About This Publication and the JAEA Organizational Outline

This publication introduces the latest research and development (R&D) conducted by the Japan Atomic Energy Agency (JAEA) in various fields of. Each chapter presents the activities of a single sector. The R&D sectors perform their activities through R&D centers or institutes, which are based in one to several locations. These centers and institutes are located throughout Japan, as highlighted in the map below. The following introduction outlines the research undertaken within each sector.

1. **The Sector of Fukushima Research and Development** promotes R&D on the decommissioning and environmental restoration following the accident at the Fukushima Daiichi Nuclear Power Station (1F) of the Tokyo Electric Power Company Holdings, Inc. (TEPCO). This sector promotes the development of the essential R&D infrastructure for 1F decommissioning efforts.
2. **The Nuclear Safety Research Center** and **Nuclear Emergency Assistance and Training Center in the Sector of Nuclear Safety Research and Emergency Preparedness** technically supports regulatory bodies by implementing various areas of nuclear safety research at the Nuclear Science Research Institute. Further, in Hitachinaka City, Ibaraki Prefecture, they perform R&D for nuclear emergency monitoring and protective measures.
3. **The Advanced Science Research Center in the Sector of Nuclear Science Research** strengthens the fundamental research in advanced atomic energy science by investigating novel phenomena, inventing new material, and creating innovative technology toward the future vision of JAEA called “JAEA2050+”. To this end, seven research themes have been organized under three divisions: advanced actinides nuclear science, advanced nuclear materials science, and advanced theoretical physics.
4. **The Nuclear Science and Engineering Center at the Nuclear Science Research Institute in the Sector of Nuclear Science Research** undertakes fundamental research into vital technologies that are required for using nuclear energy.
5. **The Materials Sciences Research Center** and **J-PARC Center in the Sector of Nuclear Science Research** are engaged in research on the use of neutrons. The research is conducted at the research reactor JRR-3 (the Nuclear Science Research Institute) and the Japan Proton Accelerator Research Complex (J-PARC). Research on the use of synchrotron radiation is performed at the Harima SR Radioisotope Laboratory.
6. **The Headquarters** and **the HTGR Research and Development Center in the Sector of Fast Reactor and Advanced Reactor Research and Development at the Oarai Research and Development Institute** aim to advance the development of high-temperature gas-cooled reactor (HTGR) technology, technology for hydrogen production through high-temperature water splitting, and technology for coupling hydrogen production plants with HTGR.

