

# INTRODUCTION



The promulgation of Japan's Atomic Energy Basic Law in December 1955 and the establishment of the Atomic Energy Commission in January 1956 laid the groundwork for the nation's utilization of nuclear energy. Japan's use of nuclear energy, from the beginning, has been exclusively for peaceful purposes. This commitment is reflected, in part, by Japan's acceptance of international safeguards, initially on the basis of agreements for cooperation, and later as a non-nuclear weapon state party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

The NPT entered into force in March 1970 and was ratified by Japan in June 1976. Under the Article 3 of the NPT, each non-nuclear-weapon state party to the Treaty is obliged to accept international safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency (IAEA), on all nuclear material existing in the state or under its jurisdiction anywhere.

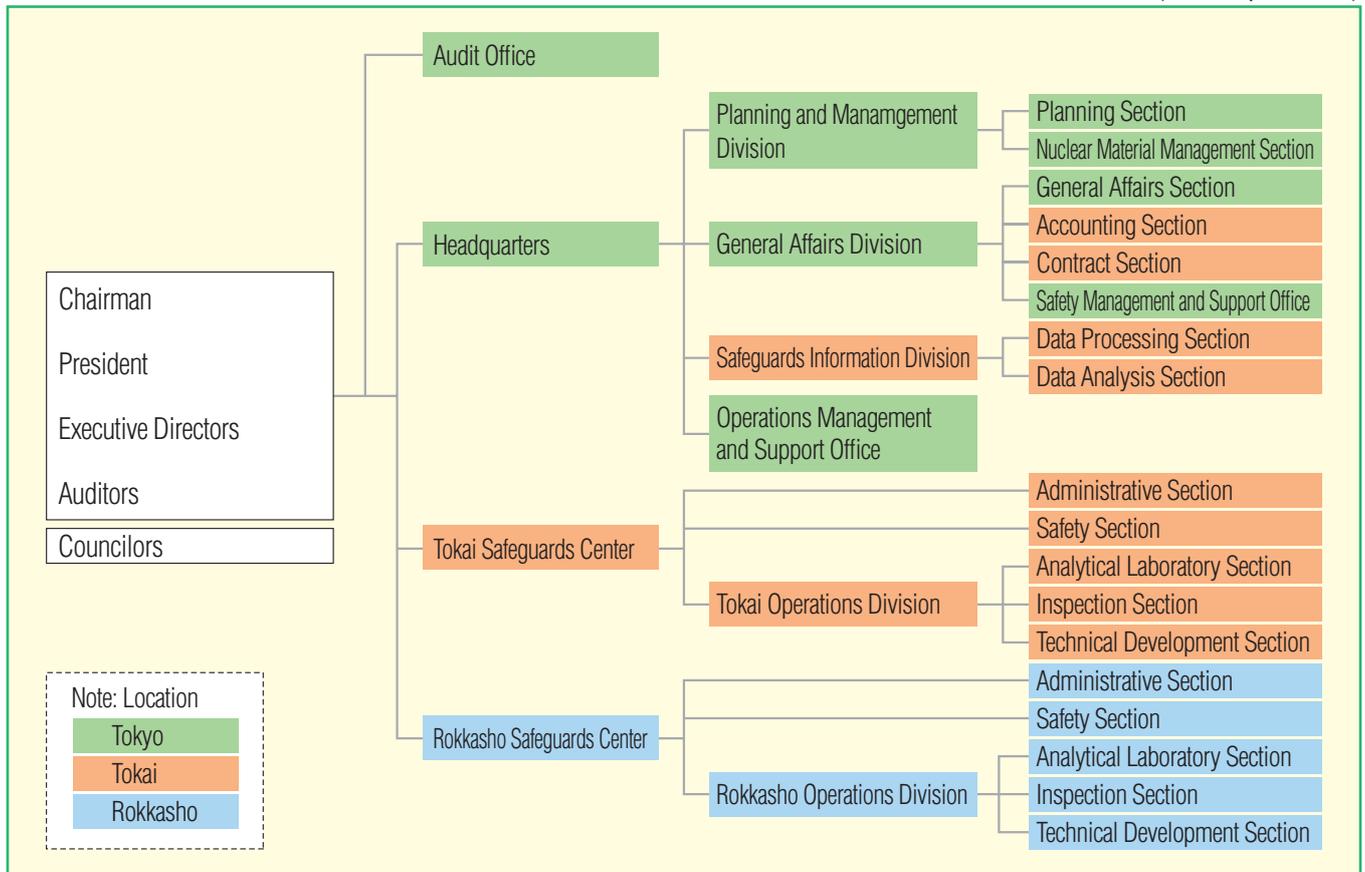
Japan's Comprehensive Safeguards Agreement with the IAEA (INFCIRC/255), negotiated after the Model Agreement INFCIRC/153, entered into force on December 2, 1977. Comprehensive safeguards agreement stipulates that the state system of accounting for and control (SSAC) of all nuclear material subject to safeguards under the agreement shall be established and maintained. And further, the agreement stipulates the content and timing of reports by the SSAC to the IAEA on facility design, facility operations, nuclear material inventories and inventory changes. These reports provide an essential basis through which the IAEA conducts verification activities to ascertain that the nuclear material is adequately accounted for and there has been no diversion.

