

International Trends and Practices on IAEA GSR Part 2

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1. Introduction

The IAEA published new safety requirements publication, GSR Part 2 in June 2016 to supersede GS-R-3 on the Management Systems for Facilities and Activities. Through this, the IAEA has completed a series of seven General Safety Requirement. [1] [2]

GSR Part 2 develops the concepts of the publication of 2006 and takes into account lessons drawn from experience in events that have occurred. Experience from Member States in developing, applying, sustaining and improving management systems was taken into account in the development of this safety standard.

GSR Part 2 was issued for the application of the Safety Principle (SF-1), which establishes requirements for effective leadership for safety and effective management for safety, and to achieve safety and a strong safety culture as continuous performance excellence in management practice.[3]

GSR Part 2 consists of three main factors : safety culture, leadership for safety, management system. These three factors are closely related to achieving nuclear safety. The safety culture is the goal of the management system, and the management system can be utilized as a tool to strengthen the safety culture. In addition, strong leadership can be very helpful in establishing a safety culture, and the management system is one of the tools for leadership.

In this paper the evolution, outline and related international trends of GSR Part 2 are introduced, and the management system example applying GSR Part 2 are described.

2. Overview of GSR Part 2

In this section the evolution history, detailed contents and development direction of sub-guides on GSR Part 2 are described.

2.1 Evolution of GSR Part 2

The beginning of GSR Part 2 is the IAEA Safety Series No.50-C-QA. In 1978, the IAEA published the Safety Series 50-C-QA, 'Quality Assurance for the Safety of Nuclear Power Plants', through Nuclear Safety Standards Program (NUSS). The Safety Series 50-C-QA was revised to the Safety Series 50-C/SG-Q, 'Quality Assurance of the Safety of Nuclear Power Plants and Facilities' in 1996, which to ensure that quality and regulatory requirements are met. Through

this, the concept of the Quality Management, which managed the organization's processes for continuous improvement, was introduced. The 50-C/SG-Q consisted of 10 codes and 14 safety guides. The safety guides Q1 to Q7 of 50-C-Q were general recommendations and the safety guides Q8 to Q14 of 50-C-Q were specific recommendations for nuclear facilities.

Since then, IAEA had supplemented the new materials with 50-C/SG-Q by referring to the contents of ISO 9001, the international standardization organization's quality management system standard, and ISO 14001, the environmental management system standard. Through these activities GS-R-3 which titled 'the Management System for facilities and activities' was developed. The 50-C-Q code was replaced by GS-R-3, and Q1 to Q7 of the Safety Guides 50-SG-Q were replaced by GS-G-3.1 and Q8 to 14 were replaced by GS-G-3.5 respectively. The existing concept of quality management in 50-C/SG-Q evolved into a new concept of integrated management system in GS-R-3 that manages the organization's overall objectives, including safety, quality, health, environment, and economy.

In 2016, GSR Part 2 was issued reflecting the lessons learned from experience in subsequent events and developing the concept of GS-R-3.

2.2 Objective and requirements of GSR Part 2

GSR Part 2 is one of seven general safety requirements issued by the IAEA. Basically, GSR Part 2 is issued to satisfy the fundamental safety principles, and in particular Principle 3, which states that "Effective leadership and management for safety must be established and sustained in organizations concerned with, and facilities and activities that give rise to, radiation risks." In other words, GSR Part 2 defines the requirements that (1) leadership for safety, (2) management for safety, (3) an integrated management system and a systemic approach are applied. The main objective of GSR Part 2 is to foster a strong safety culture within the organization through the fulfillment of these requirements. Another objective is to provide the requirements to support the "Prevention of accidents" (SF-1), "All practical efforts should be made to prevent and mitigate nuclear or radiation accidents."

To support these safety principles, GSR Part 2 consists of 14 requirements. There are two main concepts: (1) leadership for safety; and (2) management for safety. About Leadership for safety, Requirement 2 emphasizes that Managers shall demonstrate leadership

for safety and commitment to safety. About Management for safety, there are two components: safety culture and management system. Requirements 12 and 14 are for safety culture and Requirements 3 to 11 and 13 are for management system. GSR Part 2 emphasizes that not one is important for safety, but that all of leadership, safety culture, and management system should be harmonized and operated.

