

Naraha Remote Technology Development Center

Challenges towards the
decommissioning of Fukushima Daiichi
Nuclear Power Station, Tokyo Electric
Power Company Holdings, Inc.



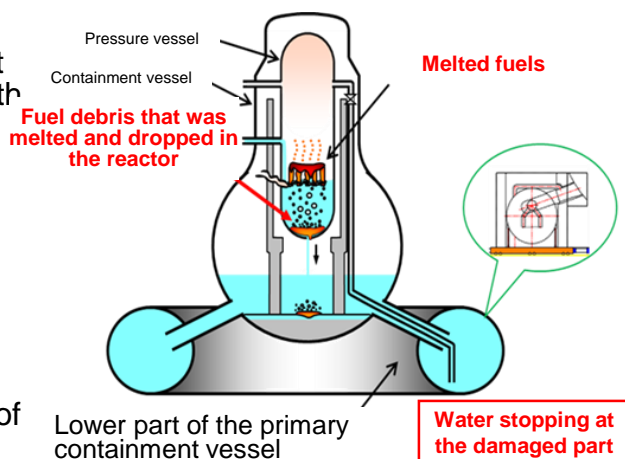
**Fukushima Research Infrastructural Creation Center
Sector of Fukushima Research and Development
Japan Atomic Energy Agency**

I

Subjects towards the decommissioning

The accident of the Fukushima Daiichi Nuclear Power Station (1F), Tokyo Electric Power Company Holdings, Inc., happened accompanied by the Great East Japan Earthquake on March, 11, 2011. Herewith radioactive materials were released into the wide range of the environment, leading to the nuclear disaster.

For the restoration from the nuclear disaster, environmental restoration and decommissioning of 1F are prerequisite. In order to promote the decommissioning of 1F, the subjects are; 1) extraction of nuclear fuel debris that was melted in the reactor, 2) disposal of radioactive wastes, 3) accident progression analysis, and 4) development of remote-control technology.

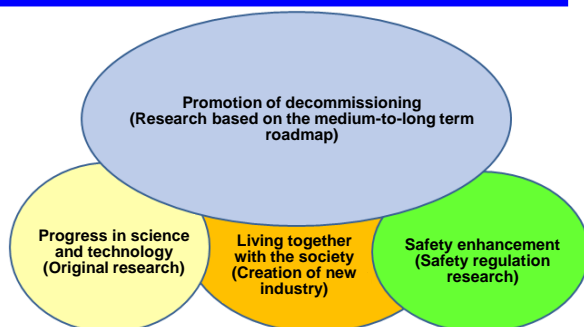


II

Mission of the Naraha Remote Technology Development Center

In order to establish the basic technology concerning remote control technologies which are necessary to the promotion of 1F decommissioning, the research base is prepared in Naraha Town, Fukushima Prefecture.

- Development and demonstration facility for remote control instruments
 - The facility was partially open from September 24, 2015.
 - Full service and support begins from April 1st, 2016.



In order to smoothly proceed the decommissioning of 1F, remote control technology development is necessary. In Naraha Remote Technology Development Center, various test facilities are prepared. Also research and development of standard test method and robot simulators for design, manufacture robots of 1F decommissioning and operator training will be conducted.

