

Procedures for preparing the expanded declarations at KAERI

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1. Introduction

The agreement between the government of the ROK and the IAEA for the application of nuclear safeguards was signed in Oct. 1975, and entered into force in Nov. of that year. The ROK signed on Model Protocol Additional to the Safeguards Agreements (AP) with IAEA in 1999, which entered into force in Feb. 2004.

The ROK submitted the initial expanded declarations in Aug. 2004 pursuant to the AP. Since then, KAERI has submitted expanded declarations on (1) the nuclear fuel cycle-related R&D activities not involving nuclear materials (Article 2.a.(i) of the AP), (2) descriptions of each buildings including structure and temporary buildings of the site (Article 2.a.(iii) of the AP), and (3) general plans for the succeeding ten-year period relevant to the development of the nuclear fuel cycle (Article 2.a.(x) of the AP) to the NSSC by 31 March of each year, and the IAEA has performed the complementary access in KAERI in order to assure the absence of undeclared nuclear materials and activities based on the expanded declarations.

This paper will focus on the overall procedures for preparing the expanded declarations relating to Article 2.a.(i) of the AP. The procedures described in this paper include collecting information of R&D projects performed in the previous year at KAERI, revising the past expanded declarations submitted to IAEA, adding new expanded declarations, linking between Article 2.a.(i) and Article 2.a.(iii), and generating new expanded declarations on Article 2.a.(i), Article 2.a.(iii) and other Articles of the AP. Most of procedures are carried out using the CIMED (Computerized Information Management system for Expanded Declarations), which was developed to effectively prepare the expanded declarations at KAERI.

2. AP Implementation System at KAERI

The NMTC (Nuclear Material & Technology Control team), which is designated as a counterpart for international and domestic safeguards work at KAERI, has the responsibility for overall implementation of the safeguards matters including the AP. The NMTC performs key roles in the implementation of the AP at KAERI-site as follows: 1) collects information on the lists of R&D projects performed in the previous year

from the R&D projects management teams, 2) requests R&D project managers to prepare the expanded declarations relating to Article 2.a.(i), 3) reviews/revises the expanded declarations provided by R&D project managers, 4) reviews the R&D projects in question whether they are applicable to the AP or not, and ask the R&D project managers if it is subjected to the AP, 5) performs the site survey for all buildings, structures and containers in KAERI, 6) link Article 2.a.(i) and Article 2.a.(iii), and prepares the expanded declarations for Article 2.a.(i), (iii) and other Articles.

The NMTC submits the prepared expanded declarations to IAEA via KINAC. The IAEA/KINAC performs the Complementary Access (CA) to verify the information provided by the KAERI. The overall diagram in implementation of the AP at KAERI is shown in fig.1.

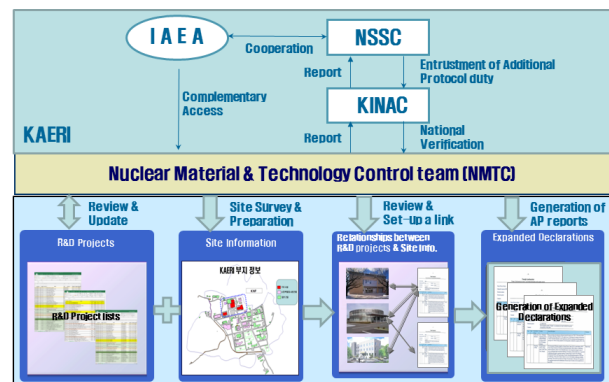


Fig 1. AP Implementation System at KAERI

3. Development of the Computerized Information Management system for Expanded Declarations

The IAEA has provided the ROK with a protocol reporter to prepare and generate the expanded declarations using the R&D projects since the AP came into effect in 2004. However, a protocol reporter did not have the necessary functions for KAERI to prepare the expanded declarations and manage the various detailed information for the AP.