Anticipating Japan's formal accession to the NPT, the Nuclear Material Control Center (NMCC) was established on April 15, 1972, under the approval of and in concert with the Government, to implement safeguards pursuant to national and international requirements. The current organizational structure of NMCC is shown in the next figure.

# ORGANIZATIONAL SERNCTURE AND LOCATION

## Organigational Structure of NMCC

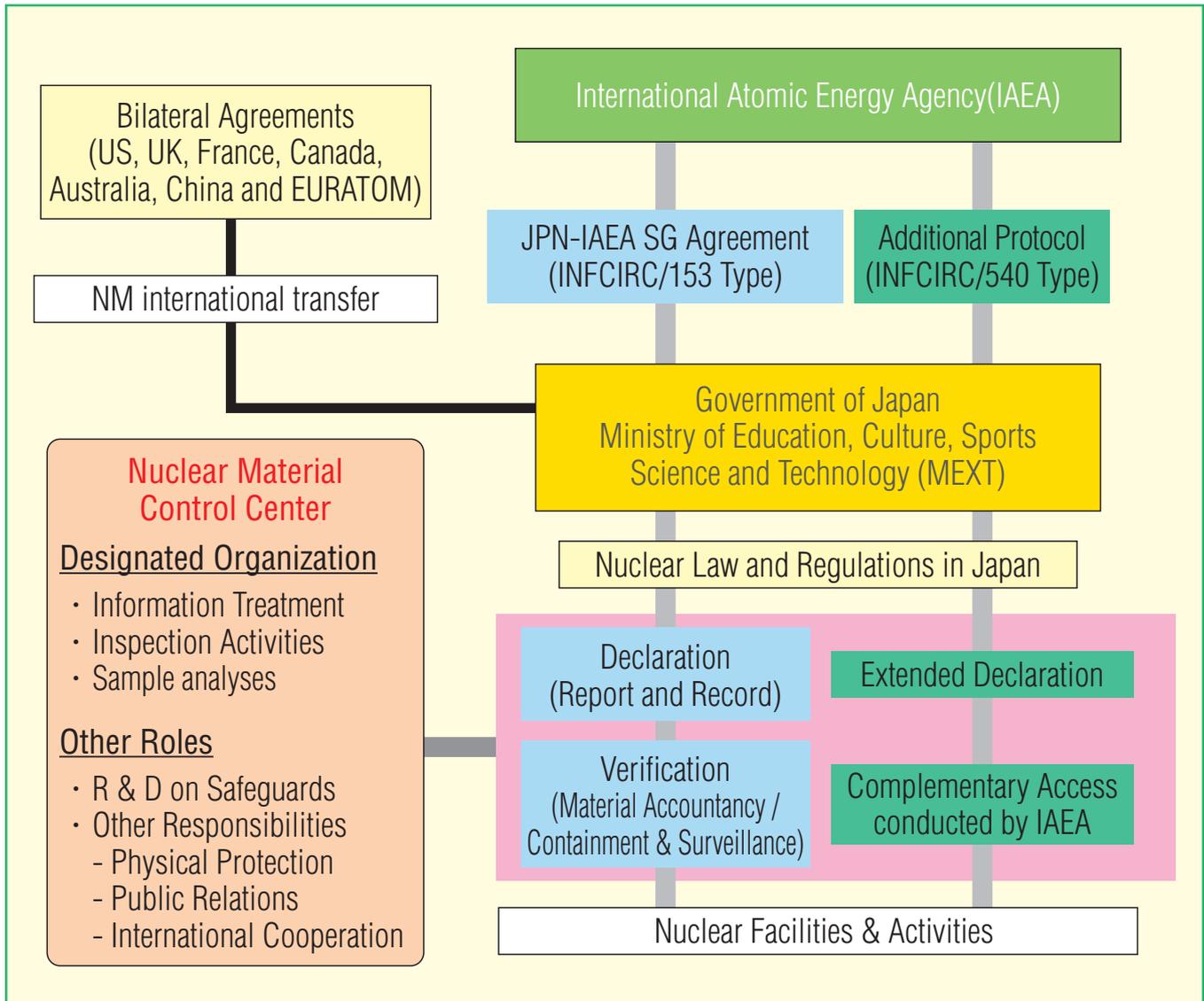
(as of April 2008)



