

## **RM Based Bilateral Regional Cooperation and its Perspective in Korea**

Seung Sik Park

*Korea Institute of Nuclear Non-proliferation and Control  
Expo-ro 573, Yuseong, Daejeon, 305-348, Korea*

### **1. Introduction**

Remote monitoring (RM) is one alternative step to fulfill safeguards requirements in the member states. Korea installed a surveillance and unattended monitoring system in the ACPF (Advanced Spent Fuel Conditioning Process Facility) at the Korea Atomic Energy Research Institute (KAERI) in 2005. Data began to be shared through a virtual private network (VPN) started in 2006 with the Korea Institute of Nuclear Non-proliferation and Control (KINAC), KAERI, and the Sandia National Laboratories (SNL), as well. From 2009 the data are also being sent to the IAEA. Recently discussions have taken place to form a trilateral KINAC-SNL-JAEA (Japan Atomic Energy Agency) network using RM to strengthen the regional cooperative nonproliferation. The cooperation is supporting the basic ground of regional approaches for the peaceful use of nuclear energy.

This paper addresses the main features of recent development to form a trilateral KINAC- SNL-JAEA network and a future prospective in nuclear nonproliferation and transparency via remote monitoring surveillance.

### **2. RM based bilateral cooperation**

#### *2.1 RM Data sharing on ACPF*

The ACPF has been under development as a part of a pyro-processing at KAERI since 1997. KAERI has built the facility in the basement of the Irradiation Material Examination Facility (IMEF), which already has a reserved hot-cell area. The Unattended Monitoring System (UMS), which collects surveillance data and measurements from the neutron monitoring systems, was developed by facility operators in 2005. Data share began from June 2009.

#### *2.2 Cooperation between the ROK and the USA*

The Permanent Coordinating Group (PCG) has an annual meeting between MEST and the DOE. It was established in 1994 to discuss the technical aspects of securing nuclear nonproliferation and transparency.

Coordination between MEST and the DOE led to the implementation of the "Cooperation on the Development of Remote Monitoring Systems and Technology" which was incorporated between 1999-

2002 [1, 2]. This project involved: 1) developing remotely accessed UMS to design, install and evaluate the concepts associated with its application, and 2) conducting RM technology workshops on sensor technology, system connectivity and data transmission.

Another Permanent Coordinating Group project was the "Development of Regional Cooperation for Nuclear Nonproliferation and Transparency" in November 2003. The objective of this project included such activities as: 1) RM/Regional VPN to share data from representative facilities for transparency purposes and to evaluate their effectiveness. 2) Regional Training classes and workshops to exchange technical information. This project was successfully completed in 2009. During this period, KAERI designed and installed a monitoring system at their ACP facility in 2005. That same year KINAC established a VPN tunnel to KAERI. The SNL also finished a remote monitoring and communication link at the Idaho National Laboratory (INL) in November 2005 to provide reciprocal data that can be viewed at KINAC. The VPN links were established between KINAC and the SNL in March 2006 [3]. That link became functional until February 2007. Work on the project ended in 2009, but a follow on project has been suggested to further regional cooperation [4]. Figure 1 shows the network configuration between KAERI-KINAC-SNL-IAEA. UMS data from ACPF at KAERI are transferred to the SNL and the IAEA separately through a KINAC server via VPN.

For spent fuel transfer from the spent fuel storage bay to dry storage canister, bundles are verified by item counting, serial number identification, and gross defects test before loading into the basket. The continuity of knowledge (COK) should be maintained during drying and welding of baskets and loading baskets into dry storage canisters. After loading of 9 baskets, dry storage canister is placed under dual C/S and fingerprint is taken for each canister for future re-verification.

