

Status of Recent Developments in the Technical Standards of Japan

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1. Introduction

Japan has systematically revamped its technical standards for nuclear reactor facilities by formulating various performance regulations. Being part of a trend toward deregulation, such efforts toward social regulation is aimed at effectively operating administrative procedural laws to keep pace with global trends and enhance the benefits of deregulation under the principle of self-responsibility.

Based on the collection of public opinions in February and March 2005, the Nuclear and Industrial Safety Agency(NISA) presented its position that it was required to promptly perform a flexible assessment of the technical feasibility of formulated society and association standards.

Current, pressing issues are summarized as an early revision of technical standards regarding nuclear facilities for power generation, use of society and association standards, and the overhaul of nuclear safety regulations subject to performance regulations. Subjecting technical standards to performance regulations means stipulating the qualitative aspects of performance and the targets that certain facilities must achieve, which are not specific standards, but general compulsory standards.

This study examines the early revision of technical standards on nuclear facilities for power generation and the status of the use of society and association standards, as well as introducing the details of revisions in the concrete containment vessel standards as specific examples.

2. Revision of Technical Standards regarding Nuclear Facilities for Power Generation and Use of Society and Association Standards

2.1 Revision of Technical Standards

Systematic efforts to establish technical standards in the form of performance regulations are directed toward overhauling the existing system of public notifications and using industrial standards. The basic direction toward that end includes issuance of relevant public announcements in the form of performance regulations, attainment of consistency between safety design examination guidelines and IAEA safety standards, reflection of new technologies of both domestic and overseas origin, and clarification of the regulations. At the same time, industrial standards should be widely applied by reflecting technical assessment of the industrial standards in lieu of public notifications, technical assessment of industrial standards whose

application is being acknowledged in fact, and demand for the formulation of industrial standards. In other words, the relevant processes comprise cooperation with academic societies and associations, implementation of technical assessment and use of regulations.

The existing technical standards, which are technical standards for nuclear facilities for power generation (Ministry Ordinance No. 62) and sub-public notifications, comprised technical standards for radiation dose equivalent (Public Notification No. 188), technical standards for structures, etc. (Public Notification No. 501), technical standards for concrete containments (Public Notification No. 452) and technical standards for welding (Ministry Ordinance No. 123). In an effort to transform these standards into performance regulations, Public Notifications No. 501, No. 452 and No. 123 were abolished on the basis of Ministry Ordinance No. 62 to ensure the use of industrial standards in accordance with NISA documents (administrative documents of the Nuclear and Industrial Safety Agency of the Ministry of Economy, Trade and Industry) and administrative procedural law examination standards. Among the industrial standards are the design and construction standards, concrete containment standards, maintenance standards and welding standards of the Japan Society Mechanical Engineering, technical codes and guidelines of the Japan Electric Association (JEAC and JEAG), standards of the Atomic Energy Society of Japan, and standards of other academic societies and associations.

On July 1, 2005, the technical standards for nuclear facilities were revised to take the form of performance regulations, with January 1, 2006 as the enforcement date.

2.2 Use of Society and Association Standards

It is required to follow certain procedures to acknowledge these standards into regulation. That is, the NISA prepares a draft of a written technical assessment, collects the opinions of relevant deliberative bodies, and takes into account public opinion. Then, such written technical assessment is promulgated to warrant its regulatory stature. Relevant matters of confirmation include maintenance of the fairness and openness of the standard formulation procedures, satisfaction of the performance item and scope requirements as required under technical standards or laws, clarification of detailed methods and specifications regarding technical matters necessary to achieve performance as required under the technical standards or laws, and specific feasibility verification regarding matters represented in industrial standards.

In the case of containment standards, standards are issued based on approval by the relevant subcommittees of JSME, specialized nuclear committee and power generation facility standards committee. Members of each committee comprise personnel from reactor manufacturers, electric businesses, constructors, public agencies concerned and academic experts.

Assessment of the technical standards regarding nuclear facilities for power generation and a feasibility review of industrial standards are under the control of the Japan Nuclear Energy Safety Organization. A feasibility review of the revision of technical standards or the use of industrial standards is being reviewed by a deliberative body within the Ministry of Economy, Trade and Industry (Nuclear Safety and Security Group of the General Resources and Energy Investigation Committee).

3. Technical Evaluation of Concrete Containment Vessel Standards

Revision of concrete containment vessel (CCV) standards is presented below as an example of a revision of technical standards. It represents the supplementation of the technical standards under Ministry Ordinance No. 62 and revision of the performance requirements in the specification regulations under Public Notification No. 452 based on its reflection in said Ministry Ordinance. In such case, since the technical standards in the form of performance regulations are based on Public Notification No. 452, consistency between the scope of requirements under the CCV standards and Public Notification No. 452 needs to be reviewed. A comparative review indicates that the CCV standards encompass Public Notification No. 452.

Some disparities with Public Notification No. 452 are separately classified. What counts here includes adequacy of stipulations, citation of design construction standards, reflection of operational performance, reflection of the latest updates of the criteria and standards that serve as the basis of Public Notification No. 452, and reflection of the results of domestic and overseas research and latest data.

(Current Status)

Article 9 of the technical standards (Ministry Ordinance No. 62)

The materials and structure of containments, piping, major pumps or major valves that are installed in nuclear reactor facilities (excluding compressors and boilers), or major structures that support the foregoing, or structures that support fuel bundles within reactor pressure vessels shall meet the standards that are respectively announced according to each category.

(Formulation of Performance Regulations)

Subparagraphs 6 and 13 of Article 9

6. The materials used in the concrete part and tensile part of concrete reactor containments shall be as follows:

a) As regards concrete, it shall possess an adequate level of compression strength in accordance with the conditions such as pressure, temperature and load of the use of the relevant reactor containments.

13. The structure and strength of concrete reactor containments shall be as follows:

a) As regards concrete, destruction by compression shall not occur under load condition I, load condition II and load condition III, and concrete reactor containments shall not sustain destruction by compression that reaches the level of major plastic deformation under load condition IV.

As described above, the result of technical assessment of CCV standards attests to specific reflection of the latest standards of the Architectural Institute of Japan, etc. as well as relevant test results. It also indicates that technical rationale was verified, that any possible problems with its application to nuclear power plants were examined, and that its technical feasibility was confirmed.

4. Conclusion

This study introduces the recent trend in Japan to formulate technical standards for nuclear reactor facilities in the form of performance regulations. This is aimed at expediting deregulation and enhancing efficiency. In the past, industrial standards were established by public notifications. Currently, however, the country is in the process of revising the Ministry Ordinances for formulation of such standards in the form of performance regulations and encouraging the use of industrial standards in NISA documents, improving the flexibility of regulations and autonomy of the nuclear industry.

This study analyzes the status of development of the relevant Ministry Ordinances, public notifications and industrial standards, which is expected to provide beneficial reference materials for our nation's development of technical standards and the use of electric power industry codes.

REFERENCES

- [1] Technical standards for nuclear facilities for power generation (Ministry of Economy, Trade and Industry Ordinance No.62)
- [2] Technical standards for the structure, etc. of nuclear facilities for power generation (Ministry of Economy, Trade and Industry Public Notification No. 501)
- [3] Annotated technical standards on nuclear facilities for power generation
- [4] NISA homepage <http://www.nisa.meti.go.jp>