

## 5-1 Role and Scope of Nuclear Safety Research

To ensure the safety of nuclear installations, the regulatory authorities conduct strict investigations and inspections. Nuclear safety research is necessary to improve the safety regulations. The latest scientific and technical knowledge is essential for the development and improvement of the safety guidelines and regulatory criteria.

The Nuclear Safety Commission (NSC) proposed a “Prioritized Plan for Nuclear Safety Research” in July 2004, to be carried out in order to meet the future regulatory needs. The major research activities expected the JAEA are shown in Fig.5-1.

The results of nuclear safety research contribute to the maintenance and improvement of safety of the nuclear facilities and also to fostering public confidence in nuclear safety.

The experimental approach is usually used in nuclear safety research to investigate the phenomena occurring during accidents and to confirm the effectiveness of safety systems. The data obtained from these experiments are used to develop safety evaluation methods. The major test facilities are shown in Fig.5-2.

Research programs conducted in accordance with the policy determined by the Japanese Nuclear Safety Commission

- Probabilistic safety assessment
- Safety of high burnup fuel
- Thermohydraulic safety for advanced utilizations of LWRs
- Safety assessment of plant aging
- Safety of nuclear fuel cycle facilities
- Safety of waste disposal and decommissioning



Fig.5-1 Major subjects and tasks of safety research

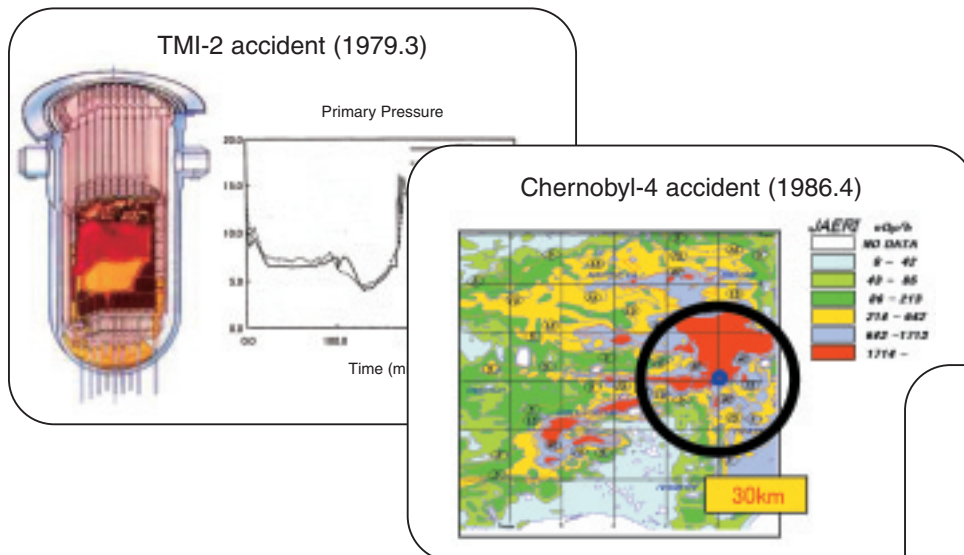
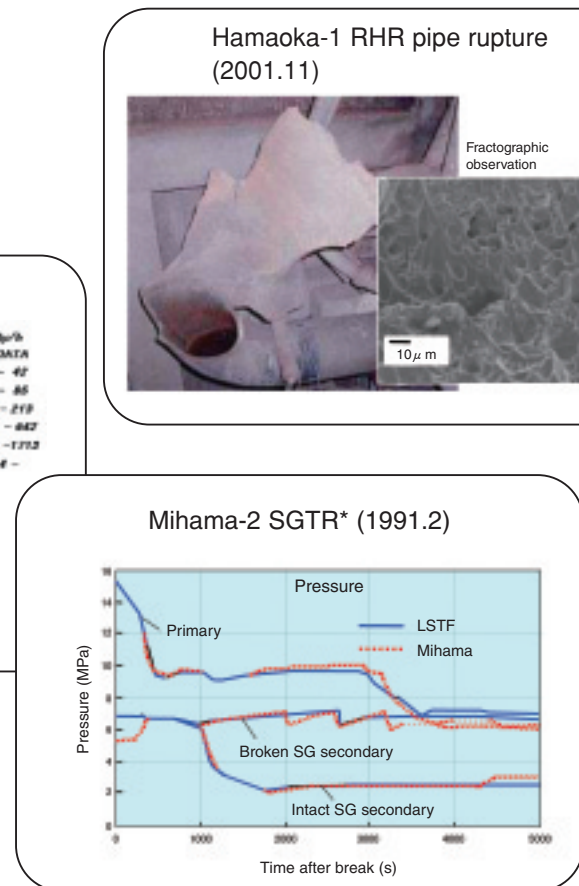
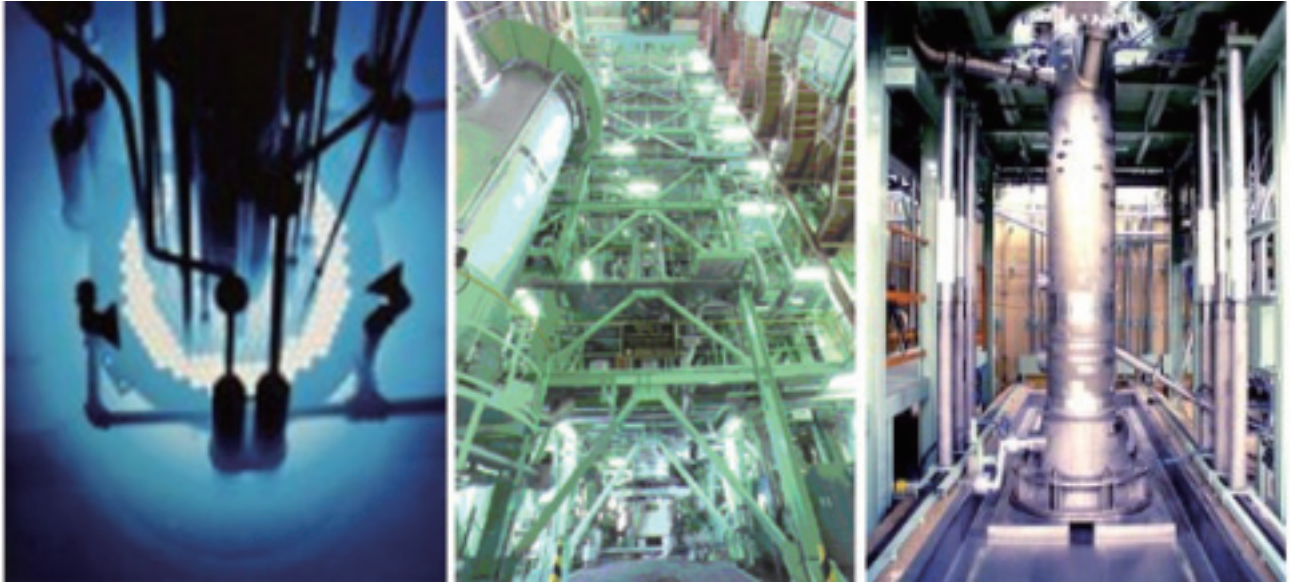