## Location of NMCC



Basic Scheme of Safeguards Implementation in JAPAN  
and Nuclear Material Control Center

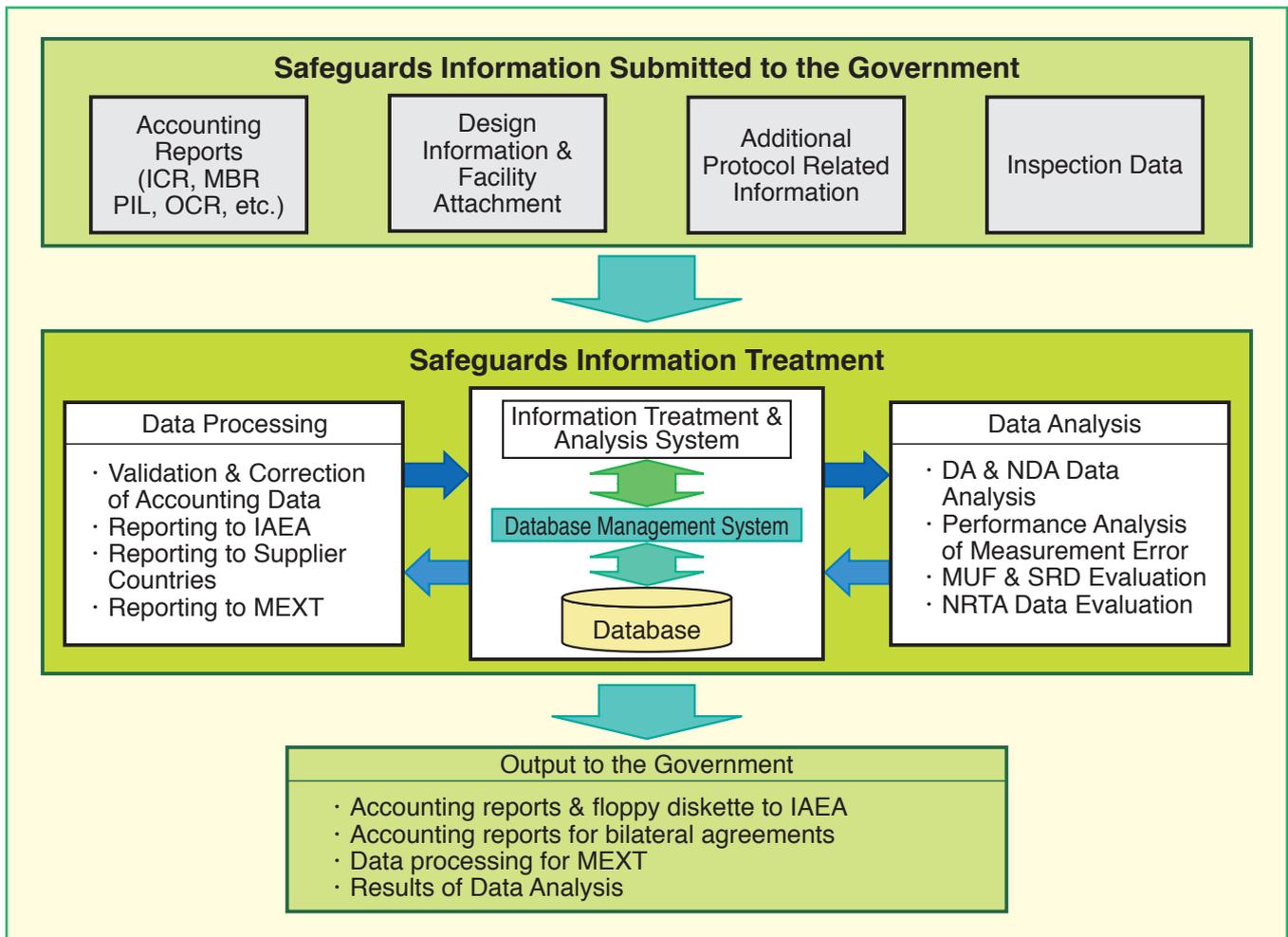


NMCC is an independent, non-profit foundation established specifically to support the Government, Ministry of Education, Culture, Sports, Science and Technology (MEXT), in meeting domestic and international requirements for safeguarding nuclear material.

The role of NMCC has expanded with the evolution of Japan's nuclear programme and changing international requirements, and today includes:

- safeguards information treatment including information required by international commitments such as the NPT Safeguards Agreement and the Additional Protocol;
- safeguards inspection activities and safeguards sample analyses;
