

CONSIDERATION OF A REGULATORY FRAMEWORK FOR SAFEGUARDS IN SMRS

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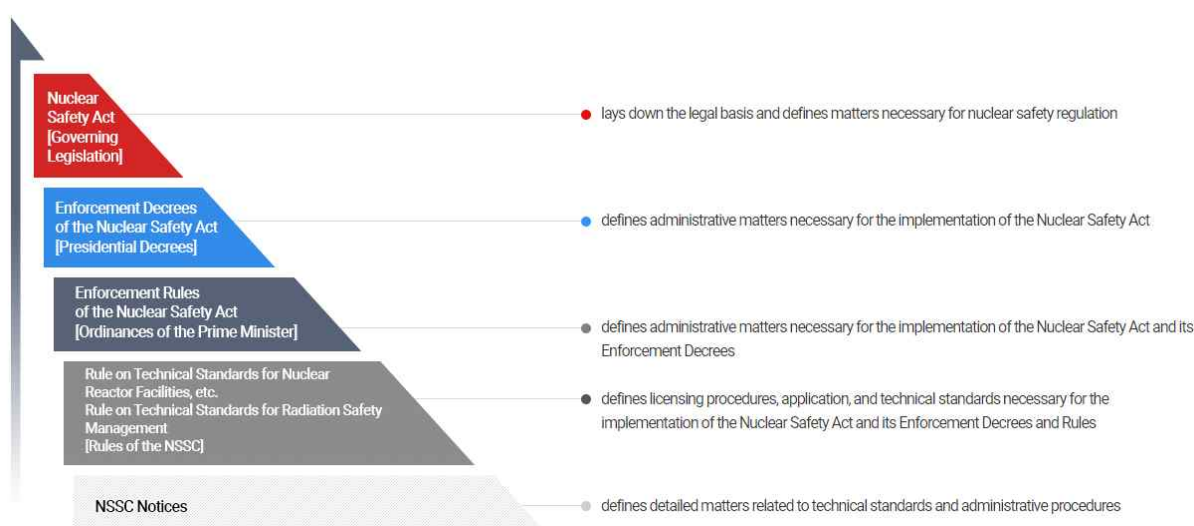
01 INTRODUCTION

- ◆ The International Atomic Energy Agency (IAEA) strives to create a comprehensive framework that incorporates Safeguards by Design (SBD) principles at the initial stages of Small Modular Reactor (SMR) development. This requires synergistic cooperation between designers, operators, regulators, and the IAEA, with designers needing to share detailed information about the nuclear facility with both the State System of Accounting and Control (SSAC) and the IAEA from the beginning of the design phase.
- ◆ Currently, in the Republic of Korea (ROK), licensees are required to submit design information, including construction and operational timelines, along with a preliminary project plan, within one month of receiving the construction permit. However, specific actions related to safeguards, beyond submitting a preliminary Design Information Questionnaire (DIQ) seven months prior to the start of construction, are lacking.
- ◆ This study proposes a legal framework to integrate SBD principles from the SMR design phase through a comprehensive review of existing construction processes for nuclear facilities, focusing on safeguards regulations.

02 CURRENT PROCESS

2.1 LEGAL FOUNDATION

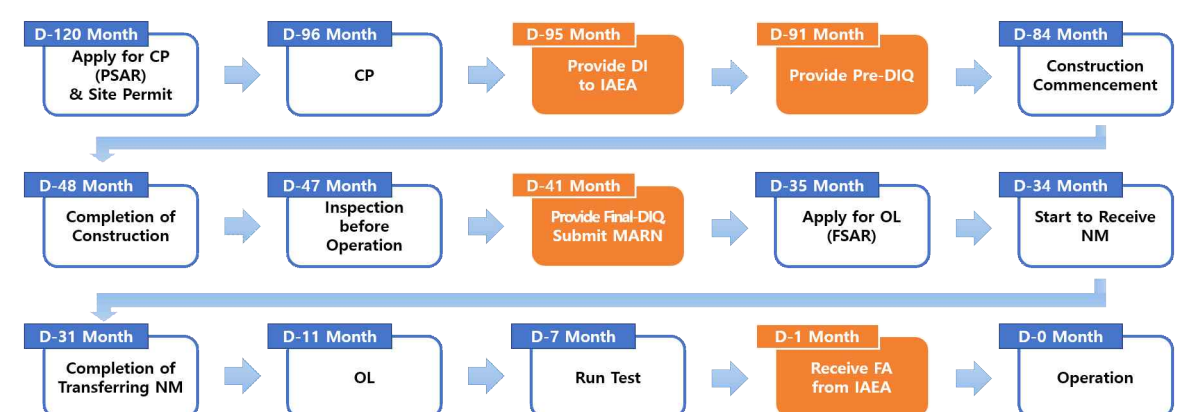
- ◆ The Nuclear Safety Act forms the legal basis for the nuclear power plant construction licensing process. It outlines two licensing pathways: one for constructing a nuclear power plant with a defined plan, and another for standard design approvals for reactors without specified construction plans. Article No. 10 pertains to construction permits for nuclear power plants, while Article No. 20 covers operating permits. The application for standard design approval (standard design is defined as the repeated design, in the case of repeated construction of power reactors and related facilities of the same design) is detailed in Article No. 12.



Legal Framework for Nuclear Safety Regulation in South Korea

2.2 LICENSING PROCESS

- ◆ Current practices do not allow for consideration of safeguards from the early design stage since DI and DIQ are excluded from licensing documentation. Although a nuclear power plant cannot operate without approved material accounting regulation (Article 15 and its provisions mutatis mutandis), this document, focused only on organization, procedures, and training, does not directly relate to IAEA safeguards.



- CP : Construction Permit
- PSAR : Preliminary Safety Analysis Report
- FSAR : Final Safety Analysis Report
- NM : Nuclear Material
- DI : Design Information
- MARN : Material Accounting Regulation for Nuclear Facility
- OL : Operating License
- FA : Facility Attachment

Licensing process for the construction of nuclear power plant

03 STRATEGIES FOR IMPROVEMENT

3.1 AMENDING THE SAFETY ACT OR DECREES

- ◆ Including MARN(MC&A regulation) in the licensing documents would allow the SSAC to participate from the early design stages, assuming licensees submit safeguard-related information.
- ◆ The most intuitive and direct solution is addition of design information into article 12 of NSA. Since the reporting of international strategic materials are mentioned in Article 98 and its related notifications, a modification of can be considered.

3.2 AMENDING THE NOTIFICATIONS OF ARTICLE 98

- ◆ Directly amending the notifications of NSSC related to Article 98 [3] is also a good way to implement the SBD concept for SMRs. Amending the relevant notification of Article 98 (as shown in Table 3) of the Nuclear Safety Act is one of the easiest ways and most effective methods. However, there is an issue with this notification, as it currently defines the entities obligated to submit design information (DI) as specific nuclear material users, making it unclear whether the applicant for standard design approval falls under this category.

04 CONCLUSION

- ◆ It is anticipated that effective application of SBD principles will be achieved by linking the provision of DI for safeguards to the standard design approval process for SMRs. If mandating the provision of DI as part of the licensing documents is too burdensome, it could be considered to add the timing of the information provision at the notification level, like discussed earlier. Additional research will provide various alternatives to the government.

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|------------------------|-------------------------------------------------------------|
| 2 Definitions of Terms | 15 Approval of MC&A Rules (Material control and Accounting) |
| 16 National Inspection | 98 Report and Inspection (IAEA) |
| 106 Training of MC&A | And their Mutatis Mutandis |

Safeguards Related Articles in NSA of Korea