KAERI developed the Computerized Information Management system for Expanded Declarations (CIMED) in 2012 to effectively prepare, generate and manage the expanded declarations using the R&D

project carried out at KAERI, as shown in fig. 2. Since then, the CIMED has continuously upgraded the functions. The main functions of a protocol reporter are as follows:

- 1) R&D project manager can easily prepare the expanded declaration in the form specified under the AP.
- 2) Easy to review and revise the expanded declarations between the project managers and NMTC
- 3) Automatic linkage between Article 2.a.(i) and Article 2.a.(iii)
- 4) The ability to generate the expanded declarations using the information of R&D projects, KAERI and others
- 5) Easy management of the expanded declarations at the NMTC

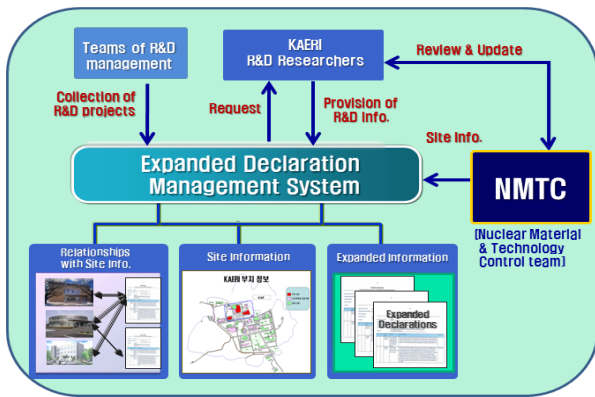


Fig. 2. Schematic Diagram of the CIMED

4. Procedures for preparing the expanded declarations at KAERI

To submit the expanded declarations to the IAEA, there are many steps from collecting the information of R&D projects and KAERI to generating the expanded declarations using the CIMED. This chapter describes 1) the roles between R&D project managers, NMTC and CIMED, 2) the necessary steps taken to prepare the expanded declarations and 3) the files maintained for the expanded declarations.

As a precondition of preparing and managing the expanded declarations at KAERI, the NMTC shall always manage the information of the terminated R&D projects, the buildings of KAERI, Article 2.a.(iv) and Article 2.a.(x) of the AP as well as the information of Article 2.a.(i) provided to the. In addition, the NMTC shall maintain the detailed information on the modified histories, room no. of offices and laboratories and references of the previous expanded declarations, etc whenever it is prepared and submitted to the IAEA as shown in fig. 3.

Fig. 3. Excel file of Article 2.a.(i) provided to IAEA

As a necessary function of the CIMED, it shall manage the information of article 2.a.(i) that have been completed or are being reported, the R&D project durations, reporting histories and references as shown in fig. 4. The fig. 4 displaying the status of Article 2.a.(i) consists of four sections; (i) outlines of R&D projects, (ii) detailed description of the R&D project, (iii) histories of the R&D project maintained in management information system of KAERI, (iv) histories of an expanded declaration. The information of KAERI according to Article 2.a.(iii) as well as the information of Article 2.a.(i) is updated every year in the same way whenever they are submitted to the IAEA.

Fig. 4. Management status of Article 2.a.(i)

The contents of the previous expanded declarations can be easily searched by clicking a line in the section of the history of expanded declarations as shown in Fig. 5, and it also continues tracking of the past expanded declaration submitted to IAEA using the reference number displayed on the screen.

Fig 5. Method of information Retrieval on Article 2.a.(i)

As described above, the basic prerequisites for preparing and managing the expanded declarations must always be maintained. And then, the NMTC requests R&D project management team, budget management team and facility management team to provide the information on R&D projects performed last year at KAERI and KAERI's information. When information is collected from the relevant departments, the NMTC divides the collected R&D projects into the R&D projects reported to IAEA, R&D projects with questionable application of the AP, etc.

As a next step, the NMTC send an e-mail to R&D project managers requesting that the expanded declarations reported under Article 2.a.(i) be modified on the basis of the R&D activities carried out last year. The excel file shown in fig. 3 is attached when sending an e-mail. Whenever the project manager replies to the NMTC with a corrected excel file reflecting the changes occurred during the R&D activities in the previous year, the NMTC reflects the corrections sent by R&D project manager in the excel file managed by the NMTC.

And then, the NMTC send an official letter to all department in KAERI to submit the expanded declarations if each department performed the R&D project that apply to the AP in the previous year. The NMTC also request the R&D project managers, who submitted the existing expanded declarations to IAEA in the past year, to review the revised data in the CIMED and sign it.

