Safety Regulation and Activity of NSC for Disposal of Radioactive Waste

Kunihisa Soda, Deputy Chair
Nuclear Safety Commission

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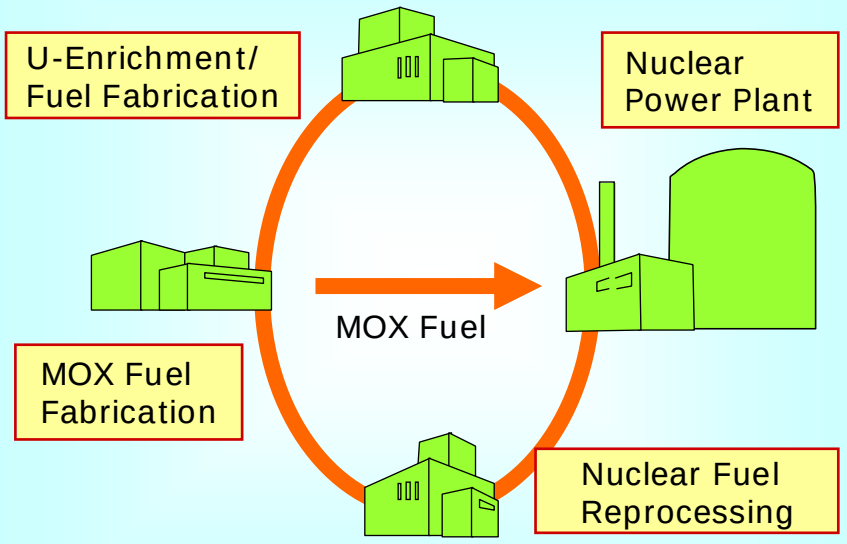
- Utilization of nuclear energy and radioactive waste
- Safety regulation for disposal of radioactive waste
  - Activity of Nuclear Safety Commission
- Safety research for disposal of radioactive waste
- International coordination for nuclear safety

Utilization of Nuclear Energy and Radioactive Waste

Sources and Characteristics of Radioactive Waste

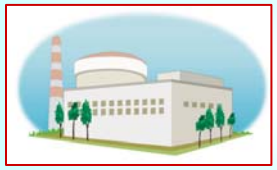
Nuclear Reactor Facilities



Note: Regulated by METI

Research Reactors/ Facilities using Nuclear Fuel materials

Facilities using Radioisotopes



Note: Regulated by MEXT

Characteristics of Radioactive Waste

- Various physical states
  - Gas, Solid, Liquid
- Wide range of radioactivity
  - Low to High level
- Institutional Control
  - Short to Long lived radioactivity level
  - Step-wise approach, Termination of the institutional control

Note: Waste below the clearance level is not treated as radioactive waste by the rule.

Decommissioning of Nuclear Facilities

Utilization of Nuclear Energy and Radioactive Waste

Categorization of Waste and Disposal

Nuclear Facilities	Examples of Waste	Category of Waste by Level of Radioactivity			Method of Disposal
Nuclear Power Plant	Concrete, metal	Low-Level Radio-active Waste	NPP Waste	Very Low-level	Near-Surface (Trench)
	Liquid waste, filters, used equipment, other used material			Low-Level	Near-Surface (Pit)
	Control rods, core internals			Relatively High-Level	Sub-Surface (1)
U-Enrichment / Fuel Fabrication Plant	Used material, sludge, used equipment		Uranium Waste		Near-Surface (Trench, Pit), Sub-Surface, Geological (2)
Reprocessing / MOX Fuel Fabrication Plant	Parts of fuel elements, filters, liquid waste		Waste including TRU		Near-Surface (Pit), Sub-Surface, Geological
Reprocessing Plant	Vitrified waste	High-Level Radioactive Waste			Geological
All Plants	Most of waste from decommission	Level below the Clearance Level			Recycle, Dispose as industrial waste

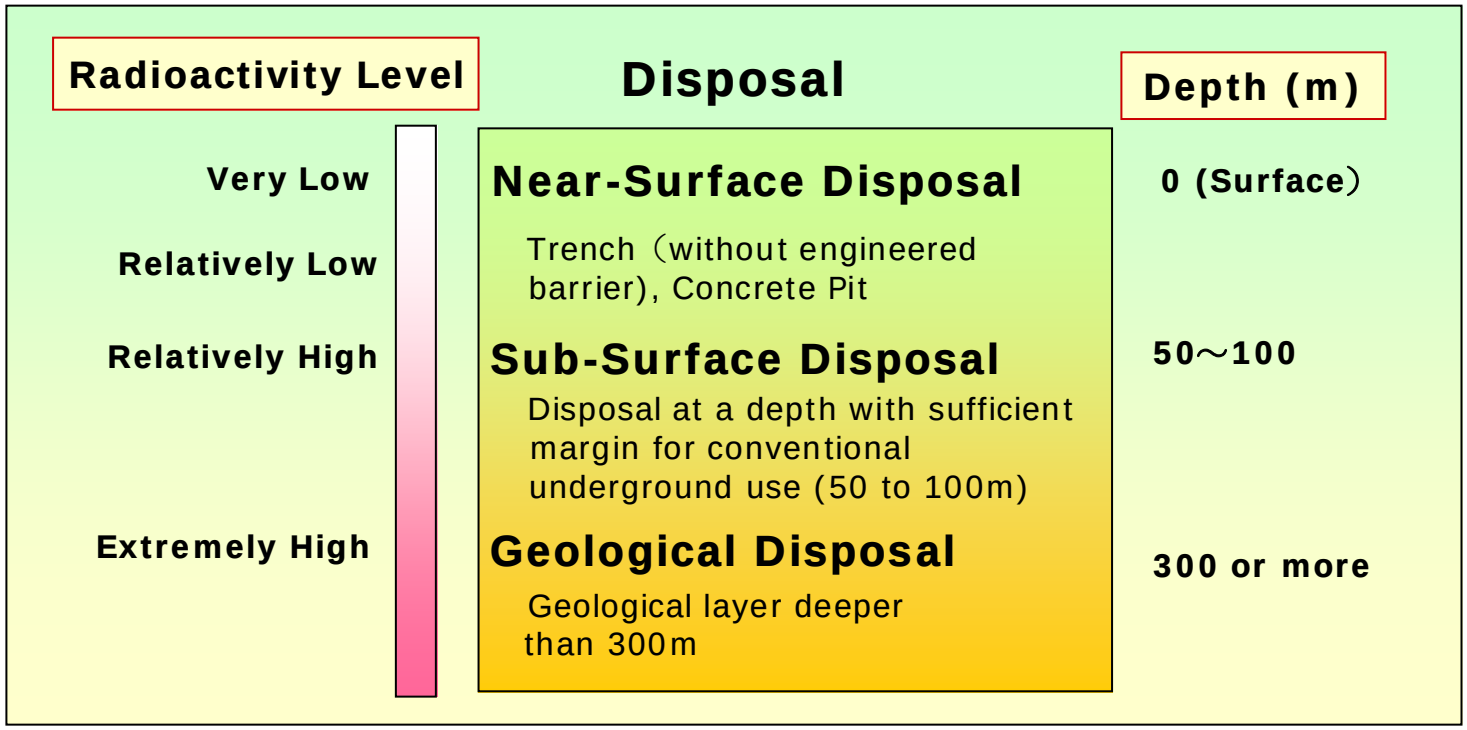
Regulation is enforced.

Note: (1) 50 to 100m deep (2) 300m deep or more

Utilization of Nuclear Energy and Radioactive Waste

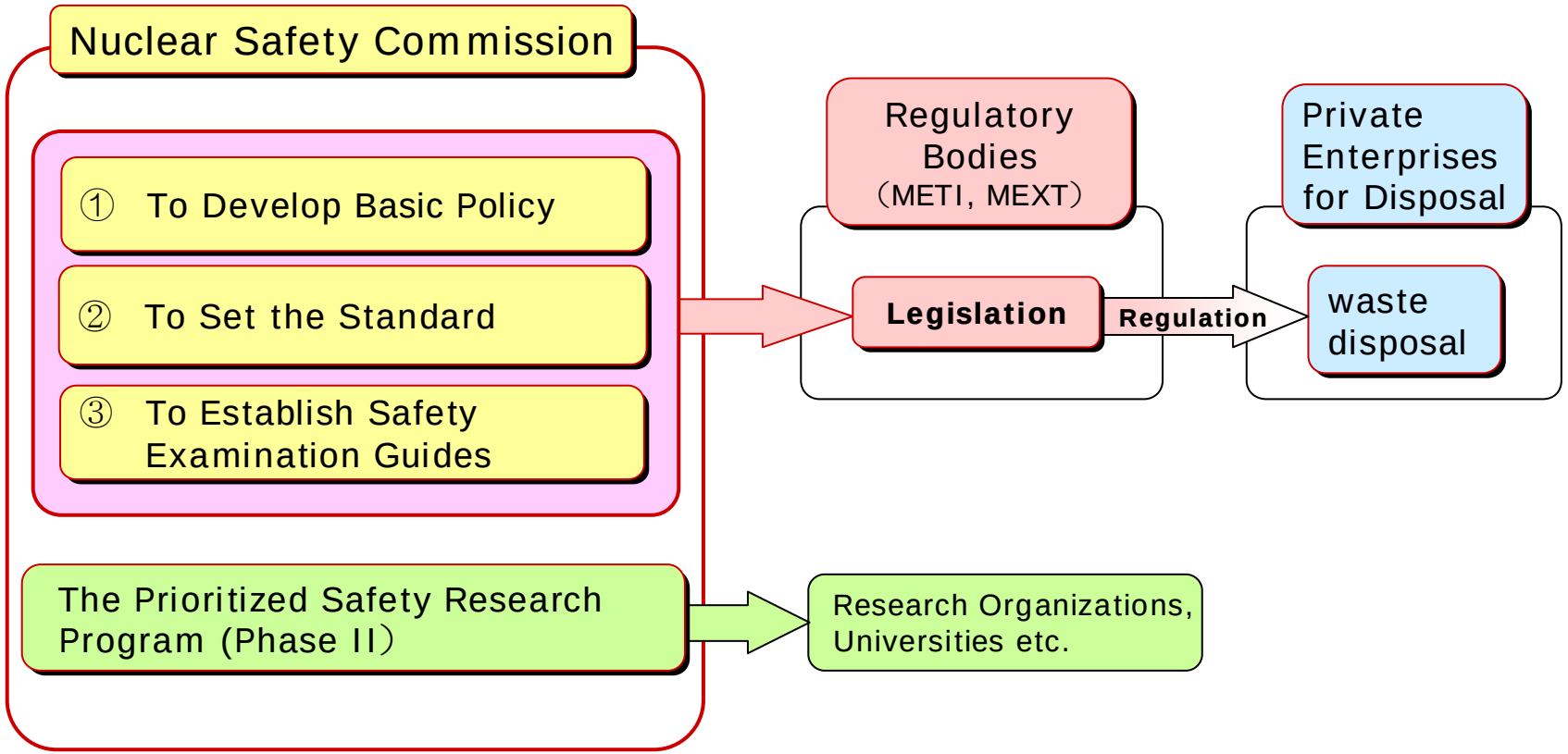
Basic Policy of Safety Regulations（Concept）