- research and development related to safeguards and physical protection; and
- other activities related to safeguards, physical protection, public relations and international cooperation.

## Safeguards Information Treatment



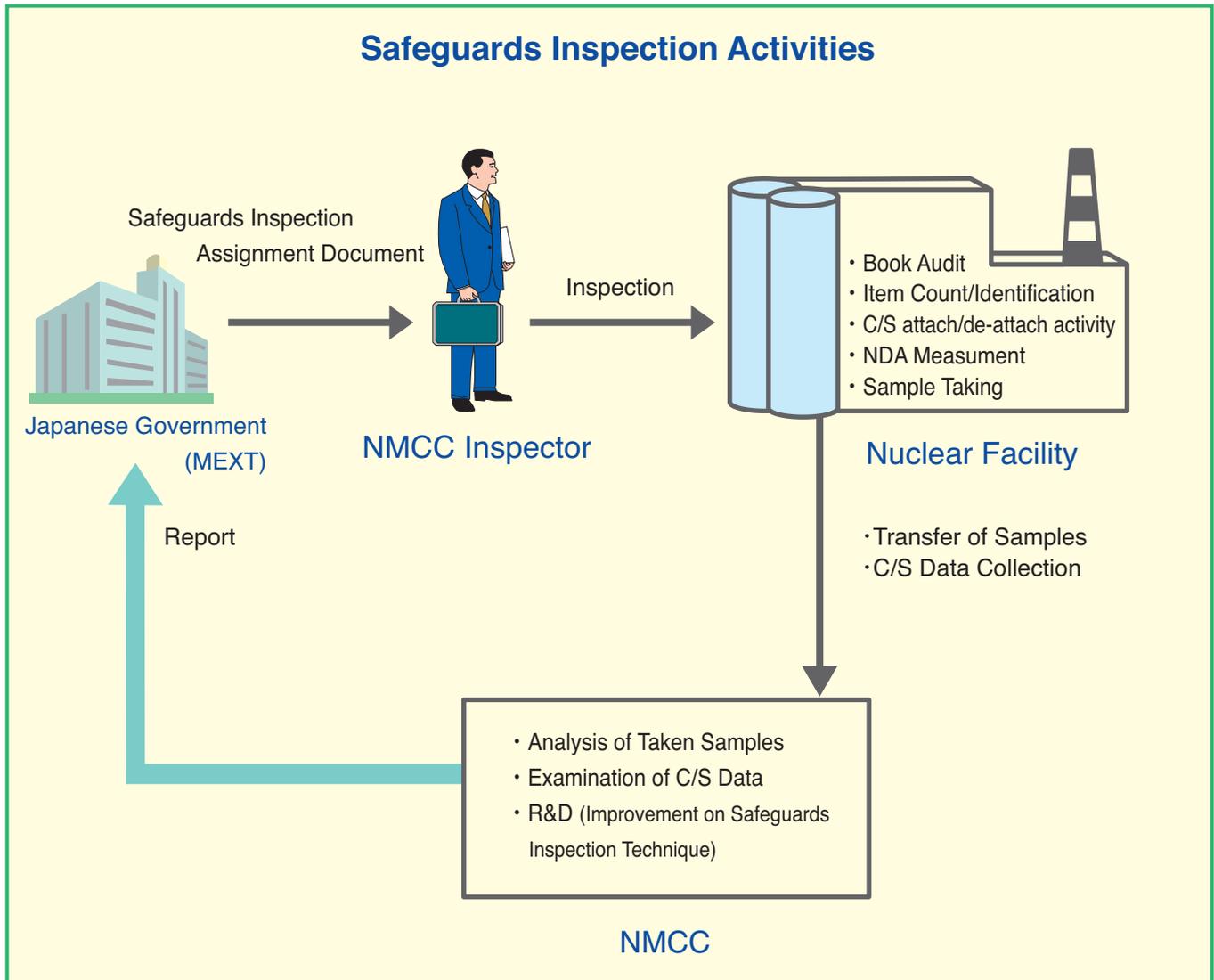
The Japan's nuclear law and regulations have specific provisions for ensuring the application of the national and the international safeguards to all nuclear materials. The law requires that the facility operators establish and maintain a reliable system of accounting and control of nuclear material in their facility. The facility operators licensed by the Government for using nuclear material have to submit reports on facility design, facility operations and nuclear material inventories and inventory changes to the Government.

