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

GB/T 31461-2024

**Guide for run back and fast cut back control in fossil fuel power
plants**

火力发电机组快速减负荷控制技术导则

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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 is required. This document replaces GB/T 31461-2015 "Technical Guidelines for Rapid Load Reduction Control of Thermal Power Generator Sets" and is consistent with GB/T 31461-2015. In addition to structural adjustments and editorial changes, the main technical changes are as follows: Added technical requirements for RB (see Chapter 4);

- a) Added RB dynamic test content (see 5.2.2);
- b) Added FCB design requirements (see 7.3);
- c) Added FCB dynamic test conditions (see 8.2.1);

d) The normative appendix was changed to an informative appendix, and the overall RB action/test status list of the unit was changed (see Appendix A, Appendix B, Appendix C, Appendix D, Appendix A, Appendix B, Appendix C, Appendix D of the.2015 edition).

e) 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 by the China Electricity Council. This document is under the jurisdiction of the National Power Plant Process Monitoring and Information Standardization Technical Committee (SAC/TC 376). This document was drafted by: North China Electric Power Research Institute Co., Ltd., Xi'an Thermal Engineering Research Institute Co., Ltd., State Grid Zhejiang Electric Power China Electric Power Research Institute Co., Ltd., China Energy Group New Energy Technology Research Institute Co., Ltd., Inner Mongolia Electric Power (Group) Co., Ltd. Inner Mongolia Electric Power Research Institute Branch, Rundian Energy Science and Technology Co., Ltd., China Southern Power Grid Electric Power Technology Co., Ltd., Shaanxi Yanchang Petroleum Fuxian Power Generation Co., Ltd., State Power Investment Group Inner Mongolia Energy Co., Ltd., State Power Investment Group Inner Mongolia Baiyinhua Coal Power Co., Ltd. The company's pit mouth power generation branch and State Energy Qingyuan Power Generation Co., Ltd. The main drafters of this document are. Yang Zhenyong, Li Weihua, Jia Qiangbang, Liu Lei, Gao Haidong, Zhang Qiusheng, Zhang Jiangfeng, Zhang Guobin, Kang Jingqiu, Xing Zhiwei, Chang Peng, Huang Weijian, Jin Guoqiang, Zhu Feng, Gao Ming, Yang Hui, Zhang Jianyu, Shi Libin, Shang Yong, Gao Mingshuai, Wang Li, Ma Le, You Mo, Chen Zhenshan, Lai Liankun, Wang Fuqiang, Zhang Jinzhe, Li Zhan, Ma Ning, and Ding Weicong. The previous versions of this document and the documents it replaces are as follows: First published in.2015 as GB/T 31461-2015; - This is the first revision. - Technical Guidelines for Rapid Load Reduction Control of Thermal Power Generator Sets

1 Scope

China's national guide to run back and fast cut back control for thermal generating units, and the current edition of GB/T 31461, replacing the 2015 edition. It specifies the technical requirements, the tests and the acceptance for both functions. Run back, abbreviated RB, is the automatic and rapid reduction of a unit's load when an important auxiliary fails - a feed pump, a fan, a mill, an air preheater. The unit cannot carry full load with the auxiliary lost, but it can carry a reduced load, and the alternative to reducing quickly is tripping. Fast cut back, abbreviated FCB, goes further: when the unit loses its connection to the grid entirely, FCB cuts the generation back to house load and keeps the unit running on its own auxiliaries, so that it can be resynchronised in minutes instead of restarted over hours. Both functions exist because a thermal unit is expensive to trip and slow to start, and because a trip removes hundreds of megawatts from the system in an instant, making a bad situation worse. Both are also difficult, because they demand a coordinated fast transient across boiler, turbine and every control loop, at exactly the moment when part of the plant has just

failed. The 2024 revision adds a chapter of technical requirements for RB, adds RB dynamic testing, adds FCB design requirements, and adds FCB dynamic test conditions. It also converts the four annexes from normative to informative and revises the unit action and test condition lists: the parameter recording tables and action lists are now guidance for the plant to adapt rather than fixed forms. Issued and in force from 24 July 2024.

This document specifies the technical requirements and acceptance contents of rapid load reduction control of coal-fired units in thermal power plants, and describes the corresponding test method. This document is applicable to coal-fired power generating units of 300 MW and above, and other types of thermal power generating units shall be implemented accordingly.

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. in this document.

GB/T 26863 Terminology of thermal power station monitoring system
DL/T 655 Acceptance test procedures for boiler furnace safety monitoring system in thermal power plants
DL/T 657 Acceptance test procedures for analog control systems in thermal power plants
DL/T 701 Terminology of thermal automation in thermal power plants

3 Terms and definitions

The terms and definitions defined in GB/T 26863 and DL/T 701 and the following apply to this document.

3.1 coordinated control When the load command of the unit changes, the boiler load command and the turbine load command are adjusted in a coordinated manner to make the actual power generation of the unit The rate changes as quickly as possible to track changes in load instructions while ensuring the stability of the unit. [Source: DL/T 701-2022, 4.20]

3.2 Analog control system modulation control system; MCS A general term for achieving automatic control of generator set and auxiliary system parameters.

Note. This type of system often includes automatic parameter control and deviation alarm functions. For the former, the output is a continuous function of the input. [Source: GB/T 26863-2022, 7.29]

3.3 Furnace safeguard supervisory system; FSSS Automatically control the ignition, burner, oil gun, air gun or bed gun of the boiler (including atmospheric pressure circulating fluidized

bed) to prevent the boiler from Monitoring and control measures for furnace explosion or implosion caused by flameout, overpressure, etc. (including atmospheric pressure circulating fluidized bed) control system. NOTE

1 It includes the fuel safety system and the burner control system. Note

2.For pulverized coal (or oil, gas) boilers, it is sometimes also called burner management system (BMS). [Source: GB/T 26863-2022, 8.6]