Scientific & Technical Development for Nuclear Nonproliferation Supporting Peaceful Use of Nuclear Energy

We have two primary missions regarding nuclear nonproliferation. One mission is to support the government in developing nonproliferation-related policies through research and study.

The other mission is to support government and international organizations by performing nuclear nonproliferation technology development. Other important missions of JAEA are to support denuclearization, nuclear material control JAEA completed installation and tests of particle collection/nuclide measurement equipment at the Okinawa Monitoring Station; its operation began after certification Feb. 2007 as a CTBTO certified facility. at its own facilities, and human resource development.

Policy Research and Study

We are performing two major policy studies, i.e., "the Evaluation of the Safeguards Achievements in Japan", and "the Study of Peaceful Use of Nuclear Energy in Asia and Improvement of Its Transparency and Confidence Building", based on in-house technical knowledge.

In 2006, we released the results of these projects investigating which measures are necessary for nuclear nonproliferation in peaceful use of nuclear energy, using Japan as a model, at an international forum and the working group meeting held by JAEA. Also, we performed investigation and research concerning assuring fuel supply and strengthening of nonproliferation by meetings of knowledgeable people and investigation of various countries' intentions.

Technical Development relating to nuclear nonproliferation

Development of the advanced safeguards system which will be applied to effective and efficient safeguards for the future Fast Breeder Reactor fuel cycle is underway. In collaboration with US as part of GNEP, cooperative research plans for next generation safeguards/physical protection have been discussed.

Regarding environmental sampling for safeguards, we are performing development of the fission track method with which a uranium particle less than 1 μm can be detected, and technical development for upgrading of analytical accuracy is underway.

We have upgraded the "JOYO" Remote Monitoring System to get improved security of communication, and have started its field trials, as a technical development for improvement of the reliability of, and confidence in, peaceful use of nuclear energy.

We also contribute to the Generation IV International Forum and INPRO (International Project on Innovative Nuclear Reactors and Fuel Cycles), and we are performing research on evaluation methodology for the proliferation resistant features of future nuclear cycle systems.

Support of Denuclearization

As technical development to contribute disarmament and denuclearization of the world, we have performed cooperative research with Russia to use surplus nuclear weapons plutonium as MOX vipac fuels in fast breeder reactors. The effectiveness of this method was recognized by both the US and the Russian Federation, and its application in Fast Breeders has been indicated.

Concerning CTBT (Comprehensive Nuclear-Test-Ban Treaty), at Tokai laboratory, we continue to perform precise analysis of environmental specimens collected at nuclide stations in the world.

In Takasaki Monitoring station we installed Noble Gas Analytical Equipment which can detect nuclear explosions under the ground, adding to the existing Particle Collection/Nuclide Analytical System.

Following Takasaki monitoring station, the technical level of the Tokai laboratory and Okinawa Monitoring Station was certificated by the CTBT Organization Preparatory Committee in fiscal 2006, so that all of the monitoring stations/laboratories established by JAEA commenced their operations as certified CTBT organization facilities (Fig.11-1, Fig.11-2).

Nuclear Material Management

Concerning safeguards, we contribute to IAEA safeguards implementation in technical aspects by conducting several technical development projects based on the agreement for technical cooperation with US Department of Energy.

Concerning physical protection, we continue technical development for strengthening of physical protection measures. For example, we conducted performance tests of a system for detection an intruder into the grounds of a facility, consisting of surveillance cameras and image processor, etc.

Concerning nuclear material transportation, we are performing technical development of safe and effective transportation of MOX powder, etc.

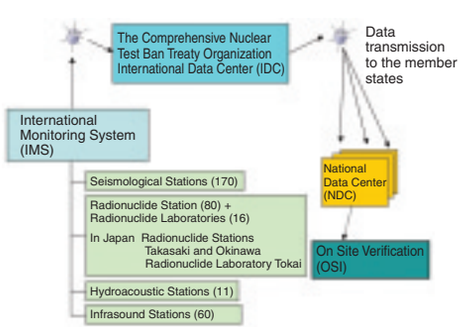

Fig.11-1 Comprehensive Nuclear-Test-Ban Treaty (CTBT) international verification
CTBT Organization Preparatory Committee is organizing to establish the International Monitoring System (IMS) with installation of monitoring stations/ radionuclide laboratories in which four different technologies to monitor the globe for nuclear explosions - seismic, infrasound, hydroacoustic and radionuclides, are used. Also, the committee is preparing a verification system by which relevant information could be provided to all of the member states of CTBT.

Fig.11-2 CTBT Okinawa Radionuclide Monitoring Station
JAEA completed installation and tests of particle collection/nuclide measurement equipment at the Okinawa Monitoring Station; its operation began after certification Feb. 2007 as a CTBTO certified facility.