NMCC, designated organization for information treatment by the Government, provides a centralized capability for processing all safeguards related information to be submitted to the IAEA and its evaluation. Categories of information that NMCC treats are as below.

- Nuclear material accounting reports such as initial reports, ICRs (Inventory Change Reports), MBRs (Material Balance Reports), PILs (Physical Inventory Lists) and the bilateral related reports such as OCRs (Obligation Control Reports) and so on; and
- Analysis of destructive and non-destructive assay data obtained during the inspections, the evaluation of SRD (shipper/receiver difference) and MUF (material unaccounted for), etc.

Japan's Additional Protocol to the Safeguards Agreement became in effect on December 16, 1999, and at the same time the national nuclear law and regulations were amended to meet the requirements of the Additional Protocol. The declarations in accordance with Articles 2 and 3 of the Additional Protocol have been prepared and dispatched to the IAEA. NMCC has been assisting the Government with the processing of such declarations.

Flowchart of the Safeguards Implementation by NMCC



Under domestic legislation and provisions of the Safeguards Agreement, the IAEA inspectors should be accompanied by representatives of the Japanese Government while on an inspection. State inspectors carry out inspection activities that essentially mirror those carried out by their IAEA counterpart. NMCC has long supported State inspectors in the conduct of inspection activities through the provision of non-destructive assay (NDA) measurement expertise and maintenance services.

With an ever-increasing need for inspection expertise and continuity of inspection staff, the Japan's Diet, in 1999, approved changes of the domestic nuclear law and regulations whereby inspection activities can be delegated to an organization that has been designated as a competent organization for this purpose by the MEXT. NMCC was designated as this competent organization for the conduct of inspections and began implementation since January 2000.



Calibration of inspection equipment  
(prior check)



Analysis using hot-cell at OSL



Components of ICVD

Improved Cerenkov Viewing Device  
(ICVD)

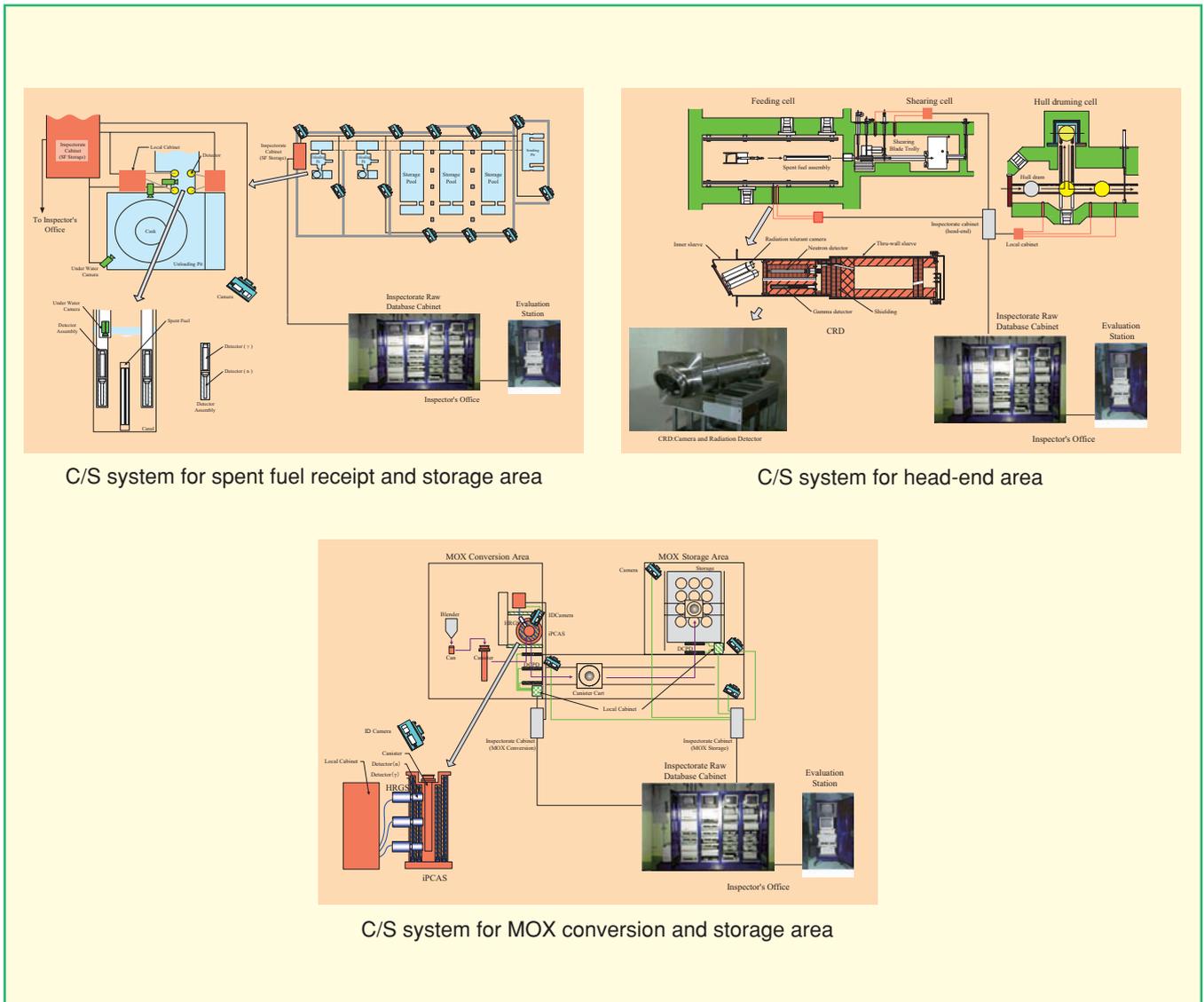


Enrichment Measurement of U  
using mass spectrometry

NMCC has long supported the implementation of safeguards in Japan through the operation of an analytical laboratory for highly precise measurement of safeguards samples through destructive analysis methods. Samples taken by State inspectors in a variety of nuclear facilities such as uranium enrichment, uranium fuel fabrication, reprocessing, mixed oxide (MOX) conversion and MOX fuel fabrication are brought to NMCC's Tokai Safeguards Center (TSC) for analysis. The TSC, located in some 130 kilometers northeast of Tokyo, started operations in February 1979 as an analytical laboratory. The laboratory is equipped with a variety of sophisticated instruments such as thermal ionization mass spectrometers (TIMS), potentiometric titrators, controlled-potential coulometric titrators and alpha/gamma spectrometers, for nuclear material analysis. Construction of a new laboratory complex was completed at the end of January 2001 and was commissioned in March 2001 as a facility licensed for nuclear material use by the Government.

