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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 15146.12-2017**

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**Nuclear criticality safety for fissile materials outside reactors -  
Part 12: Burnup credit for low water reactor( LWR) fuel**

反应堆外易裂变材料的核临界安全 第12部分：轻水堆燃料燃耗信用制

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## Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and definitions

### Foreword

"Nuclear criticality safety of fissile material outside reactor" has been or is planned to be released in 12 parts.

- GB 15146.1 Nuclear criticality safety of fissile material outside the reactor Part 1. Administrative provisions on nuclear criticality safety;
- GB 15146.2 nuclear criticality fissile material outside the reactor Part 2 of the fissile material handling, processing, processing Basic technical rules and subcritical limits;
- GB 15146.3 Nuclear criticality safety of fissile material outside the reactor Part 3. Nuclear criticality safety of fissile material storage Claim;
- GB 15146.4 nuclear critical fissile material outside the reactor safety fissile material containing aqueous steel pipe transfer of nuclear Critical safety guidelines;
- GB 15146.5 Nuclear criticality safety of fissile material outside the reactor Plutonium - Guidelines and critical nuclear control of natural uranium mixtures Critical limit
- GB/T 15146.6 nuclear criticality fissile material outside the reactor safety Part 6. Borosilicate glass Raschig ring and its Use criteria
- GB 15146.7 nuclear criticality fissile material outside the reactor sub-critical neutron proliferation in situ measurement safety requirements;
- GB 15146.8 Nuclear criticality safety of fissile material outside the reactor Part 8. Heap operation, storage, transportation Light water reactor combustion Nuclear Criticality Safety Guidelines
- GB/T 15146.9 fissile material outside the reactor nuclear criticality safety nuclear criticality detection and alarm system performance and Inspection requirements;
- GB 15146.10 nuclear criticality fissile material outside the reactor fixed neutron absorber safety requirements;
- GB/T 15146.11 nuclear criticality fissile material outside the reactor based on the limit and control of moderator nuclear criticality Safety;

--- GB/T 15146.12 Nuclear criticality safety of fissile material outside reactor - Part 12. Credit rating of light water reactor fuel burnup. This section is "Part 12 of the Nuclear Criticality Safety of Fissile Materials Outside Reactors". This part is proposed by China National Nuclear Corporation. This part of the National Nuclear Standardization Technical Committee (SAC/TC58) centralized. This part of the drafting unit. China Nuclear Power Engineering Co., Ltd., China Institute of Atomic Energy. The main drafters of this section. Huo Xiaodong, Zhu Qingfu, Yang Haifeng, Yi Xuan, Shao Zeng. Nuclear criticality safety of fissile material outside the reactor Part 12. Light water reactor fuel burn credit system

## 1 Scope

GB/T 15146.12-2017 is the Chinese national standard on nuclear criticality safety for fissile materials outside reactors - part 12: burnup credit for low water reactor( lwr) fuel, in the field of energy and heat transfer engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 31 July 2017 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 February 2018. Classification: ICS 27.120.30, CCS F09. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This part of the Nuclear Criticality Safety of Fissile Materials Outside Reactor provides for the storage and transport of uranyl dioxide fuel assemblies for commercial light water reactors Criteria for Consideration of Reactive Effects Caused by Fuel Irradiation and Radioactive Decay in Critical Safety Control. This section also presents the critical safety The inputs to the evaluation describe the fuel burnup requirements. This section applies to commercial light water reactor uranium dioxide fuel storage and transportation components. This section assumes that the fuel and any fixed combustible absorber are included in the complete module. In any way to decompose, reinforce, Damaged or reassembled fuel needs further analysis.

## 2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB 15146.1 Nuclear criticality safety of fissile material outside reactor Part 1. Administrative provisions on nuclear criticality safety

GB 15146.2 Nuclear criticality safety of fissile material outside the reactor Part

2 Basic fissile material handling, processing and handling Technical rules and subcritical limits

### 3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Combustible absorber burnable absorber A material added to a fuel assembly to control reactivity by absorbing neutrons, controls reactivity primarily at an early stage of the life of the fuel. along with Irradiation continued, the combustible absorber neutron absorption decreased. If the combustible absorber is an integral part of the fuel assembly (not removable Move), known as "fixed", otherwise known as "removable." This section refers to the combustible absorber unless otherwise specified, all means fixed Type

3.2 Flammable absorber credit system burnable absorber credit Consideration is given to the reduction of total reactivity caused by the presence of stationary combustible absorbers. As the fuel containing combustible absorber by irradiation in the life Initial reactivity may increase, and fuel burn analysis should be performed when believing flammable absorbers in post-irradiated fuel.

3.3 Burn burnup The energy released per unit mass of initial actinides (such as uranium and plutonium) in a region of a fuel assembly in that region, that is, Than the fuel consumption.