Fig.5-3 Data contributing to emergency response or accident investigation



\* SGTR : Steam Generator Tube Rupture



**Nuclear Safety Research Reactor (NSRR) :**  
 NSRR is a research reactor to conduct fuel irradiation experiments with pulse operation. Experiments are performed to establish safety guidelines and regulatory criteria for fuel failure threshold under reactivity-initiated accident (RIA) conditions.

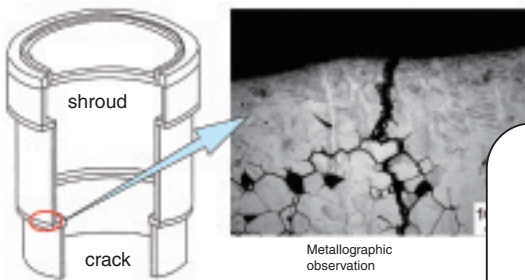
**Large Scale Test Facility (LSTF) :**  
 LSTF is the largest test facility in the world to simulate responses during loss of coolant accidents and abnormal transients of PWR. The components are 1/48-scale in volume and full-scale in height. The OECD/NEA/ROSA Program is being conducted using the LSTF.

**Nuclear Fuel Cycle Engineering Research Facility (NUCEF) :**  
 NUCEF is a facility for research and development of the nuclear fuel cycle including radioactive waste disposal. The research results contribute to establish safety guidelines and criticality databases.

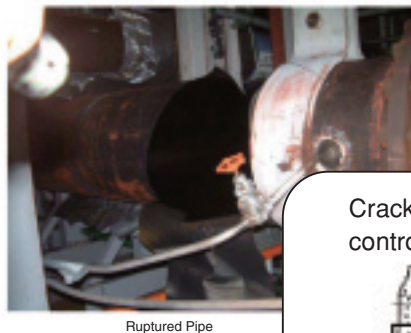
**Fig.5-2 Major facilities for nuclear safety research**

Moreover, when accidents or trouble occurred at nuclear facilities, the JAEA played a responsible role by providing technical experts to assist the government or local government in conducting accident investigations or emergency responses, in such cases as the JCO criticality accident and the Mihama-3 secondary pipe rupture (Fig.5-3).

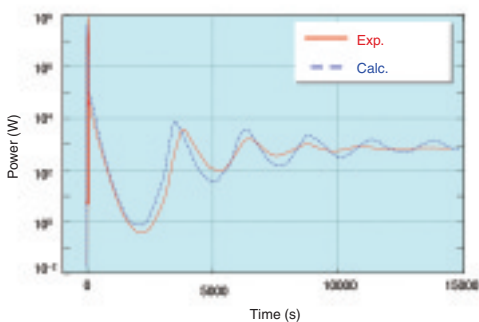
Stress corrosion cracking of BWR core shroud and piping (2002.8)



Mihama-3 secondary pipe rupture (2004.8)



JCO criticality accident (1999.9)



Cracking in BWR hafnium blade type control rod at Fukushima I-3 (2006.1)