The implementation of safeguards at the large-scale reprocessing plant at Rokkasho (RRP), scheduled to start commercial operations in 2009, involves the operation of an on-site laboratory (OSL) necessary to timely analyze a large number of samples. The OSL is jointly used by NMCC and the IAEA in a manner that both the Japanese Government and the IAEA are able to come to their own independent conclusions. NMCC has been extensively involved in the design, installation, licensing and operation of the OSL.

## Safeguards System established for RRP



Research and development (R&D) work related to safeguards and physical protection are important subjects of NMCC's work. R&D work at NMCC are carried out at the request of the Japanese Government, the Japan Atomic Energy Agency (JAEA) and Japanese utilities. The scope of R&D projects relevant to nuclear material control includes facility or process specific aspects of material accountancy, containment/surveillance (C/S) and physical protection.

In recent years, NMCC's R&D work has been concentrated on advanced safeguards technologies for commercial MOX fuel fabrication plant (JMOX) to be constructed adjacent to Rokkasho Reprocessing Plant (RRP), since works for RRP had almost been completed. Systems for automated non-destructive measurement and C/S for both MOX powders and MOX assemblies have been developed.

NMCC, serving as a Secretariat, assists the Government in coordination of Japan Support Programme for Agency Safeguards (JASPAS) tasks. The main objective of JASPAS tasks is to further the technical development of IAEA safeguards through technical support. Along the way, NMCC has carried out 17 tasks among around 100 JASPAS tasks in total.

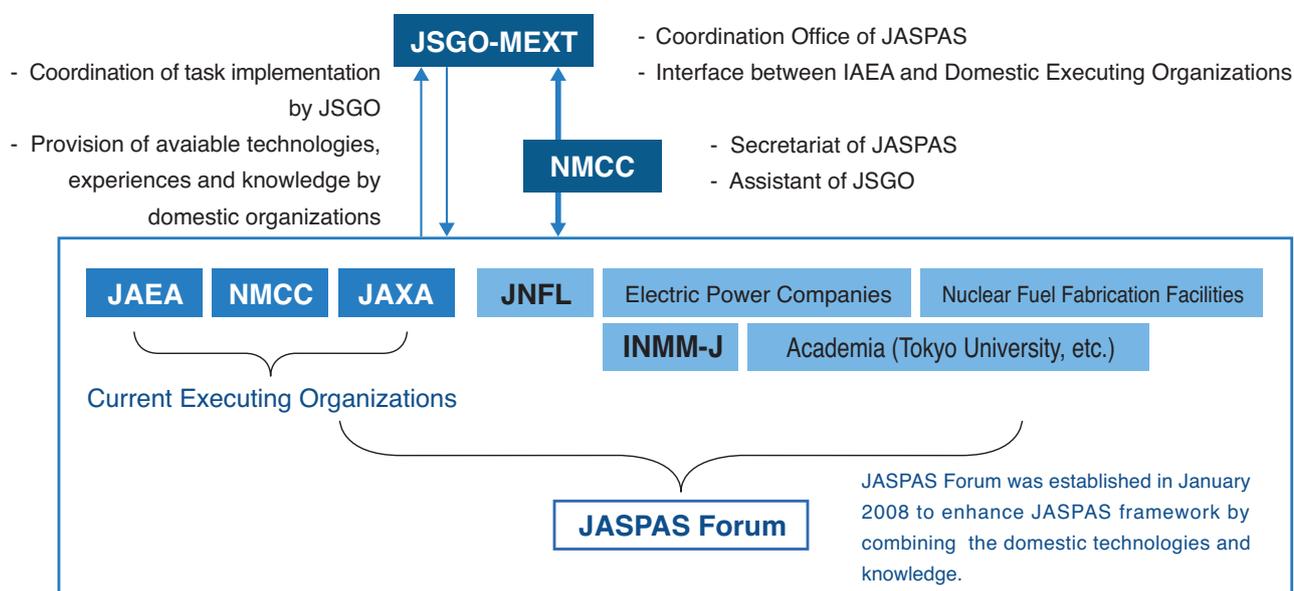
## JASPAS Task carried out by NMCC

(as of November 2008)