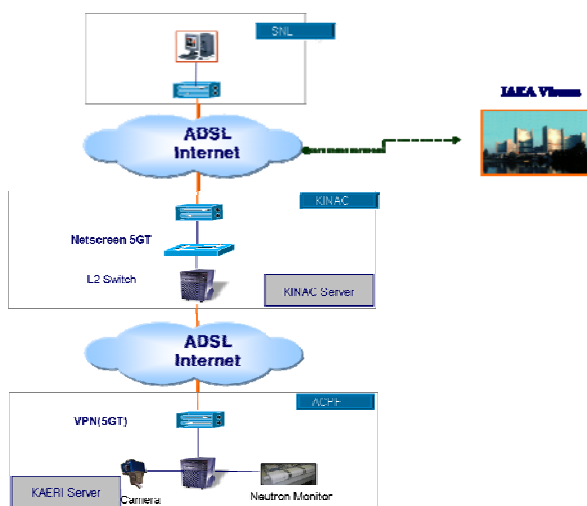


Figure 1 The network configuration between KAERI/KINAC-SNL-IAEA

### 2.3 Cooperation between the ROK and Japan

KINAC had two joint meetings with the JAEA on regional cooperative nuclear nonproliferation and transparency in February 2009 and in January 2010. The meeting focused on regional and future applications using existing bilateral cooperation between KINAC-SNL/DOE and the JAEA-SNL/DOE. Both Japan and Korea have had similar dealings with the SNL in the past. KINAC is conducting a project on the ACPF at KAERI, while the JAEA is carrying out a project on the fresh fuel storage room at Joyo via a VPN system with the SNL. Discussions were centered on what type of information or data will be shared, how it will be collected, and who has access to that information. In the future, it will be possible to connect the KINAC-SNL/DOE system with the JAEA-SNL/DOE system --thus creating a trilateral system [5].

### 3. Potential expansion in regional transparency projects

Promoting data-sharing between KINAC and the JAEA is significantly meaningful for enhancing transparency, as part of regional cooperation. Certain types of data sharing (e.g. RM surveillance or measurement) with possible assistance from the SNL could be expanded from bilateral exchanges to that of regional exchanges - potentially multi-lateral cooperation with such organizations as the Austrian Safeguards and Non-Proliferation Office (ASNO), or the Asia-Pacific Safeguards Network (APSN) [6].

### 4. Conclusion

In 2001, the ROK had introduced an enhanced cooperation scheme for LWRs based on the RMS in collaboration with the IAEA. The ROK MEST-US DOE technical cooperation has been successfully

maintained through the PCG since 1994. In 2009, KINAC/MEST began joint meetings on the regional cooperative nuclear nonproliferation and transparency with the JAEA/MEXT. The trilateral system between KINAC-JAEA-SNL is being promoted as a future transparency step. By promoting cooperation and information exchange, such as RM surveillance or measurement data, it could help regional countries establish an association of nuclear transparency [7].

### REFERENCES

- [1] "Minutes of the 2<sup>nd</sup> Annual Meeting of the Permanent Coordinating Group (PCG) for the Arrangement between the Republic of Korea Ministry of Science and Technology and the United States Department of Energy," Nov. 1995
- [2] "Minutes of the 6<sup>th</sup> Annual Meeting of the Permanent Coordinating Group (PCG) for the Arrangement between the Republic of Korea Ministry of Science and Technology and the United States Department of Energy," Aug. 2002
- [3] "Minutes of the 9<sup>th</sup> Annual Meeting of the Permanent Coordinating Group (PCG) for the Arrangement between the Republic of Korea Ministry of Science and Technology and the United States Department of Energy," Mar. 2006
- [4] "Minutes of the 12<sup>th</sup> Annual Meeting of the Permanent Coordinating Group (PCG) for the Arrangement between the Republic of Korea Ministry of Education, Science and Technology and the United States Department of Energy," Nov. 2009
- [5] "Meeting notes of 1<sup>st</sup> Joint JAEA-KINAC Technical Meeting on Regional Cooperative Nuclear Nonproliferation Transparency, Feb. 2009
- [6] "Minutes of the 11<sup>th</sup> Annual Meeting of the Permanent Coordinating Group (PCG) for the Arrangement between the Republic of Korea Ministry of Education, Science and Technology and the United States Department of Energy," Oct. 2008
- [7] Chang Sang-ku, KINAC Newsletter, Vol. 2, Mar. 2010.