Development of Technology and Human Capacity Building in the Nuclear Nonproliferation and Nuclear Security Fields to Support the Peaceful Use of Nuclear Energy

The Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN) has been conducting a variety of activities in the areas of technology development and human-resources development related to nuclear nonproliferation and security in cooperation with affiliated domestic and overseas institutions toward a world without the threat of nuclear weapons or nuclear terrorism, as summarized in Fig.10-1.

Technology Development for Japanese and International Applications

A variety of technologies are under development to strengthen nuclear nonproliferation and security in accordance with domestic and international trends. Current projects in nuclear material detection and measurement technology include the development of a non-destructive assay technology to measure nuclear material retaining high radiation levels by irradiating neutrons from an external pulsed neutron source. Another involves the development of non-destructive assay technology to measure nuclear material with delayed gamma spectroscopy, outlined in Topic 10-1. A workshop was also organized in January 2020 regarding the technology developed for detecting nuclear materials in heavily shielded containers using nuclear resonance fluorescence (NRF); this work has received positive feedback by domestic and foreign experts. Nuclear forensics technology used to identify the origin and processing history of nuclear materials used in criminal acts has been improved. Small and low-cost detectors for first responders following nuclear terrorism events and artificial intelligence (AI) for analyzing nuclear forensic signatures are also under development. These developments contribute to the improvement of international nuclear forensic capabilities through international joint sample analysis exercises. Furthermore, methodologies to evaluate and reduce attractiveness of nuclear or radioactive material for nuclear security are being developed in collaboration with the United States of America (US).

Policy Research Based on Technical Expertise

Based on requests from the relevant administrative agencies, factor analysis affecting denuclearization has been studied through case studies, of denuclearized countries such as South Africa, Ukraine, Belarus, Kazakhstan, countries attempted to possess nuclear weapon such as Libya, Iran, Iraq, North Korea, and Syria, from the view point of the incentive for the development of nuclear weapons, domestic and international context, progress in development, and effectiveness of sanctions. The technical procedures related to the disarmament, disabling, dismantlement, and verification have also been investigated and considered in view of the peaceful use of nuclear energy.

Support for Human Resources Development

ISCN has conducted capacity building support activities targeting Asian countries since 2011. As of March 2020, about 4600 participants from Asian countries including Japan have joined ISCN training activities on nuclear nonproliferation (safeguards) and nuclear security. ISCN's capacity building support activities have contributed to human-resource development in Asia and have drawn high praise from the US and Japanese governments.

Contributions to the International Verification Regime for CTBT

To establish a global verification regime for nuclear testing, the international monitoring system of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and a related national data center have been under provisional operation. A joint radioactive noble-gas measurement project began with as a way to strengthen the CTBT Organization's (CTBTO's) capability of detecting nuclear tests based on a voluntary contribution made to the CTBTO by the Government of Japan in February 2017 at Horonobe-Cho of Hokkaido and at Mutsu City of Aomori. This project aims to monitor behavior of background radioactive Xenon in the East Asia region and has been extended until 2022.

Support for JAEA's Nuclear-fuel Transportation and Procurement of Research Reactor Fuels

ISCN coordinates and provides support of nuclear transportation performed by JAEA's research and development centers and dealing with fresh fuels demand of JAEA research reactors and spent fuel after use. ISCN has been contributing to the Global Threat Reduction Initiative (GTRI), which has been strengthening global nuclear security, by promoting the systematic return of highly enriched uranium to the US.

Efforts to Promote Understanding

ISCN promotes understanding of nuclear nonproliferation and nuclear security at home and abroad by delivering the ISCN News Letter with articles on international trends and analysis of nuclear nonproliferation and nuclear security and ISCN activities, and by holding the International Forum on Peaceful Use of Nuclear Energy.

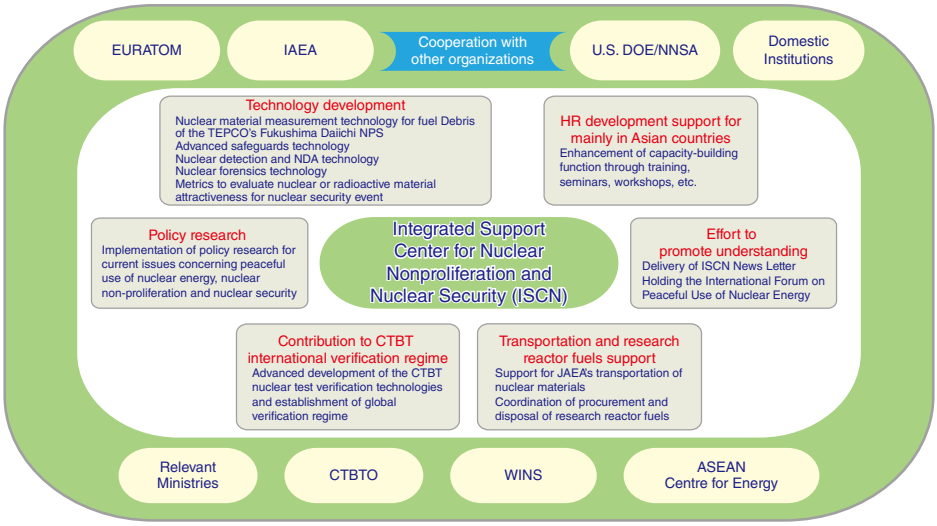

Fig.10-1 Summary of ISCN's activities and affiliated institutions
ISCN has played an active role in strengthening nuclear nonproliferation and nuclear security in cooperation with affiliated domestic and overseas institutions.