Once R&D project managers submit new expanded declarations, or review and sign the revised contents of the existing expanded declarations stored in the CIMED, the NMTC can officially receive the expanded declaration as shown in fig 6. Sometimes, some new expanded declarations can be excluded from Article 2.a.(i) during the review of the NMTC. These excluded expanded declarations shall be also managed by the CIMED.

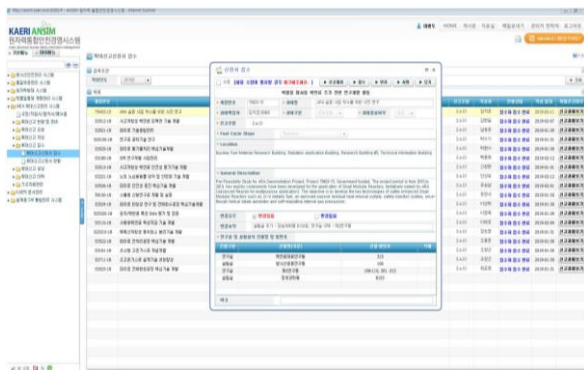


Fig 6. Article 2.a.(i) reception in the CIMED

The final expanded declaration submitted by existing R&D project manager should be reviewed and confirmed again because some changes of expanded declaration could be made during their review. If some

contents of the expanded declaration has been revised again by the R&D project manager, then the revised contents should be reflected in the excel file managed by the NMTC as well. The NMTC shall officially receive and sign the expanded declarations as shown in fig. 7.

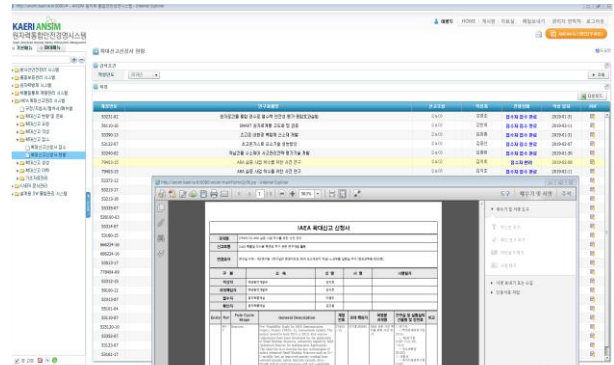


Fig 7. Approval procedures of Article 2.a.(i)

The co-relation between Article 2.a.(i) and Article 2.a.(iii) should be established when the preparation of Article 2.a.(i) and (iii) is completed as follows;

- The titles of R&D project being performed in the Article 2.a.(i) should be manually recorded in the general descriptions of buildings concerned in the Article 2.a.(iii).
- The CIMED automatically establishes the reference numbers using the co-relations between Article 2.a.(i) and Article 2.a.(iii) when the expanded declarations is created.

The CIMED creates all declarations on Article 2.a.(i), (iii), (iv) and (x) sequentially as it does a cross-check on the creation state of the previous Articles as shown in fig. 8.

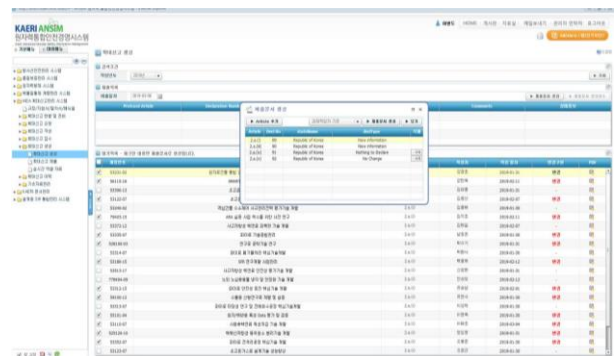


Fig 8. Creation of the expanded declarations in the CIMED

After the creation of expanded declarations by the CIMED, the print form of expanded declarations is shown in Fig. 9. The contents of expanded declarations include only information to be provided to IAEA as specified in the guideline of AP. It is difficult for each expanded declaration to get information about name, department and telephone number of project manager,

project title, etc. These relevant information can be recorded and managed in the CIMED in order to enhance the efficiency of information management of expanded declaration as shown in Fig 10, and it is useful for receiving the CA of the Article 2.a.(i).

for preparing and managing the R&D projects and the CIMED from collecting to submitting the expanded declarations.