Research Administration

Building

W35m × L25m × H20m

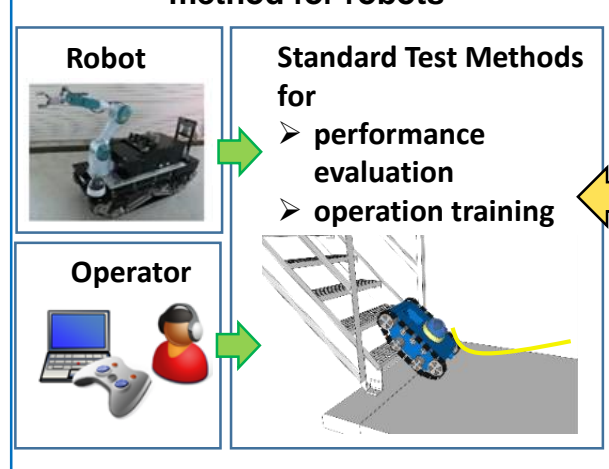


Test Building

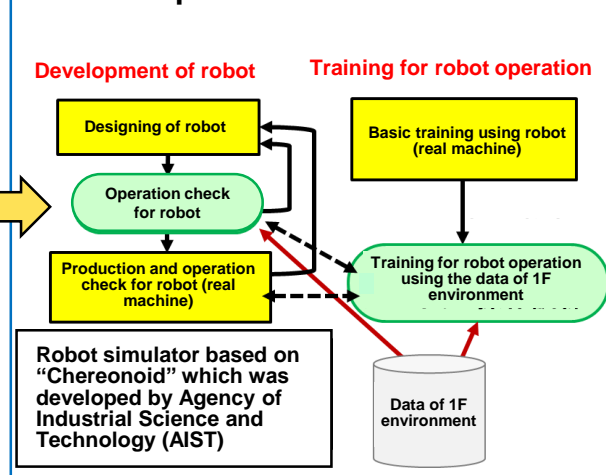
W80m × L60m × H40m



Development of standard test method for robots



Development of robot simulator



Facility and equipment at Naraha Remote Technology Development Center

The facility is composed of Research Administration Building and Test Building. The Research Administration Building is used as office and meeting space of researchers. The building is also equipped with immersive virtual reality (VR) system and robot simulator. In the Test Building, a mock-up of reactor primary containment vessel (PCV) is installed, and the situation of 1F is simulated as well as possible. Also indoor demonstration test of disaster response robots, education and training of operators are conducted.

Research Administration building

Virtual Reality (VR) System

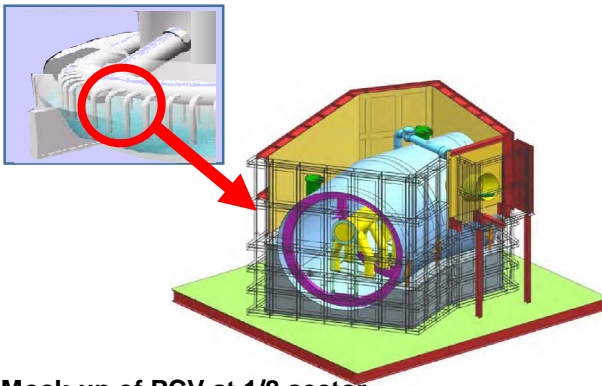
You can

- experience a feeling as if you were in the 1F site by freely moving in a virtual facility.
- set the moving route and speed in order to suppose training accordance to work plan.
- confirm the results of the training, because the information on the route of the trainer can be recorded and played back later.



Test Building

Demonstration test facility at real scale



Mock-up of PCV at 1/8 sector
H18m × W20m × L18m

Test material of lower part of primary containment vessel at real scale

Provided by International Research Institute for Nuclear Decommissioning (IRID)

Test facility for components

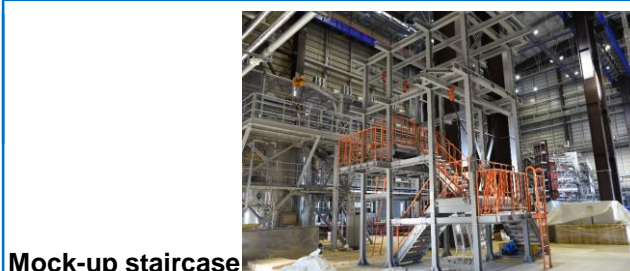


Test water tank

D4.5m × H5.5m (Depth 5m)

Cylindrical tank simulating water environment at 1F, which is necessary to the demonstration test for underwater robot, will be prepared.

Also heating apparatus, underwater camera, and underwater light will be equipped as attached facilities.



Mock-up staircase

11 steps, Width(adjustable) 0.7~1.0m, Inclination(adjustable in 6 levels) 40~55deg

Mock-up stairs simulating the stairs in 1F, which are necessary to the demonstration test for robots, will be prepared. Further, assembly parts are modularized in order to meet various needs.



Motion capture

Measurable range H2m × W10m × L10m

Motion capture necessary to measure the working situation will be prepared. The measuring region can be changed by moving the camera.



**Fukushima Research Infrastructural Creation Center
Sector of Fukushima Research and Development
Japan Atomic Energy Agency (JAEA)**

Naraha Remote Technology Development Center

1-22 Aza-Nakamaru, Oaza-Yamadaoka, Naraha Town, Futaba-gun,
Fukushima 979-0513, Japan

Telephone: +81-240-26-1040 (main) Fax: +81-240-26-1042

Iwaki Office

8F Taira Central Building, 7-1 Aza-Omachi, Taira, Iwaki City,
Fukushima 970-8026, Japan

Telephone: +81-246-35-7650 (main) Fax: +81-246-24-4031