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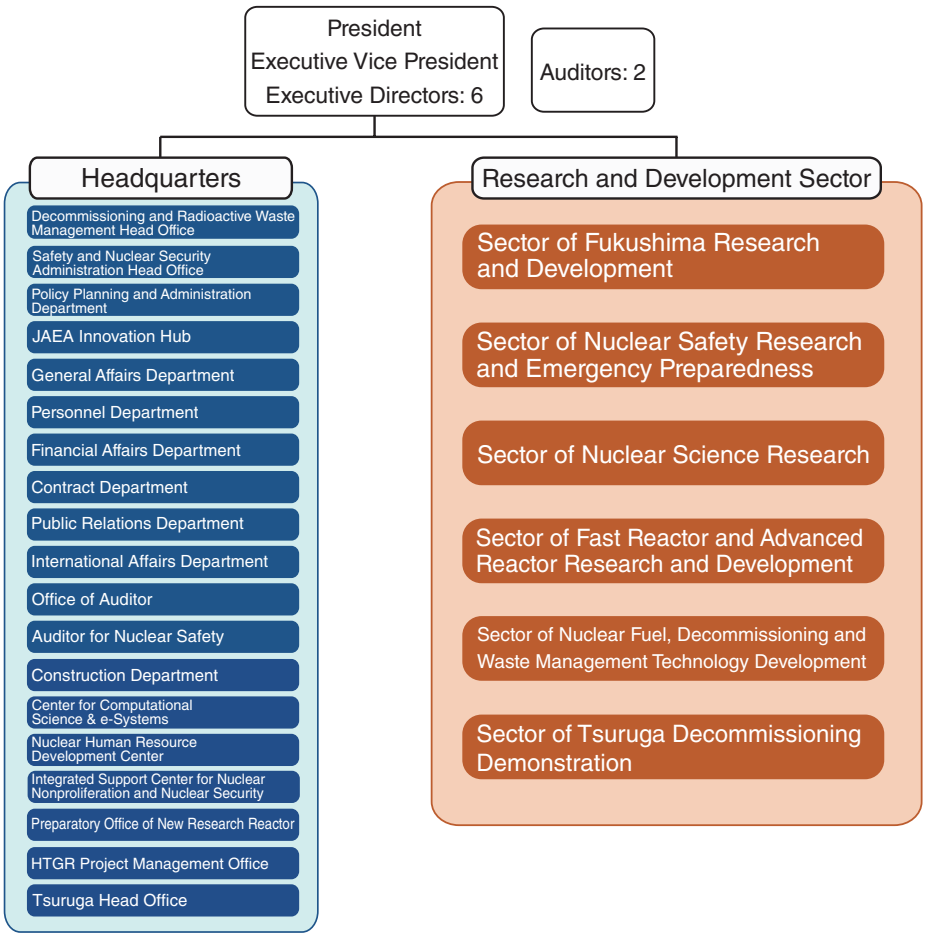

As of January, 2023

7. **The Headquarters**, **the Fast Reactor Cycle System Research and Development Center**, and **the Tsuruga Comprehensive Research and Development Center in the Sector of Fast Reactor and Advanced Reactor Research and Development** aim to establish fast reactor (FR) cycles to address long-term energy security and global environmental issues. This work includes enhancing the safety of the FR system at the Oarai Research and Development Institute, compiling results on the prototype fast breeder reactor Monju (MONJU), developing inspection and repair technologies for the FR system at the Tsuruga Comprehensive Research and Development Center, and manufacturing plutonium fuel and reprocessing spent FR fuel at the Nuclear Fuel Cycle Engineering Laboratories in cooperation with the Sector of Nuclear Fuel, Decommissioning and Waste Management Technology Development.

8. **The Sector of Nuclear Fuel, Decommissioning and Waste Management Technology Development** advances technologies for the safety and rational decommissioning of nuclear power facilities and measures for the processing and disposing of radioactive waste. It operates at the Aomori Research and Development Center, the Nuclear Fuel Cycle Engineering Laboratories, and the Ningyo-toge Environmental Engineering Center. The sector also performs multidisciplinary R&D aimed at improving the reliability of the geological disposal of high-level radioactive waste in Japan. One vital field is the establishment of techniques for evaluating the long-term stability of the geological environment. This research is performed at the Tono Geoscience Center. The primary focus of the Horonobe Underground Research Center and the Nuclear Fuel Cycle Engineering Laboratories is safety assessment and improvement of technologies for the design of geological disposal facilities. The Nuclear Fuel Cycle Engineering Laboratories also focus on developing nuclear fuel cycle technology.

9. **The Center for Computational Science & e-Systems** aims to advance simulation technologies and fundamental technologies in computational science. Further, it aims to improve the operation and maintenance of computer systems and networks. These activities are primarily conducted at the Nuclear Science Research Institute and the Kashiwa Office.

10. **The Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN)** is involved in strengthening nuclear nonproliferation and nuclear security both domestically and internationally. This is achieved through the development of technologies for IAEA safeguards and nuclear detection and forensics, policy research and analysis, capacity-building support activities targeting Asian countries, operation of CTBT international monitoring facilities (located in Japan), and provision of coordination and support by the JAEA for nuclear fuel transportation. These efforts are primarily undertaken at Head Office and the Nuclear Science Research Institute.

R&D Institutes/Centers of JAEA