the fuel composition, which increases the *computation* complexity. However, the negative reactivity determined through burnup credit may be used to reduce the *overall* complexity of maintaining criticality safety. Several American National Standards Institute/American Nuclear Society (ANSI/ANS) standards provide guidance that is relevant to burnup credit. This standard supplements the guidance given in those standards and provides requirements and recommendations for handling the unique issues associated with the implementation of burnup credit.

The 2015 revision to this standard was limited to two clarifications in the text of the standard. First, it clarified the combined validation approach given in Sec. 5.2 by adding a second paragraph which introduces a new term, Δk_d, which is an allowance for the bias and uncertainty in bias of the change in k with irradiation. Second, the 2015 revision makes it clear that the burnup uncertainty can be statistically combined with other uncertainties. In addition to these clarifications, an appendix on boiling water reactor pool burnup credit was added.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the reference section that provides guidance on the use of references.

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Contents

Section **Page**

Appendix