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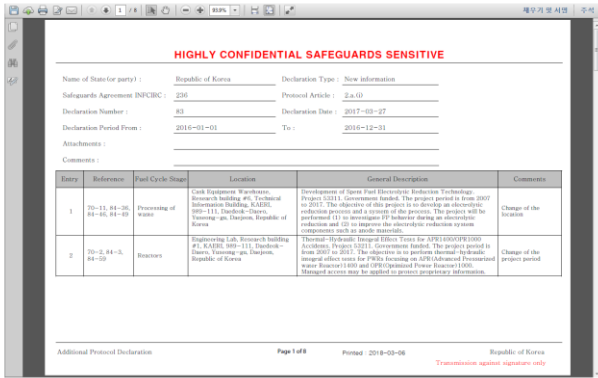


Fig 9. Output Form of Expanded Declarations

Entry	Reference	Fuel Cycle Stage	Location	General Description	Comments	관리책임자	진행상태
1	70-11, 84-10, 84-09	Processing of waste	Low Enrichment Uranium Research Building #1, Technical Information Building, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Development of Super Fuel Element Production Technology Project 5213, Government funded. The project period is from 2007 to 2017. The objective of this project is to develop an enrichment reduction process and a system of the process. The project will be performed (1) to investigate the enrichment reduction process and (2) to investigate the enrichment reduction process components such as waste treatment.	Change of the location	김민준	진행
2	70-2, 84-10, 84-09	Research	Engineering Lab, Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Thermal-hydraulic integral Effect Tests for APR 1400(CPR 1000) Accident, Project 5211, Government funded. The project period is from 2007 to 2017. The objective is to perform thermal-hydraulic integral effect tests for APR1400 using an APR1400 Pressurized Water Reactor (PWR) and APR1400 Pressurized Water Reactor (PWR) to investigate the behavior of the reactor system and to improve the electric reduction system components such as waste treatment.	Change of the location	김민준	진행
3	71-12, 84-10, 84-09	Research	UPE Laboratory for Innovative Utilization of Reactor Fuel, Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Development of Core-to-Core Fuel Integrity Establishment Technology, Project 5214, Government funded. The project period is from 2007 to 2017. The objective is to develop a core-to-core fuel integrity establishment technology and to improve the core-to-core fuel integrity establishment technology.	Change of the location	김민준	진행
4	71-10, 84-10, 84-09	Research	High-Resolution Research Building, Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Development of High-Resolution Research Building, Project 5210, Government funded. The project period is from 2007 to 2017. The objective is to develop a high-resolution research building and to improve the high-resolution research building.	Change of the location	김민준	진행
5	71-7, 84-10, 84-09	Processing of waste	Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Development of Fuel Cycle System Technology, Project 5215, Government funded. The project period is from 2007 to 2017. The objective is to develop a fuel cycle system technology and to improve the fuel cycle system technology.	Change of the location	김민준	진행
6	80-1, 84-10, 84-09	Research	Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea. The project period is from 2007 to 2017. The objective is to develop a research building and to improve the research building.	Change of the location	김민준	진행
7	80-12, 84-10, 84-09	Processing	PRIDE Facility, Research Building #1, KAERI, 909-111, Daejeon-City, Daegu-do, Republic of Korea	Development of Fuel Cycle System Technology, Project 5214, Government funded. The project period is from 2007 to 2017. The objective is to develop a fuel cycle system technology and to improve the fuel cycle system technology.	Change of the location	김민준	진행

Fig 10. Management status of the expanded declarations with relevant information

The expanded declaration created by the CIMED is eventually transformed to the excel file required by IAEA, and submitted to IAEA through the NSSC/KINAC.

5. Conclusions

KAERI has submitted expanded declarations on the nuclear fuel cycle-related R&D activities not involving nuclear materials as well as descriptions of each buildings including structure and temporary buildings of the site to IAEA under the AP.

KAERI developed the CIMED for the effective preparation, modification and management of the expanded declarations on Article 2.a.(i) from a numerous R&D projects performed at KAERI.

It is very important to establish the procedures for preparing and submitting the expanded declarations according to the AP at KAERI, which carries out numerous R&D projects. The KAERI established the procedures to implement the AP, and the roles between the NMTC, R&D project managers, relevant department