Providing Advanced Scientific Knowledge to Promote Environmental Restoration and Decommissioning by Concentrating Expertise

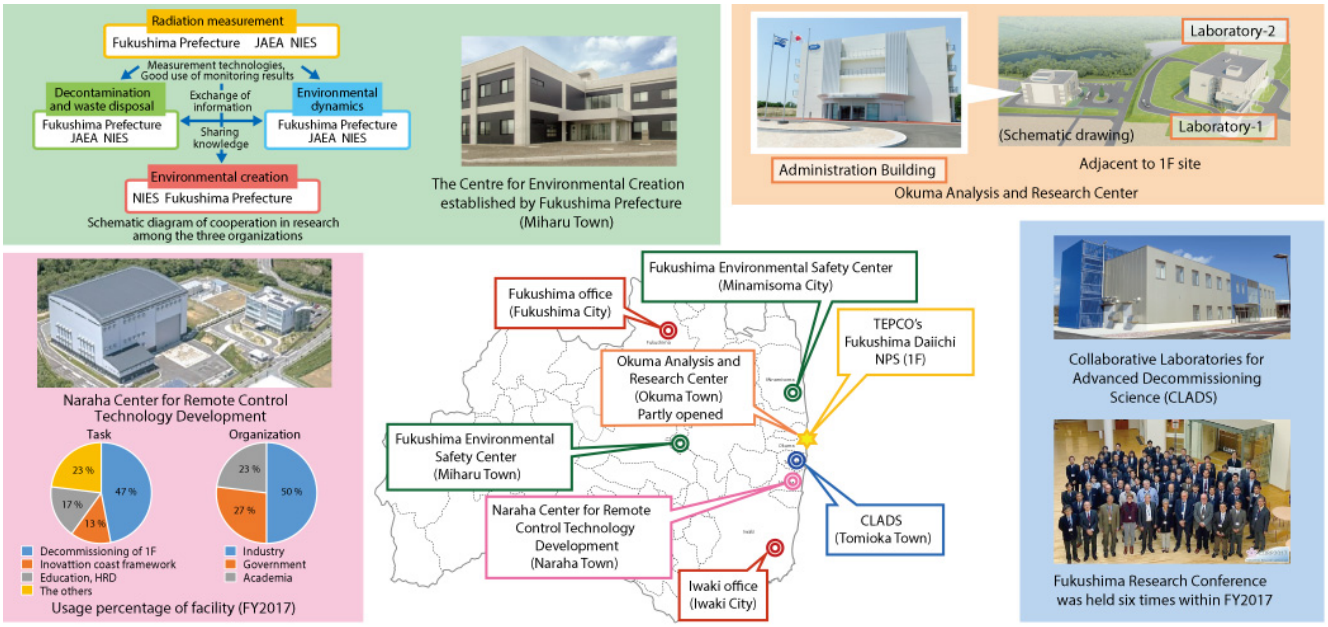

Fig.1-1 Sector of Fukushima Research and Development: R&D bases and activities

As Japan's sole comprehensive R&D institute in the field of nuclear energy, we are conducting R&D to promote the decommissioning of the TEPCO's Fukushima Daiichi NPS (1F), as well as environmental restoration after the 1F accident (Fig.1-1). Our research results are described below.

Towards the decommissioning of 1F, the Collaborative Laboratories for Advanced Decommissioning Science (CLADS), as an international research hub based on the Mid- and Long-term Roadmap formulated by the Inter-Ministerial Council for Contaminated Water and Decommissioning Issues, is promoting research and development on: 1) clarification of 1F-accident-progression scenarios (Topics 1-1 and 1-2); 2) retrieval of fuel debris from nuclear reactors (Topics 1-3 and 1-4); 3) treatment and disposal of radioactive wastes generated by the decommissioning work (Topics 1-5 and 1-6); and 4) remote-controlled instrumental technologies (Topics 1-7–1-9).

The CLADS main building began operation in Tomioka Town in FY2017 (Fig.1-1, right), and has integrally promoted R&D and human-resource development by industry, academia and government. Also, we have held many Fukushima research conferences attended by domestic and international researchers in Fukushima prefecture (Fig.1-1, bottom right). The Research Fund for Promoting Projects on Decommissioning Research was founded by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in FY2018. The purpose of this fund is to promote fundamental R&D and human-resources development (HRD), mainly at CLADS. With this fund, we will reinforce cooperation with universities and research institutes so that we can continuously achieve a more stable environment for R&D and HRD.

The Naraha Center for Remote Control Technology Development, which began operation in FY2016 in Naraha Town, is available for external users who are interested in the development of the remote-control devices to be used in decommissioning work and nuclear disasters (Fig.1-1, left). The number of facility users from industry, academia, and government exceeded one hundred (38 in FY2016 and 64 in FY2017) (Fig.1-1, bottom left). We are improving the test equipment by developing robot simulators and robot test methods to encourage facility use.

The Okuma Analysis and Research Center is intended to analyze radioactive wastes and fuel debris for development of long-term waste management. The Center consists of three buildings: an Administration Building, Laboratory-1, and Laboratory-2 (Fig.1-1, top right). The Administration Building, which consists of office rooms, meeting spaces, workshop, etc., was opened in March 2018 in Okuma Town. Laboratory-1, which is now under construction, will be used for analyzing low-to-medium-radiation-level rubbles and secondary waste. Laboratory-2, which is at the design phase, will be used to analyze high-radiation-level material, such as fuel debris.

These three centers described above are regarded as decommissioning-related facilities that will play a part in the Fukushima Innovation Coast Framework, and will therefore contribute ever more to 1F decommissioning.

For environmental restoration, the Fukushima Environmental Safety Center is carrying out R&D in accordance with the Medium- and Long-Term Activities of the Centre for Environmental Creation (CEC), in collaboration with Fukushima Prefecture and the National Institute for Environmental Studies (NIES) (Fig.1-1, top left). We have cooperated with Fukushima Prefecture and the NIES of the CEC to investigate and analyze the environmental impact due to the forest fire that occurred inside the difficult-to-return zone of Namie Town in April 2017. The Fukushima Environmental Safety Center has been developing technologies for environmental monitoring and mapping (Topics 1-10 and 1-11) in order to establish methods for monitoring contaminated forests, river areas, inshore areas and so on. Moreover, the Center conducts research on environmental dynamics (Topics 1-12–1-15) to predict and resolve the migration of radioactive materials in the environmental, as well as research on decontamination and volume reduction (Topics 1-16–1-18). The Center is disseminating R&D results with a web-based system that will meet a wide variety of needs for researchers, municipalities, local residents, and so on (Topic 1-19).

We will continue to offer technical expertise to promote environmental restoration and decommissioning of 1F by concentrating expertise. We are contributing to Fukushima's revitalization through development of regional industries and HRD by network buildings and cooperation with regional industries, research institutes, and educational institutes.