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

GB/T 44080-2024

**Management specification of reliability, availability,
maintainability and safety (RAMS) for nuclear power plants**

核电厂可靠性、可用性、可维修性和安全管理规范

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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: 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 was proposed and coordinated by the National Nuclear Energy Standardization Technical Committee (SAC/TC58): This document was drafted by: Tsinghua University, Shanghai Nuclear Engineering Research and Design Institute Co., Ltd., China General Nuclear Power Engineering Co., Ltd., China National Nuclear Corporation Operation Service Technology Co., Ltd., China Nuclear Power Engineering Co., Ltd., Beijing Institute of Petrochemical Technology, China Nuclear Energy Technology Co., Ltd., Shenzhen Zhongguang Nuclear Engineering Design Co., Ltd., Nuclear Power Operation Research (Shanghai) Co., Ltd., and Nuclear Industry Standardization Institute: The main drafters of this document are: Li Zhizhong, Zhang Renyou, Hu Juntao, Duan Feng, Zhong Zhimin, Xu Zhixin, Yu Guangwei, Tian Xiufeng, Liu Zhaopeng, Tong Jiejuan, Liu Tao, Zhao Jun, She Manrong, Zhang Bing, Sun Feng, Wang Xin, Ling Shiqing, Du Dongxiao, Deng Ruiyuan, Wu Feifei, Liu Shangyuan:

This document divides the life cycle of a nuclear power plant into the following 5 major stages and 14 minor stages:

- a) Design: 1) Concept design (including site selection); 2) Definition and application conditions of nuclear power plants; 3) Risk analysis; 4) Determination of nuclear power plant demand; 5) Nuclear power plant demand allocation; 6) Detailed design:
- b) Construction: 1) Manufacturing; 2) Construction and installation:
- c) Debugging: 1) Nuclear power plant confirmation; 2) Acceptance inspection of nuclear power plants:
- d) Operation and supervision management: 1) Operation and maintenance; 2) Performance tracking; 3) Transformation:

e) Decommissioning: Decommissioning and final disposal: Based on the above stage division, this document provides the reliability, availability, maintainability and safety tasks of each stage of the nuclear power plant life cycle: Objectives, requirements, inputs, results and verification tasks provide guidance for the systematic management of the entire process of nuclear power plants, but also emphasize the operation of nuclear power plants: Based on the applicability of the contents of this document to specific nuclear power plants and taking into account the special needs of specific nuclear power plants, the unit shall evaluate how to apply it to specific In addition, the requirements of this document only involve reliability, availability, maintainability and safety, which need to be applicable in accordance with GB/T 19001: The required quality management system is implemented with the support of the required quality management system: Nuclear power plant reliability, availability, maintainability and Security Management Specifications

1 Scope

GB/T 44080-2024 is the Chinese management specification for reliability, availability, maintainability and safety in nuclear power plants. RAMS management is familiar from the railway sector, where EN 50126 established the approach; this document brings the same life cycle discipline to nuclear plant, where the four properties interact in ways that make treating them separately unsafe, since a maintainability decision taken in detailed design determines the outage time that determines the availability, and the risk analysis that justified the design has to be carried forward and revalidated at every later stage or it becomes a historical document. The standard sets the general RAMS requirements, the life cycle based management framework, and then the management specification for each stage of the life cycle in seventeen pages, giving for every stage the objectives, requirements, inputs, deliverables and verification tasks. Six informative annexes provide an example RAMS specification, a RAMS programme, examples of plant parameters, the RAMS tasks mapped onto each life cycle stage, the risk analysis and evaluation methods and examples of risk acceptance criteria. It applies to RAMS management at every stage of the nuclear power plant life cycle, from siting through decommissioning, and is written to sit within a quality management system meeting GB/T 19001.

This document specifies the implementation of a coherent whole process management of reliability, availability, maintainability and safety throughout the life cycle of a nuclear power plant: Methods and requirements: This document is applicable to RAMS management at all stages of the life cycle of nuclear power plants:

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 2900:

99 Credibility of electrical terminology HAF103-2022 Safety regulations for commissioning and operation of nuclear power plants

3 Terms and definitions

The terms and definitions defined in GB/T 2900:99 and the following apply to this document: 3:

1 Audit A systematic, independent, documented process for obtaining records, statements of fact, or other relevant information and evaluating them objectively to determine The extent to which specified needs are met: [Source: ISO /IEC TR29110-1:2016, 3:7] 3:

2 Hazard An essential quality or condition that may result in harm or destruction: [Source: ISO /IEC /IEEE24765:2017,3:1787-1] 3:

3 Hazard Log A document that records all safety management activities, hazards identified, decisions made, and solutions taken:

Note: Hazard logs are also called security logs: 3:

4 Mission Profile A description of the expected ranges and variations of parameters such as power, reactivity, temperature, pressure, flow, etc: during the mission of a nuclear power plant: 3:

5 Resource support All resources arranged and organized to operate and maintain a product at the required life cycle cost and specified availability level: