

## **Study on the System Requirements and Structures of Mailbox Declaration System for Reference Pyroprocessing Facility in the ROK**

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### **1. Introduction**

The mailbox declaration system applied for the implementation of Safeguards at the Reference Pyroprocessing Facility (REPF) plays important role to support the declared information provided from Near-Real Time Accountancy (NRTA) and provides reference data to confirm the measurement results generated from the Unattended Monitoring System (UMS) for the purposes of verification and real-time monitoring of the movements and changes of nuclear materials (NM) at the processes in the REPF.

In order to install and operate the mailbox declaration system at the REPF, this study focused on the operation, security, transmission of confidential information, procedure for transmission of mailbox declaration system as system requirements, and structure of mailbox declaration system to review the declared information through the mailbox by the national authority and to transmit the revised information to the IAEA.

### **2. System Requirements and Structures for the Mailbox Declaration System at the REPF**

#### *2.1 The System Requirements for the Mailbox Declaration System at the REPF*

In order to operate the electronic mailbox connected to the Ethernet, the following requirements for the mailbox operation, installation, and security of mailbox should be satisfied.

For the mailbox operation, The IAEA should establish the system which is necessary for the mailbox operations. Then, the ROK and the IAEA determine the declaration time, measures, and the contents of facility operation information including the mailbox declaration submitted by the facility operators. The IAEA also provide the guidelines including the methods and procedures to confirm the submission of mailbox declaration, and establish the procedure to analyze and to verify the mailbox declarations. The national authority provides the guidelines for the preparation and submission of mailbox declaration. The facility operator establishes the appropriate system to timely prepare the mailbox declaration to be able to submit within the agreed time (e.g. computerized nuclear material accounting system). The facility operator also prepares the detailed guidelines and procedures to submit the mailbox declaration.

For the security of mailbox, The IAEA establish and operate the information security system for the mailbox. Then, the IAEA prepare the software necessary for the

encryption and decryption of transmitted mailbox declaration, and provide the software and digital signatures to the national authority and facility operator. The national authority manages the relevant software and digital signatures provides by the IAEA, evaluates the security of mailbox throughout the supervision of facility operator's mailbox operations. The facility operator applies all possible measures to prevent the Ethernet network of mailbox system from the cracking attempt and to block the possible release of mailbox information.

For the requirements for transmission of confidential information to mailbox, The ROK and the IAEA determine the procedures for the transmission of confidential information to the mailbox in advance, and prepare the guideline and procedure for the transmission of confidential information in the additional mailbox (e.g. the mailbox installed in the facility) if necessary. The national authority determines the transmission of confidential information to the mailbox installed in the facility if the necessity of transmission of confidential information to the mailbox is raised. (If the confidential information is transmitted to the mailbox installed in the facility, the IAEA inspectorate carries out the analysis/verification processes of mailbox information during the on-site inspection.). The national authority takes the necessary steps not to transmit the confidential information to the normal mailbox throughout the discussion with facility operators, and notify to the IAEA that the confidential information has been transmitted to the mailbox installed in the facility by all possible means. The facility operator discusses the transmission of confidential information with the national authority and notifies the result of transmission of confidential information to the mailbox installed in the facility to the IAEA and national authority.

For the requirements regarding the transmission of mailbox declaration, all messages declared through the mailbox are transmitted to the national authority for the review, and revised mailbox information is submitted to the IAEA. The facility operators cannot deny the analysis/evaluation results for the mailbox declarations after the messages are transmitted. The transmission time for the mailbox declaration messages should be true (trusted time stamp). Once the mailbox declaration messages are transmitted to the IAEA and the national authority, the IAEA, the national authority, and the facility operator cannot change the contents of mailbox declarations. Revised messages for the transmitted mailbox declaration messages can be changed/revised as long as the IAEA and the national authority are able to receive and to monitor the messages. The mailbox

declaration messages can be produced, transmitted, or received by the authorized institutions/users. (Unauthorized transmission (receipt) is not possible). The procedures or measures for the confirmation of acknowledgement messages are necessary (automatic reply of acknowledgement messages in the mailbox system). The timely reply for the IAEA acknowledgement messages to the national authority and the facility operator is necessary. The confidentiality of mailbox information is required.

## 2.2 Structures of Mailbox Declaration System

The mailbox systems in the Wolsong CANDU reactors and fuel fabrication plants (KNF) ROK are composed of senders' mail server system installed in the national authority (KINAC) and receiver's mail server system installed in the IAEA headquarters. The facility operator uses the mail account ([userID@kinac.re.kr](mailto:userID@kinac.re.kr)) provided by the national authority (KINAC). The national authority (KINAC) confirms and accumulates the messages dispatched from the facilities and the acknowledge messages replied from the IAEA in the mailbox account ([sgmailbox@kinac.re.kr](mailto:sgmailbox@kinac.re.kr)). The IAEA operate the automatic reply system for the acknowledgement messages from the mailbox server in the IAEA headquarters. In addition, IAEA inspectorate can confirm the mailbox information messages in the regional office (Hilton Hotel Kyungju) so that they review the declared messages in the IAEA mailbox in real time, and use the mailbox information for the verification activities at on-site inspections.

The mailbox system for the IAEA, national authority, and facility operator is described in the Fig. 1.

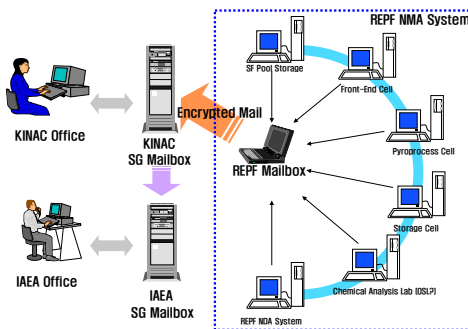


Fig. 1. The Mailbox System for the IAEA, National Authority, and Facility Operator

The configuration of mailbox systems currently applied to the Wolsong CANDU reactors and fuel fabrication plants (KNF) is satisfied with the requirements of mailbox declaration system for the REPF. It means that the same configuration of mailbox declaration system can be applied to the mailbox system at the REPF throughout the IAEA's provision of digital

signatures and relevant software to the facility operator at the REPF.

## 3. Conclusions

In this study, the system requirements and structures for the mailbox declaration system at the REPF are prepared.

According to the system requirements suggested in this study, the review of mailbox declaration submitted from the facility operator should be carried by the national authority (KINAC) to confirm the correctness and consistency by comparative analysis with NRTA data transmitted to the IAEA in real-time and to determine the confidentiality of declared information through the mailbox declaration system.

Eventually, the system requirements and structures of mailbox declaration system mentioned in this study provide the guideline for the establishment of mailbox declaration system at the REPF.

## REFERENCES

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