

## Desktop Severe Accident Graphic Simulator Module for CANDU6 : PSAIS

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### 1. Introduction

This paper introduces the PSAIS (PHWR Severe Accident ISAAC-based Simulator) which is a desktop severe accident graphic simulator module. PSAIS is developed as a window-based severe accident simulator using ISAAC ((Integrated Severe Accident Analysis Code for CANDU Plant) [1] as its engine. The ISAAC code is a system level computer code capable of performing integral analyses of potential severe accident progressions in nuclear power plants, whose main purpose is to support a Level 2 probabilistic safety assessment or severe accident management strategy developments. The code has the capability to predict a severe accident progression by modeling the CANDU6-specific systems and the expected physical phenomena based on the current understanding of the unique accident progressions. The code models the sequence of accident progressions from a core heatup, pressure tube/calandria tube rupture after an uncovering from inside and outside, a relocation of the damaged fuel to the bottom of the calandria, debris behavior in the calandria, corium quenching after a debris relocation from the calandria to the calandria vault and an erosion of the calandria vault concrete floor, a hydrogen burn, and a reactor building failure. Along with the thermal hydraulics, the fission product behavior is also considered in the primary system as well as in the reactor building. PSAIS can be a supporting or supplementary measure to understand the trends of accident progression, thus can be a training tool to implement the severe accident management strategies.

### 2. Main Features of PSAIS

PSAIS can simulate spectrum of physical processes occurring during severe accidents. Output results are displayed in user friendly graphical format by using text-based (numerical) output of ISAAC program. Window-based simulator of PSAIS is designed to provide graphical displays of the results during the transient simulation so that the users can easily follow the plant dynamics. Figure 1 through 4 show an example of PSAIS graphic display for the primary heat transport system, calandria vessel, reactor building, and plotting of important parameters.

PSAIS consists of following sub-modules:

- System menu and tool bar
- Project view
- Event summary
- Interactive control
- Parameter help view
- Input editor
- Reactor vessel view
- Reactor coolant system view
- Containment building view

### REFERENCES

- [1] KAERI, "Development of Computer Code for Level 2 PSA of CANDU Plant," Korea Atomic Energy Research Institute, KAERI/TR-1573/95,(December, 1995.

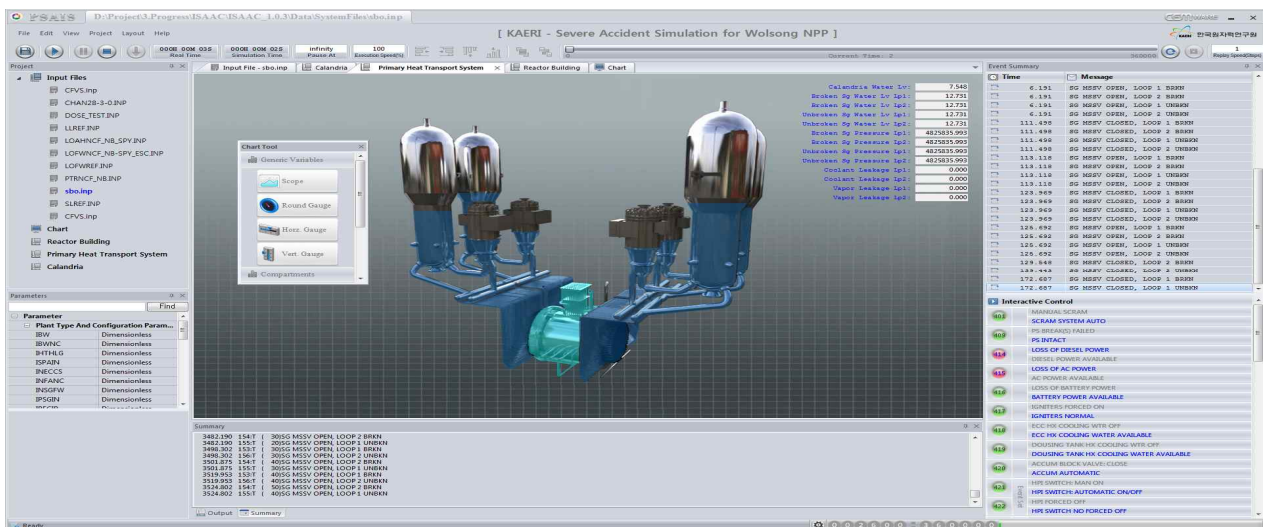


Figure 1. A Sample Display of PSAIS Graphic Module – Primary Heat Transport System Sub-module

