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

GB/T 14546-2025

Replacing GB/T 14546-2008

**Practice for the design of DC auxiliary power system for
nuclear power plants**

核电厂直流电力系统设计实施方法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. This document replaces GB/T 14546-2008 "Recommended Practice for Design of DC Power Systems in Nuclear Power Plants" and is in compliance with GB/T 14546-2008. In addition to structural adjustments and editorial changes, the main technical changes are as follows:

--- Changed the battery working cycle, battery maintenance and test requirements (see Chapter 5, Chapter 5 of the.2008 edition);

--- Added relevant requirements for battery expansion and modification and some installation design requirements (see 6.2);

--- Changed the calculation method of battery charger capacity (see 6.4, 6.2 of the.2008 edition);

--- Changed the requirements for battery charger output characteristics (see 6.7, 6.4 of the.2008 edition);

--- Changed the typical connection mode of DC power system (see 7.1, 7.2 of the.2008 edition);

--- Changed the description of factors affecting the short-circuit current of batteries and chargers (see 7.3,

7.8 of the.2008 edition);

--- Added the delay setting requirements for busbar low voltage alarm (see 8.3);

--- Added relevant requirements for electromagnetic interference and lightning overvoltage protection (see Chapter 9). Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Technical Committee for Standardization of Nuclear Instruments (SAC/TC30). This document was drafted by: Shanghai Nuclear Engineering Research and Design Institute Co., Ltd., East China Electric Power Design Institute Co., Ltd. of China Electric Power Engineering Consulting Group Limited Company. The main drafters of this document are. Gu Shenjie, Ni Dan, Jiang Songfang, Ye Yongjian, Huang Dongyan, Sun Hao, Lu Yanyun, Zhang Yi, Wang Sicong, Liu Xin, Wei Yuning and Li Xin. The previous versions of this document and the documents it replaces are as follows:

1 Scope

GB/T 14546-2025 is the Chinese national standard on practice for the design of dc auxiliary power system for nuclear power plants, 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 1 August 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 February 2026. Classification: ICS 27.120.20, CCS F 83. 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 document specifies the implementation method for the design of DC power systems for nuclear power plants. This document applies to the design of lead-acid batteries, static charging devices and DC power distribution equipment for DC power systems, including the number of equipment and type selection; determination of equipment ratings; interconnection; selection of instrumentation, control and protection, etc. This document does not apply to AC power supplies for charging devices and loads supplied by DC power systems (unless they affect the DC power system). design), nor is it suitable for locomotive-specific starting battery systems. If the following special application scenarios have independent batteries or uninterruptible power supply systems, they are not within the scope of this document.

- a) Engine (starting);
- b) emergency lighting;

c) fire detection and alarm;

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 3859 (all parts) General requirements for semiconductor converters and grid-commutated converters

GB/T 12727 Identification of electrical equipment important to safety in nuclear power plants

GB/T 13286 Criteria for the independence of safety-related electrical equipment and circuits in nuclear power plants

GB/T 15473 Quality Appraisal of Safety-Grade Static Charging Devices and Inverter Devices for Nuclear Power Plants

GB 50217 Design Standard for Power Engineering Cables NB/T.20028.1 Batteries for nuclear power plants Part

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 battery capacitybatterycapacity The usable ampere-hour capacity of the installed battery measured by test.

3.2 battery chargerbatterycharger Converts AC power into DC power, charges the battery and keeps it fully charged, and provides power to DC loads during normal operation.