

9. Activities of Rokkasho Research Center

At Rokkasho village in Aomori Prefecture, the International Fusion Energy Research Centre (IFERC) project and International Fusion Materials Irradiation Facility/Engineering Validation and Engineering Design Activities (IFMIF/EVEDA) project have been conducted under the Broader Approach (BA) agreement between the EU and Japan from June 2007. The roles of the NIFS Rokkasho Research Center (RCE) established on May 2007 are to assist NIFS and universities to cooperate with those activities, and to prepare the environment for promoting various collaborative research including technology between activities at Rokkasho and at universities. As cooperation activities, the head of the NIFS RCE is undertaking tasks as the IFERC Project Leader (PL) from September 2009, and the NIFS RCE has been placed inside the Rokkasho Fusion Institute of QST, where IFERC and IFMIF/EVEDA projects are located. Also, a staff member of the NIFS RCE is working as the leader of the general coordination group of the Joint Special Team for a Demonstration Fusion Reactor (DEMO) design, which is the organization set in May 2015 for establishing technological bases required for the development of DEMO as an all-Japan collaboration. In addition, the NIFS RCE performs communication work with the organizations related to ITER-BA, the Aomori prefectural office, and the Rokkasho village office, and also publicity work in order to have local residents understand nuclear fusion research.

In order to complement ITER and to contribute to an early realization of the DEMO reactor, the IFERC project implements the three sub-projects under the coordination by IFERC PL: DEMO Design and R&D Coordination Centre composed of DEMO Design Activities (DDA) and DEMO R&D activities, the Computational Simulation Centre (CSC), and the ITER Remote Experimentation Centre (REC). The IFERC project itself was and is implemented on schedule as originally planned. However, update of the IFERC project plan with the extension until the end of March 2020 was approved in order to ensure the smooth transition to BA phase II planned from April 2020 to March 2025.

In 2017, the DEMO design work was primarily focused on the design integration of baseline DEMO plant concepts, which work as a proxy for more detailed design integration work, and mainly concentrated on five tasks; (1) compilation of the 2nd intermediate report, (2) design integration for DEMO pre-conceptual design, (3) DEMO physics design integration, (4) component design and system engineering, and (5) material database activities.

The DEMO R&D activity in 2017 was dedicated to draft the final reports of JA Procurement Arrangements (PAs), and the final report of DEMO R&D Activity was compiled in December 2017. Research activity such as structural material R&D is continued under DDA. In addition, the EU/JA joint work for analysis of JET dust and tiles is continued until the end of 2019, based on the mutual understanding that this joint work is quite important for the ITER regulatory aspects as it provides the only experimental evidence in a tokamak of tritium retention in first wall materials.

CSC Activity was successfully completed and all the deliverables related to PAs were submitted and approved in 2017. After the complete shutdown of the CSC took place on December 31, 2016, the activity on CSC consisted in dismantling the IT equipment, organising the final CSC review meeting, and preparing the CSC closing ceremony and the CSC final report. The final report on the CSC consists of a main part and two annexes – one for the IT equipment, and the other for the scientific results. An “IFERC HPC follow-up working group” was set-up in 2017 for continuously sharing experience and practices and for preparing propositions for future joint activities in HPC for the BA extended period.

The main objectives of REC in 2017 were to complete 1) preparation of remote facility: the environmental preparation of the REC room and network at Rokkasho IFERC site, 2) the development of remote participation tools: the software for the remote experimentation system, experimental data analysis and simulation for inter-

discharge analysis for JT-60SA, and 3) the development of the software for the RDA and analysis. Those objectives were successfully completed, verified through various verification tests, and summarized in the provisional final report of REC activity as of December 2017.

Another staff member of NIFS Rokkasho Research Center is undertaking the role of the leader of the general coordination group of the Joint Special Team for a DEMO design. Since collaboration among many researchers from NIFS and other institutions and technicians from companies is indispensable for the conceptual design investigations of the DEMO reactor, which is widely spread across instruments, equipment, and facilities, the NIFS Rokkasho staff works as a coordinator and provides advice on various design activities.

In summary, the NIFS RCE contributes widely not only to the success of ITER but also to the realization of fusion energy through the continuous efforts mentioned above.

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