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ENERGY INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

NB/T 20358.15-2021

Budget quotas of nuclear power plant construction project works - Part 15: Assembly and installation of module and steel containment vessel

核电厂建设工程预算定额 第15部分：模块及钢制安全壳拼装和安装

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Foreword

This document was issued on 7 January 2021 by the National Energy Administration of the PRC and takes effect on 1 July 2021.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 01.040.27, Chinese classification F 02.

This document has been drafted in accordance with the rules given in GB/T 1.1-2020 Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

This document is Part 15 of NB/T 20358 Budget quotas of nuclear power plant construction project works. The following parts of NB/T 20358 have already been issued:

- Part 1: Civil works of the nuclear island;

- Part 2: Finishing works of the nuclear island;

- Part 3: Steel structure works of the nuclear island;

- Part 4: Mechanical equipment installation works of the nuclear island;

- Part 5: Piping installation works of the nuclear island;

- Part 6: Ventilation and air conditioning works of the nuclear island;

- Part 7: Electrical equipment installation works of the nuclear island;

- Part 8: Automatic control instrumentation installation works of the nuclear island;

- Part 9: Communication equipment installation works of the nuclear island;

- Part 10: Sand blasting, anticorrosion and thermal insulation works of the nuclear island;

- Part 11: Civil works of the conventional island;

- Part 12: Thermal equipment installation works of the conventional island;

- Part 13: Electrical equipment installation works of the conventional island;

- Part 14: Fabrication of modules and of the steel containment vessel;

- Part 15: Assembly and installation of modules and of the steel containment vessel.

This document was proposed by the Nuclear Power Standardization Technical Committee of the energy industry.

This document is under the jurisdiction of the Nuclear Industry Standardization Research Institute.

The main drafting organizations of this document are: State Nuclear Power Technology Corporation Ltd., Shanghai Nuclear Engineering Research and Design Institute, Electric Power Planning and Engineering Institute, China Nuclear Industry Construction Group Co., Ltd., Shandong Nuclear Power Equipment Manufacturing Co., Ltd., Zhejiang Thermal Power Construction Co., Ltd. of China Energy Engineering Group, Guodian Nuclear Power Engineering Co., Ltd., China Nuclear Power Engineering Co., Ltd. and CGN Nuclear Engineering Co., Ltd.

The main drafters of this document are: Zheng Baozhong, Zhang Jian, Lu Chunhua, Wang Chuanxiang, Sun Quanpao, Xie Jianxun, Zhang Li, Luo Haitao, Hu Jiawei, Li Peizhe, Gao Zhineng, Zhao Lu, Yang Xiaolong, Fang Qing, Xuan Hongfu, Xu Xueping and Wang Mo.

This document is issued by the National Energy Administration and is a recommended standard of the energy industry of the People's Republic of China.

This part belongs to the same quota family as Part 14, which covers the shop fabrication of modules and of the steel containment vessel, whereas this part covers their assembly and erection on site.

1 Scope

NB/T 20358.15-2021 is Part 15 of the Chinese budget quota series for nuclear power plant construction. It prices the work of assembling and installing structural modules and the steel containment vessel - the shop-fabricated sub-assemblies and the containment rings, heads and penetrations that are welded together on site and lifted into the reactor building. A budget quota is not a technical specification: it is the official book of unit rates that tells an estimator how much labour, machinery and consumable material a defined unit of work consumes. This part covers module receipt and pre-assembly on the laydown area,

sub-module joining, containment vessel course assembly, welding and weld inspection, dimensional survey and adjustment, heavy lifting by very large crawler crane, positioning and temporary bracing, surface preparation and coating, and the scaffolding and temporary works that go with them. Each quota item states the work content it includes, the unit it is measured in, the labour hours by trade, the machine-shift consumption by equipment type, and the material quantities. The general explanation at the front of the volume sets out how the quotas are applied, what is and is not included in each rate, the adjustment coefficients for working conditions, and the rules for measuring quantities. It is used by owners, contractors and cost consultants to prepare budget estimates, tender prices and cost control baselines for nuclear power projects in China, and by reviewers to check that a submitted price is defensible.

This quota specifies the quotas, within the budget quotas of nuclear power plant construction project works, for the assembly and installation of modules and of the steel containment vessel.

This quota is applicable to the projects related to the assembly and installation of structural modules, mechanical modules and the steel containment vessel of AP/CAP1000 series nuclear power plants. It may be used for reference for other nuclear power reactor types and nuclear engineering works.

2 General provisions

2.1 This quota shall be implemented together with the Cost quotas of civil and installation works of the nuclear island of nuclear power plant construction project works and the Cost quotas of construction machinery shift of nuclear power plant construction project works.

2.2 This quota is the basis for preparing construction drawing budgets, for making project payments and final accounts on completion, for tendering and bidding, and for pricing bills of quantities; it is also the basis for preparing preliminary estimate quotas.

2.3 This quota has been compiled, under normal natural and environmental conditions, on the basis of the construction organization design and the construction machinery provision that are reasonable at the present stage, taking into account reasonable cross-operation, as well as the relevant technical standards of AP/CAP series nuclear power plants, the construction and acceptance specifications, the quality outline and safe operating procedures, and the requirements for civilized and safe construction and for environmental protection on the construction site.

2.4 The consumption of labour, materials and construction machinery in this quota reflects the technical and organizational level of nuclear power plant construction at the present stage. Except where adjustment is expressly permitted by the quota, the quota shall not be adjusted because the construction organization, the working methods or the material losses of a given project differ from those assumed.

2.5 The determination of the labour cost of this quota is specified as follows:

a) The labour day of this quota is expressed as a composite labour day, without distinction of trade or skill grade, and each composite labour day is based on an eight-hour working system;

b) The composite unit price of this quota is applied at a labour cost of 135 yuan per labour day for production workers, which includes the basic wage, wage-related allowances, auxiliary wages, employee welfare expenses and labour protection expenses.

2.6 The determination of the material consumption of this quota is specified as follows:

a) The materials (semi-finished products and finished products) in this quota are considered as conforming products, meeting the quality standards and the design requirements and provided with certificates of conformity and test records;

b) The quantities of materials (semi-finished products and finished products) in this quota already include the losses for transport within the site, the losses arising from construction operations and the losses arising from stacking on the construction site;

c) Revolving (reusable) materials in this quota are listed on the basis of the amount apportioned per turnover;

d) Sundry materials of small quantity and low value are combined in this quota under the item 'other material costs' and are expressed in yuan;

e) Material costs are calculated uniformly on the basis of the material warehouse prices, the material miscellaneous transport expenses, transport loss expenses and procurement and custody fee rate amounting in total to 2.5 percent.

2.7 The determination of the construction machinery consumption of this quota is specified as follows:

a) The types and specifications of the construction machinery in this quota have been determined comprehensively on the basis of normal construction and reasonable provision, in combination with the machinery equipment situation of nuclear industry construction enterprises; during implementation, except where the quota provides otherwise or where the design imposes special requirements, the quota shall not be adjusted at will because the machinery actually used differs from that assumed in the quota;

b) The apportioned cost of small machinery is combined in the quota under the item 'other machinery costs' and is expressed in yuan;

c) The quota already includes the labour and machinery consumption required for the horizontal and vertical transport of materials, semi-finished products and finished products from the site warehouse, the site stacking area or the site processing area to the point of operation;