The safety mentioned in GSR Part 2 includes both the protection of humans and environments against radiation hazards and the safety of facilities and activities that give rise to radiation hazards. Therefore, GSR Part 2 can apply to all nuclear facilities and activities, including operators, suppliers and regulators.

In addition, it emphasize that regulatory bodies and other governmental organizations need to apply the requirements appropriately according to the organization's role. As a result, the management systems have been established and operated in accordance with GSR Part 2 in various countries around the world. KINS has also established and operated its management system from 2015.

2.3 Development directions of sub-guides related to GSR Part 2

GS-G-3.1 (Application of Management System for Facilities and Activities) and GS-G-3.5 (Management System for Nuclear Facilities) are currently being used effectively as safety guides related to GSR Part 2.

These two safety guides are linked to the existing GS-R-3. Some detailed aspects of requirements were taken out of GS-R-3 and asked to be placed in the guidance to GSR part 2. Therefore the newly developed safety guide for GSR Part 2 is required to reflect the contents of two existing safety guides. Since the publication of GSR Part 2, the IAEA has begun to develop new safety guides for practical application and has been collecting application examples and opinions from each country through various channels such as IAEA technical meetings.

Another development direction of the sub-guides is to integrate two guides into a single guide for GSR Part 2 and to develop them in order to fully observe the requirements of GSR Part 2. According to this direction new safety guide will be divided into four chapters in single guide, and each chapter will be classified as follows.[4]

- *Chapter 1*: Guide on generic requirements of GSR Part 2 (IMS, graded approach, safety and security interface : Generic requirements embedded in all standards)
- *Chapter 2*: Leadership and culture for safety (Role of leadership for safety, fostering of a strong safety culture: Requirements 1, 2, 12 of GSR Part 2)
- *Chapter 3*: Management for Safety (Management Responsibility, Management System, Resource

Management, Processes implementation : Requirements 3 ~ 11 of GSR Part 2)

- *Chapter 4*: Measurement, assessment and improvement (management system, leadership and culture for safety : requirements 13 and 14)

As the level and needs of each country are varied and enormous in relation to new guide, it will take considerable time to choose and review the content to be included in the new guides. The IAEA Secretariat will receive the DPP (Document Preparation Profile) approval in 2018 and develop the guide in earnest.

3. Application examples of GSR Part 2 (especially, management system in regulatory body)

3.1 Overseas Nuclear Regulatory Body

In many countries around the world, regulators as well as operators have adopted management systems as a means of ensuring safety in their nuclear industry. The effectiveness and efficiency of Operators' management system are reviewed through Peer Review (e.g, WANO review, IAEA OSART, etc.). Regulatory bodies are also checked for the efficiency and effectiveness of their management systems through the IRRS. The application of management system enables to minimize the influence of our work on nuclear safety by reducing the deviation of work.

1) Canada CNSC

CNSC established the management system manual in 2004 for the first time, and has used until now by several amendments.[5] CNSC categorized into core processes, management processes, and enabling processes, and each process is defined as sub-processes and activities. The core processes relate to regulatory framework management, licensing and certification management, and regulatory compliance. The management process is the process to determine and manage the operational direction of the organization, and the enabling process is the process relating to the operation of the organization, such as resource management.

The documentation hierarchy of management system consists of three levels: the 1) management system manual, 2) process documentation, 3) procedure and guidelines.

The Harmonized Plan for Improvement Initiatives has been established and improved to improve the processes and programs of the CNSC. CNSC refers to IAEA safety standards for nuclear regulation and Treasury Board Secretariat's Management Accountability Framework for general management.

In addition, CNSC regularly improves its management system through self-assessment, formal and informal assessment by third parties, and reflection of domestic and overseas operating experience.

Through these efforts, CNSC is committed to strengthening its safety culture.

