# Establishment of Alarm Management System for Radiation Emergency Response

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### 1. Introduction

In the event of a radiation emergency, information sharing and rapid propagation of the radiation emergency should be done promptly in order to effectively perform emergency response in the early stage

From this point of view, this study describes an AMP (Alarm Manager Program) to disseminate the emergency situation early and call the designated emergency responders when the radiation level of the facility or environment rises to the emergency level

## 2. System Configuration

#### 2.1 Hardware and Software Configuration

The hardware system consists of a computer server for collecting radiation data of facilities and environment, respectively, and a DBMS (Data Base Manager System) for managing data stored in real time as shown in Fig. 1. The facility and environmental data are stored in DBMS in real time. The AMP developed in this study compares real-time radiation data with radiation emergency settings as shown in Fig. 2. If the radiation data is exceeding than the set value, it is designed to automatically propagate the situation via SMS (Short Message Service) and call emergency personnel.

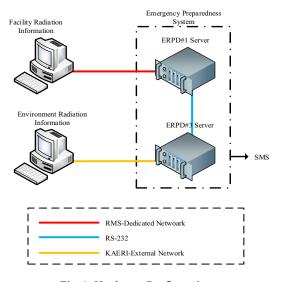


Fig. 1. Hardware Configuration.

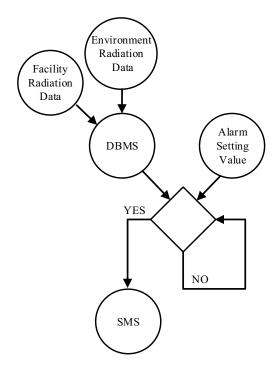


Fig. 2. Software Configuration.

AMP runs on MS Windows 7, and Visual Studio 2010 and MSSQL2014 software are used for development. Since the radiation data from facility has the IEEE 754 floating point structure of 1 signal bit, 8 exponent bits and 23 mantissa bits, it must be converted to a real number by applying a real number conversion function. The formula 1 shows a realvalued conversion equation. Where, s is signal bit, e and M are exponent bit and mantissa bit, respectively.

Real Number = 
$$(-1)^{S} \times (1, M) \times 2^{e-127}$$
 (1)

The AMP can check the facility name, tag, set value and person in charge as shown in Fig 3. In addition, it has a function to periodically check the communication status of facility and environmental radiation data for the health scientist of the system and notify the maintenance person in case of trouble.



Fig. 3. Alarm Manager Program.

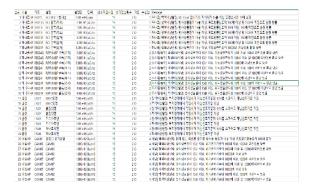


Fig. 4. Alarm Setting Value.

### 3. Conclusion

Radiation emergency response should be established to ensure that the protection of lives is swiftly handled. The construction of a system to realize such a purpose must be established to enable rapid emergency response. For this purpose, the AMS of this study is expected to be used effectively in the emergency personnel call-up by spreading the situation quickly in case of radiation emergency.

## REFERENCES

- Criteria for essential digital assets such as nuclear facilities (KINAC,RS019)
- [2] IEEE Standard for floating-point arithmetic-1997
- [3] Visual Studio 2010 MSDN (Microsoft Developer Network)