

Radiological Emergency Response System of KAERI

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1. Introduction

The Act of Physical Protection and Radiological Emergency came into effect in Feb. 2004[1]. This act requires to the nuclear industries that the situation of the radiological emergency should be monitored by some proper equipment. To monitor the radiological emergency based on the act, KAERI, Korea Atomic Energy Research Institute, has been installing RERS, Radiological Emergency Response System, and establishing the implementation plan on the radiological emergency response[2]. This paper describes the hardware and the operation of the RERS in view of the radiological emergency response.

2. Radiological Emergency Response System

As based on the act, the RERS is required that it must monitor the radiation and radioactivity and lease of radioactivity material, and it also must equip the emergency sound system and the uninterrupted electric power in the hardware.

In response to the act, the RERS consists of the DB server, the personal computers, the operator intelligence, the emergency sound, the radiation monitors at the local facility, and the radiation monitors and weather monitors at the environment as shown in the figure 1.

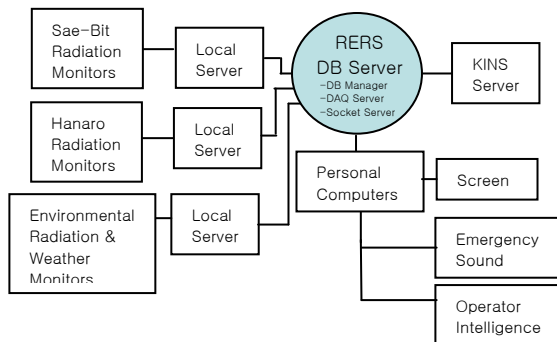


Figure 1. Radiological emergency response system

The DB server operates under the Window 2003. It has DB manager for the memory adjustment, DAQ server for the data transmission and the Socket server for the data storage and relay. The personal computers are use for the data backup, data trend display with the facilities layout. They are connected to the large screen. It is to watch in detail. The operator intelligence works the informing function to the designated operators only when the radiological emergency occurs at the facility. It is done by the calling to the operator's cellular phone.

The whole KAERI rings with the emergency sound when the radiological emergency occurs, too. The ringing is distinguished from the emergency class, i.e. Alert, Site Area Emergency and General Emergency. The locals, Hanalo and Sae-Bit, are also installed the same one. The facility operator can use it in case of the emergency. The local facilities equip the radiation monitors connected to the local server. the RERS is connected to the local server. And it is also connected to the KINS server, too. The local data from the Hanaro, the Sea-Bit and the environment, is transmitted to the RERS server with real time mode. They also sent to the KINS server via the RERS server. It is done at the same time. The transmission between the RERS to the local runs on the internet network of the KAERI, while the KINS is the telephone line for the data security. The RERS is supplied by the uninterrupted electric power.

3. Safety Parameters

In view of the radiological emergency, the monitoring using the RERS will be considered whether the radiological accident is limited within the nuclear facility or leased out of the nuclear facility. The former case should be interested in the radiation intensity and the contamination, the latter case is not only the radiation intensity and the contamination but also the contamination area of the out side.



Figure 2. Environmental parameters

As the major safety parameters of the RERS in the normal operation, these are considered that the environment is the velocity and the direction of the wind and the radiation intensity of the gamma-ray. The figure 2 is shown the environmental monitoring spots. The

gamma-ray monitor is 6 spots. The weather monitor is 1 spot.

The Hanaro, Research Reactor, is considered the stack and around and in the reactor core. The stack is interested in the concentration quantity of the radioactive particle and the noble gas. The intensities of the gamma-ray and the neutron around the reactor core are interested in the monitoring, while in the core is a decrease and an increase of the level and the temperature of the water.

The Sae-Bit, Fresh Fuel Fabrication Facility, is considered the stack and the fuel handling room. The monitoring at the stock is an increase of the concentration of the radioactivity material. The room is an increase the radioactive contamination and the concentration in the air and on the floor, individually.

3. Consideration and Conclusion

KAERI has implementing the activities for the radiological emergency response to prepare in the radiation accident at the nuclear facilities. The activities limited at the Hanaro are extending to the nuclear fuel cycle facilities according to the Act of Physical Protection and Radiological Emergency. It will be necessary a train based on assuming real accident. However, most of the developed scenarios, which assume a real accident, are for the application at the commercial nuclear power plants, so that there are not so much the scenarios for the research reactor and the nuclear fuel cycle facilities.

Preferentially, the development of the scenarios based on theoretical modeling will require for the research reactor and the nuclear fuel cycle facilities. And the scenario will be the conformity in the property of the facility, but it couldn't easy due to the great variety and complexity of the facility.

The RERS is installing for the monitoring of the radiological emergency at the Hanaro and Sae-bit of the KAERI. The instillation will be extended to the nuclear fuel cycle facility. It is also considered the safety parameters.

REFERENCES

- [1] Act of Physical Protection and Radiological Emergency, MOST, Sep. 2006.
- [2] Radiological Emergency Response Plan, KAERI, Aug. 2006.