2) Europe - France ASN

Regulatory bodies in most countries of Europe have established and operate management systems even without nuclear facilities. The management system of European countries is operated according to both ISO9001 and IAEA Safety Standard. Thus, management systems of each country operate in a similar way. In here, the case of France is described representatively.[6]

The management system of the French Nuclear Safety Authority (ASN) is developed and operated in accordance with ASN internal rules approved by the ministry of ecology and supported by the ASN committee. Through this process the importance of establishing and operating the management system was emphasized and the application of management system became mandatory. In addition, the European Union (EU) calls for the implementation of a management system for regulatory bodies to foster and strengthen the safety culture through chapter 8 of Directive 2014/87 / EURATOM. To meet these requirements, ASN established a management system by referring to both IAEA's GS-R-3 and ISO 9001, ISO's quality management system standard.

ASN's management system is (1) complying with legal and regulatory provisions, and (2) regularly revising policy and quality objectives. (3) And it reflects their needs through communication with stakeholders, and (4) explains the management system process through related documents and records. (5) ASN's information systems are being used to execute core processes.

ASN's management system process is consists of 12 main processes, which are 5 core processes, 4 management processes and 3 support processes.

The document system for implementing these management system processes consists of four levels: quality policy - process map - procedures - auxiliary documents for tasks in compliance with the requirements of GS-R-3 and ISO 9001. All documents are maintained and available in ASN's information system.

ASN also conducts various evaluations to continuously improve the management system. (1) ASN verifies the suitability of the management system manual, organization and organization management by self-assessment, and (2) conducts internal quality audits every four years with an assessment team composed of internal experts. (3) ASN also receives peer review from the IAEA every 10 years to verify the validity of the management system. (4) ASN collects improvement requests through feedback sheets and improvement sheets, and improve the management system.

3.2 Experience of management system at KINS

KINS introduced its first Quality Management Program in December 2001 in accordance with IAEA TECDOC-1090 entitled "Quality Assurance within Regulatory Bodies" published in June 1999. KINS has already prepared and operated a quality management program to improve the quality of regulatory works, but it is not enough to meet the safety standards of IAEA focused on nuclear safety.[7]

KINS made the transition from the Quality Management Program to the Integrated Management System and changed the title of its management system manual from the Nuclear Safety Regulation Quality Management System Manual into the Management System Manual as recommended in the report by the IAEA Integrated Regulatory Review Service (IRRS) Mission in 2011. The management system of KINS was established reflecting the characteristics of the management system required by GSR Part 2. For example, in accordance with the requirement 6 of GSR Part 2 on the integration of the management system, it was established to include safety, health, environment, security, quality, human and organizational factors. It also applied the process approach in accordance with Requirement 10 and periodically evaluates / improves the management system in accordance with Requirement 13. Since 2015, KINS management system has been assessed by self-assessment, independent assess and management review for continuous improvement.

4. Implication

The objective of GSR Part 2 is to achieve safety goals through the implementation of management systems and to strengthen the safety culture. The existing GS-R-3 was a requirement only for the management system for nuclear safety, but GSR Part 2 expanded its area of application to emphasize leadership and safety culture for safety as well as management system. Also, Management system, safety culture, and leadership could not be separated because they have complementary relationships that affect each other. Therefore, it is essential not only to minimize the influence of our work on nuclear safety by enhancing the effectiveness and efficiency of the management system, but also to utilize the management system as a tool to strengthen our leadership and safety culture. GSR Part 2 also empathize that need to assess and improve leadership and safety culture, therefore it is necessary to consider how assess and improve leadership and safety culture.

REFERENCES

[1] Leadership and Management for safety, GSR Part 2, IAEA, 2016.

- [2] The Management System for facilities and activities, GS-R-3, IAEA, 2006.
- [3] Fundamental Safety Principles, SF-1, IAEA, 2006.
- [4] Developing Guidance for GSR Part 2, IAEA Technical Meeting to review and revise IAEA Safety Guides and Related Reports on Leadership Management for safety and Safety Culture, IAEA, Vienna, 10-12 July 2017.
- [5] Management System Manual regulating for Safety (revision 4), CNSC, February 2017.
- [6] ASN Management System, Training course on Oversight of Safety Culture and Management Systems, ENSTTI, Brussels, 18-22 April 2016.
- [7] KINS Management System Manual, KINS, 2016.