New Nuclear Emergency Prognosis system in Korea

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This paper reviews the status of assessment and prognosis system for nuclear emergency response in Korea, especially atmospheric dispersion model. The Korea Institute of Nuclear Safety (KINS) performs the regulation and radiological emergency preparedness of the nuclear facilities and radiation utilizations. Also, KINS has set up the "Radiological Emergency Technical Advisory Plan" and the associated procedures such as an emergency response manual in consideration of the IAEA Safety Standards GS-R-2, GS-G-2.0, and GS-G-2.1. The Radiological Emergency Technical Advisory Center (RETAC) organized in an emergency situation provides the technical advice on radiological emergency response. The "Atomic Computerized Technical Advisory System for nuclear emergency" (AtomCARE) has been developed to implement assessment and prognosis by RETAC.

KINS developed Accident Dose Assessment and Monitoring (ADAMO) system in 2015 to reflect the lessons learned from Fukushima accident. It incorporates (1) the dose assessment on the entire Korean peninsula, Asia region, and global region, (2) multi-units accident assessment (3) applying new methodology of dose rate assessment and the source term estimation with inverse modeling, (4) dose assessment and monitoring with the environmental measurements result. The ADAMO is the renovated version of current FADAS of AtomCARE.

The ADAMO increases the accuracy of the radioactive material dispersion with applying the LDAPS(Local Data Assimilation Prediction System, Spatial resolution: 1.5 km) and RDAPS(Regional Data Assimilation Prediction System, Spatial resolution: 12km) of weather prediction data, and performing the data assimilation of automatic weather system (AWS) data from Korea Meteorological Administration (KMA) and data from the weather observation tower at NPP site.

The prediction model of the radiological material dispersion is based on the set of the Lagrangian Particle model and Lagrangian Puff model. The dose estimation methodology incorporate the dose assessment methods of IAEA, WHO, and USNRC. The dose assessment result will express on the GIS (GIS (Geographic Information System) to provide to the local- governments and the central government.