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

GB/T 28550-2012

**Piping verification requirements during nuclear power plant
commissioning**

核电厂调试阶段管道验证要求

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Quarantine;
Standardization Administration of the PRC**

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. This standard is in the research and concluded on the basis of domestic nuclear power plant commissioning stage of the pipeline proven practical experience, reference power conduit ASMEB31 nuclear power plants and pipeline systems in the pre-running and vibration tests during initial startup requirements ASMEOM-S/G-2000 PART3 the relevant content and preparation. This standard is proposed and managed by the China Electricity Council. This standard was drafted. Suzhou Thermal Power Research Institute Co., Ltd., China Guangdong Nuclear Power Engineering Co., Ltd., Zhejiang Electric Power Test & Research Institute, Guangdong Electric Network Power Research Institute, Sichuan power industry adjustment tests. The main drafters of this standard. Young Oriental, Liu Yong, Yu Yang, Pan Guoqing, Chen Tiansheng, Masayuki Yan, Han Aimin, Chen Xiaowei, Sunquan Rong, YANG Yan bamboo. Nuclear power plant commissioning stage pipeline verification request

1 Scope

China's national standard for verifying nuclear piping during the commissioning of a nuclear power plant. It specifies the methods and requirements for the verification of the piping of a pressurised water reactor during the commissioning period, and it applies to the piping verification carried out during the pre-operational test phase of a nuclear island; non-pressurised water reactor plants may apply it by reference. The standard was prepared on the basis of practical experience from the commissioning of Chinese nuclear plants, with reference to the requirements for pre-operational and initial start-up vibration testing of power piping in ASME B31 and in ASME OM-S/G-2000 Part 3. Piping verification asks two questions that cannot be answered on paper. The first is thermal: does the pipe expand where the analysis said it would, and does it come back. The second is dynamic: does the pipe vibrate. Vibration is the one that surprises people, because it does not appear in a stress analysis of a static system and it is created by the flow the plant has never had before. A pump running, a valve throttling, a two-phase flow, a relief line discharging, a check valve slamming - each of those puts an oscillating load into a pipe that was designed for a steady one, and a line that vibrates fails by fatigue in months or years rather than failing at commissioning. So the verification is done while the plant is being brought up for

the first time, with the pipe accessible and the system clean: displacements are measured against the predicted values, the pipe is observed and instrumented during transients, and the vibration is measured and judged against criteria. A line that fails is modified while modification is still cheap. Issued on 29 June 2012 and in force since 1 November 2012.

This standard specifies the period PWR nuclear power plant commissioning a nuclear piping circuit verification methods and requirements. This standard applies to pipes verification of PWR nuclear islands pre-operational test phase, non-pressurized water reactor nuclear power plant can be implemented by reference.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 28548 nuclear factory owner loop hydrostatic test technical guidelines

GB/T 28549 Nuclear Island nuclear power plant commissioning stage pipeline and master branch hanging device verification request DL/T 1103-2009 nuclear power plant piping vibration test and evaluation

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Nuclear grade pipe nuclearpipe Nuclear safety-related piping, including the Nuclear Safety Class 1, Class 2 nuclear safety, nuclear safety level 3 pipeline.

3.2 Reactor coolant main pipe reactorcoolantmainpipe Connecting pipe reactor pressure vessel, steam generator and reactor coolant pump between, constitute a primary circuit pressure boundary Points, referred to as the main channel, is the Nuclear Safety Class 1 equipment.

3.3 Static exhaust gravityvent Piping and equipment with water, the air is discharged by gravity process.

3.4 Dynamic exhaust dynamicalvent With the power equipment (pumps), lines and equipment in the water cycle, air is discharged from the process.

3.5 Cold function test coolfunctionaltest Nuclear fuel each function tests prior to loading on a primary coolant system at normal temperature conditions carried out.

3.6 Hot function test hotfunctionaltest Prior to loading nuclear fuel for the reactor primary coolant system temperature and pressure to operating conditions the function of the thermal shutdown carried out test.