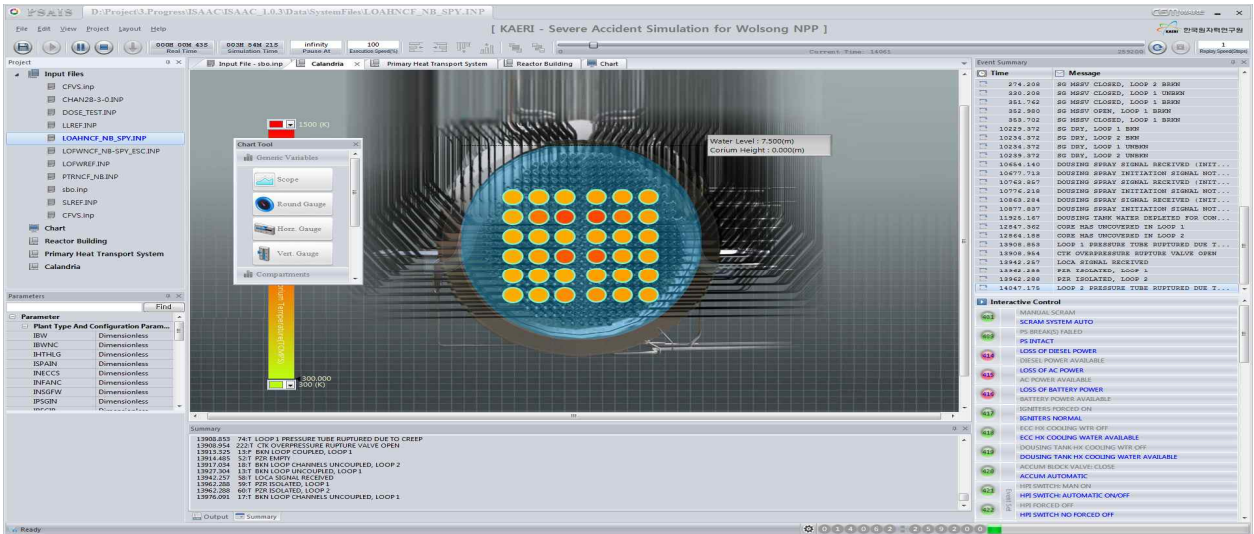


Figure 2. A Sample Display of PSAIS Graphic Module – Calandria Vessel Sub-module

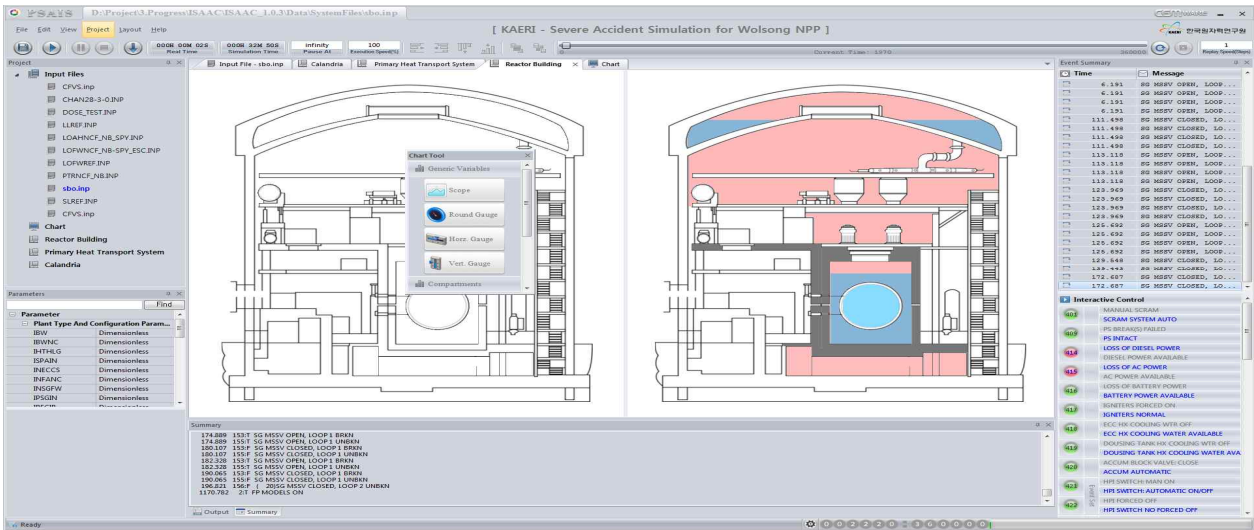


Figure 3. A Sample Display of PSAIS Graphic Module – Reactor Building Sub-module

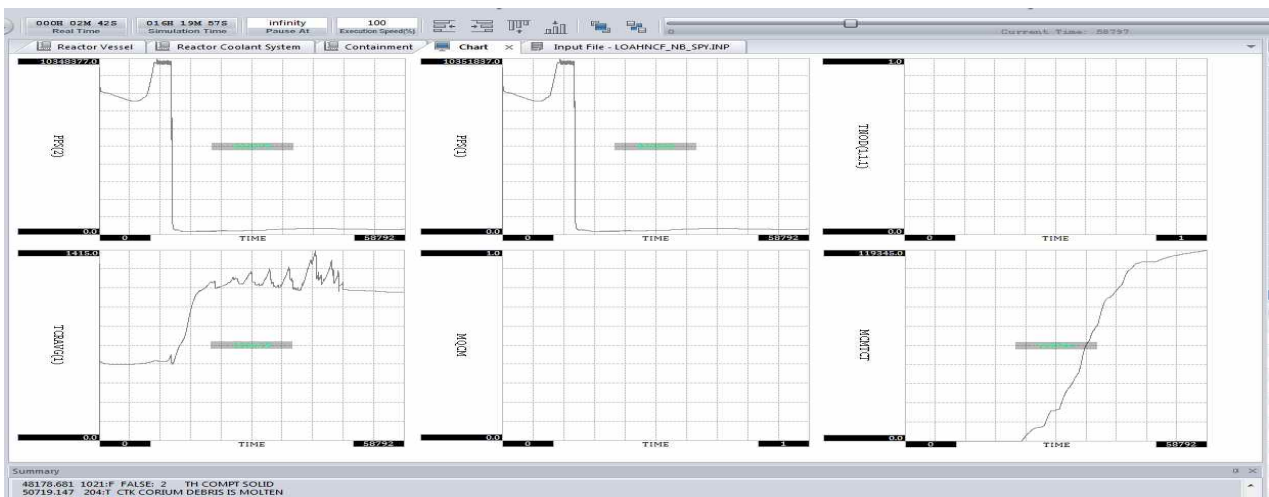


Figure 4. A Sample Display of PSAIS Graphic Module – Parameters Plotting Sub-module