

that the requirements for the relevant qualification are satisfied. The examination is conducted by the Committee for Certification of Operation Supervisors, which is comprised of the plant director, chief reactor engineer, and other managing staff.

10.1.3 Reactor simulator^{10-3, 10-4)}

The Monju Advanced Reactor Simulator (MARS) is the world's first full-scope simulator for an FR power plant. MARS was installed at the Monju site in order to effectively evaluate control performance and to efficiently conduct education and training of operators. Operation started in April 1991.

The objectives of MARS are the following: training for operation during normal, abnormal, and faulty operations; evaluation of operating procedures, control characteristics, and operation performance; and development of operator aid systems aiming at advancing operation control functions. MARS was developed based on the following basic policies.

- Major plant systems are simulated with physical models based on fundamental principles such as mass and energy conservation laws.
- Plant conditions ranging from cold shutdown to power operation can be continuously simulated in real time.
- The main control panel, supervisory consoles, and local panels simulating the actual plant are installed, and the malfunction and failure of components can be simulated.

MARS was later modified to improve functions and to enhance education and training capabilities reflecting lessons from the Secondary Sodium Leak Accident, etc. The modified system configuration is shown in Fig. 10-4. The main improvements are as follows:

- The scope of simulation was expanded to include image information and a virtual local panel for improved presence. For example, an image of the generation of white smoke at a local area was added, by which a sodium leak event is easily judged.
- Simulator training was made more realistic by adding the fire alarm panel, the heating, ventilation and air conditioning system (HVAC) control panel, a simulated integrated sodium leak monitoring panel, and an emergency drain function associated with Monju modification work (Photo 10-2).



Photo10-2 Operation training with simulator (simulating SBO)

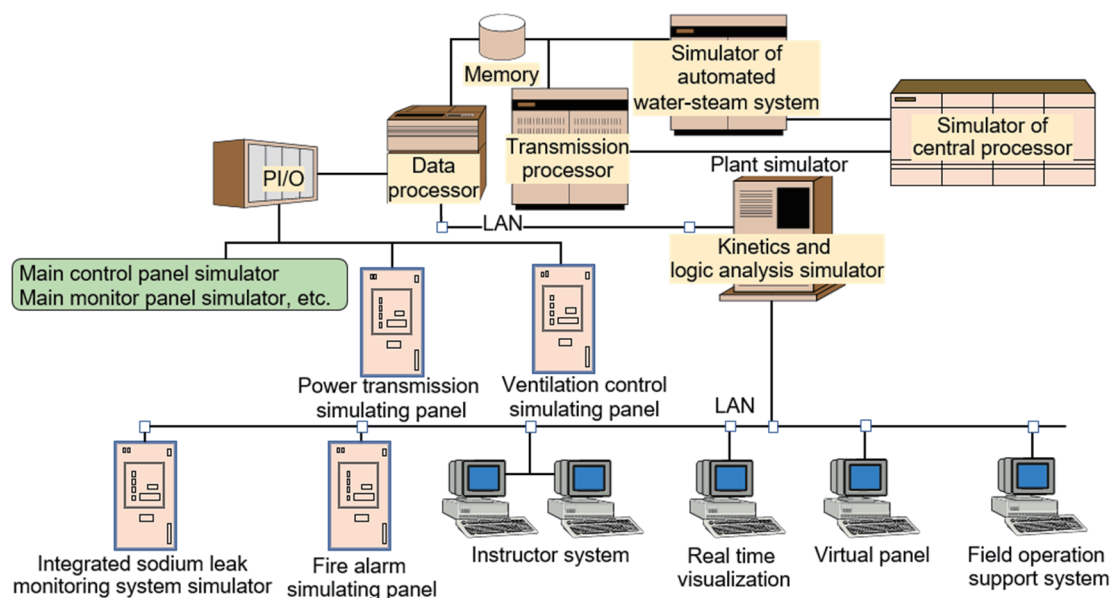


Fig.10-4 Structure of operator training simulator