	Task ID	Title of the Task	Status
1	D-1733	Provision of Open Source Information	O
2	A-1721	Support for Development of J-MOX SG Systems	O
3	B-1713	Revision to Nuclear Fuel Cycle Training Manuals	O
4	C-1553	Randomly Scheduled Inspections for Integrated Safeguards	O
5	A-1521	Cost Free Expert : Integrated Safeguards Implementation	C
6	C-1501	Determination of Decommissioned Status of Facilities	C
7	JNT C 1389	Review and Update of Physical Model	C
8	D-1282	Provision of Open Source Information	C
9	E-1281	Safeguards Equipment for the RRP MOX Storage Area	O
10	E-1280	Development of a Low-cost/Portable Back-up Digital Camera	T
11	C-1215	Application of the State-level Integration Concept on Fuel Cycles under SG	C
12	A-1214	Advanced DA Methods for On-Site Laboratory	T
13	E-1188	Integrated Head-End Verification and C/S System for RRP	C
14	A-1132	Independent Data Collection and Evaluation during LASTAC Exercise	C
15	A-996	Solution Mass Verification Technology Study on the Mock-up Input Accountancy Tank for Rokkasho Reprocessing Plant	C
16	E-819	Integrated Spent Fuel Assembly Verification and C/S System for RRP	C
17	A-270	Resin Bead Sampling and Analytical Technique (Jointly carried out with PNC, former JAEA)	C

(note: status of on-going task is indicated as 'O', completed as 'C', and terminated as 'T'.)

### Domestic System for implementing JASPAS





"Nuclear Material Control Center News" (Japanese only)



Technical Meeting on Safeguards Implementation among IAEA, Japanese Government, including NMCC, and Operators



Annual Meeting with KINAC

With increasing interest in nuclear non-proliferation and the safeguarding of nuclear material, the importance of public relations and dissemination of relevant information has also increased. NMCC issues the "Nuclear Material Control Center News" on a monthly basis and publishes leaflets, booklets and other materials related to safeguards and physical protection. NMCC also provides periodic seminars, lectures and regularly scheduled training courses on nuclear material accountability and physical protection.

Increased awareness of the importance of international cooperation is reflected in the growth of the number of international visits and information exchanges in the field of nuclear material management. Since 1995, NMCC has undertaken an "Arrangement for Cooperation in Information Exchange on Nuclear Material Control" with the Korea Institute of Nuclear Nonproliferation and Control (KINAC) of Republic of Korea to promote cooperation in the field of nuclear material management.



Following the revelations regarding the existence of a clandestine nuclear weapons programme in Iraq after the Gulf War, the IAEA Secretariat, Japan and other Member States of the IAEA undertook an extensive multi-year programme to strengthen the effectiveness and improve the efficiency of IAEA safeguards. The centerpiece of this effort was the successful negotiation of the "Protocol Additional to Safeguards Agreements" which greatly extends the information and inspector access available to the IAEA. Japan is the first country with an extensive nuclear programme to accept the Additional Protocol which entered into force on December 16, 1999. Implementation of the Additional Protocol provides the IAEA with the basis for assurance of absence of undeclared nuclear materials and activities in a State and with the opportunity to optimize the quantitative verification activities by IAEA. NMCC is involved in the development of the integrated safeguards including development of safeguards approaches, inspection procedures and verification technologies.

Japan currently has 53 operating nuclear power reactors with a total generating capacity of some 48 GW, accounting for about one-third of the nation's electricity generation. A commercial-scale nuclear fuel cycle complex, including a reprocessing plant, an enrichment plant, radioactive waste disposal facilities and a MOX fabrication plant, are either under construction or in operation at Rokkasho-Mura, Aomori Prefecture. Japan continues to see nuclear energy as an essential component in an overall energy strategy to meet the nation's demand for energy while limiting the impact on the environment and attaining energy security.