

## New Threats and New Design Bases

Since the very first nuclear power plant, the design basis accident (DBA), which is a large break loss of coolant accident (LB-LOCA), did not change. For that matter, Engineered Safety Features (ESFs) in a nuclear power plant (NPP) did not change much either. That is because current ESFs are basically for the current DBA, LB-LOCA. However, a series of core melt down accidents are happening. Therefore, we now know that a nuclear reactor core can go melt. In addition, there is still a big disparity between the public perception on the nuclear safety and nuclear engineers' safety. The current "nuclear energy" issue in Korea is "de-nuclearization" in the national energy mix. On the other hand, the "nuclear safety" issue is the question of "how many nuclear reactors could be built in one site." And what are the technical and/or legal bases for the judgement?

The current paper proposes that we need: 1) a new safety goal of zero release, 2) a severe accident as the new DBA and 3) additional ESFs for new DBA.



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### (Biographical information)

#### <CURRENTLY>

1. Adjunct Professor, Division of Advanced Nuclear Engineering, Pohang University of Science and Technology (POSTECH)
2. Chairman, SSIC (Safety & Security International Coop)

#### <PREVIOUSLY>

1. Visiting Technical Advisor, Korea Institute of Nuclear Safety (KINS)
2. General Chair, PSAM 13, October 2016, Seoul, Korea
3. Co-Chairman, KJPSA, Korea-Japan PSA Workshop
4. President and Advisor, Agency for Defense Development (ADD), 2008-2014
5. President and Researcher, Korea Atomic Energy Research Institute (KAERI), 1989-2007
6. Principal Researcher, US Brookhaven National Laboratory (USBNL), 1984-1989
7. Member of the Senior Advisory Group on Nuclear Energy (SAGNE), Director General of the IAEA, 2006-2007

#### <EDUCATION>

1. Ph. D, Nuclear Engineering, University of Michigan (US), 1986
2. MS/Nuclear Engineer, Nuclear Engineering, MIT (US), 1982
3. BS, Nuclear Engineering, Seoul National University (Korea), 1974
4. BS, Chinese Language and Literature (HSK 6th Grade), Korea Open University, 2014

#### <AREAS OF EXPERTISE>

1. Probabilistic Safety/Risk Assessment (PSA/PRA)
2. Nuclear Safety and Severe Accident
3. Nuclear Reactor Design (PWR, SFR, VHTR, etc.)
4. Reliability Analysis/System Engineering

#### <PUBLICATIONS>

1. more than 120 scientific papers
2. four books and many newspaper articles