- Consideration of radioactivity level, Rational and effective management approach taking into account of risk, Long-term safety strategy based on effect of physical barriers and isolation, decay of radioactivity etc.



Safety Regulations for Disposal of Radioactive Waste

Activity of Nuclear Safety Commission



Note: Atomic Energy Commission (AEC) has established the basic policy of radioactive waste management in Japan based on the Basic Nuclear Policy of Japan.

Safety Regulations for Disposal of Radioactive Waste

Development of Basic Policy by NSC (1/4)

- Generic Issues of Importance and Basic Guides for Safety Review
  1. Basic Guides for Safety Review of Radioactive Waste Burial Facilities, March 1988, revised October 2009
  2. Generic Issues of Importance for the Safety Regulation of Radioactive Waste Disposal, Special Committee on Radioactive Waste and Decommissioning, June, 2004.
- Basic Policy for Safety Regulations et al.

  Low-Level Radioactive Waste
  1. Basic Policy of Safety Regulation for Land Disposal of Low-Level Solid Radioactive Waste, Special Committee on Safety Regulation of Radioactive Waste, NSC, October 1985.
  2. Reference Values on Radionuclide Concentration for Safety Regulation of Land Disposal of Low-Level Radioactive Solid Waste (3rd Report), Special Committee on Safety Regulation of Radioactive Waste, NSC September 2000.

Safety Regulations for Disposal of Radioactive Waste

Development of Basic Policy by NSC (2/4)

- Basic Policy for Safety Regulations et al.（continued）

***Low-Level Radioactive Waste** (continued)*

3. Upper Bounds of Radioactive Concentration for Burial of Low-Level Radioactive Solid Waste, NSC, May 2007.
4. Basic Policy for Safety Regulations Concerning Land Disposal of Low-Level Radioactive Waste (Interim Report), NSC, July 2007

High-Level Radioactive Waste

1. Basic Policy of Safety Regulation on High-Level Radioactive Waste Disposal (First Report), Special Committee on Safety Regulation of Radioactive Waste, November 2000.

Waste from Research Reactors, Facilities using Radio Isotope and others

1. Basic Policy of Safety Regulation for Near Surface Disposal of Solid Radioactive Waste Generated from Research Laboratories, etc., NSC, April 2006.
2. Basic Policy of Safety Regulation for Near Surface Disposal of Solid Radioactive Waste Generated from Radio Isotope Utilization Facilities, etc. NSC, January 2004.

Safety Regulations for Disposal of Radioactive Waste

Development of Basic Policy by NSC (3/4)

- Decommissioning, Clearance Level

Decommissioning of Nuclear Reactor Facilities and facilities using Nuclear Fuel Materials

1. Basic policy on regulatory system after the termination of nuclear facility operation, Jan 2005.
2. Basic policy for securing safety for decommissioning nuclear facilities, Dec 1985, rev. Aug 2001）

Clearance Level

1. Major Nuclear Facilities, Heavy Water Reactor, Fast Breeder Reactor, Nuclear Fuel Utilization Facility, Uranium Treatment Facility（1999.3-2009.10）
2. Radionuclide Concentrations for Materials not requiring Treatment as Radioactive Wastes generated from Dismantling etc. of Reactor Facilities and Nuclear Fuel Use Facilities, Special Committee on Radioactive Waste and Decommissioning, Dec 2004, rev. March 2005.

Safety Regulations for Disposal of Radioactive Waste

Development of Basic Policy by NSC (4/4)

- Current activity and future scope on development of basic policy for waste disposal, e.g.
  - Sub-Surface, Geological disposal
  - TRU, Uranium Waste, High-Level Radioactive Waste, Site Release
  - Risk management approach (concept)

Safety Regulations for Disposal of Radioactive Waste

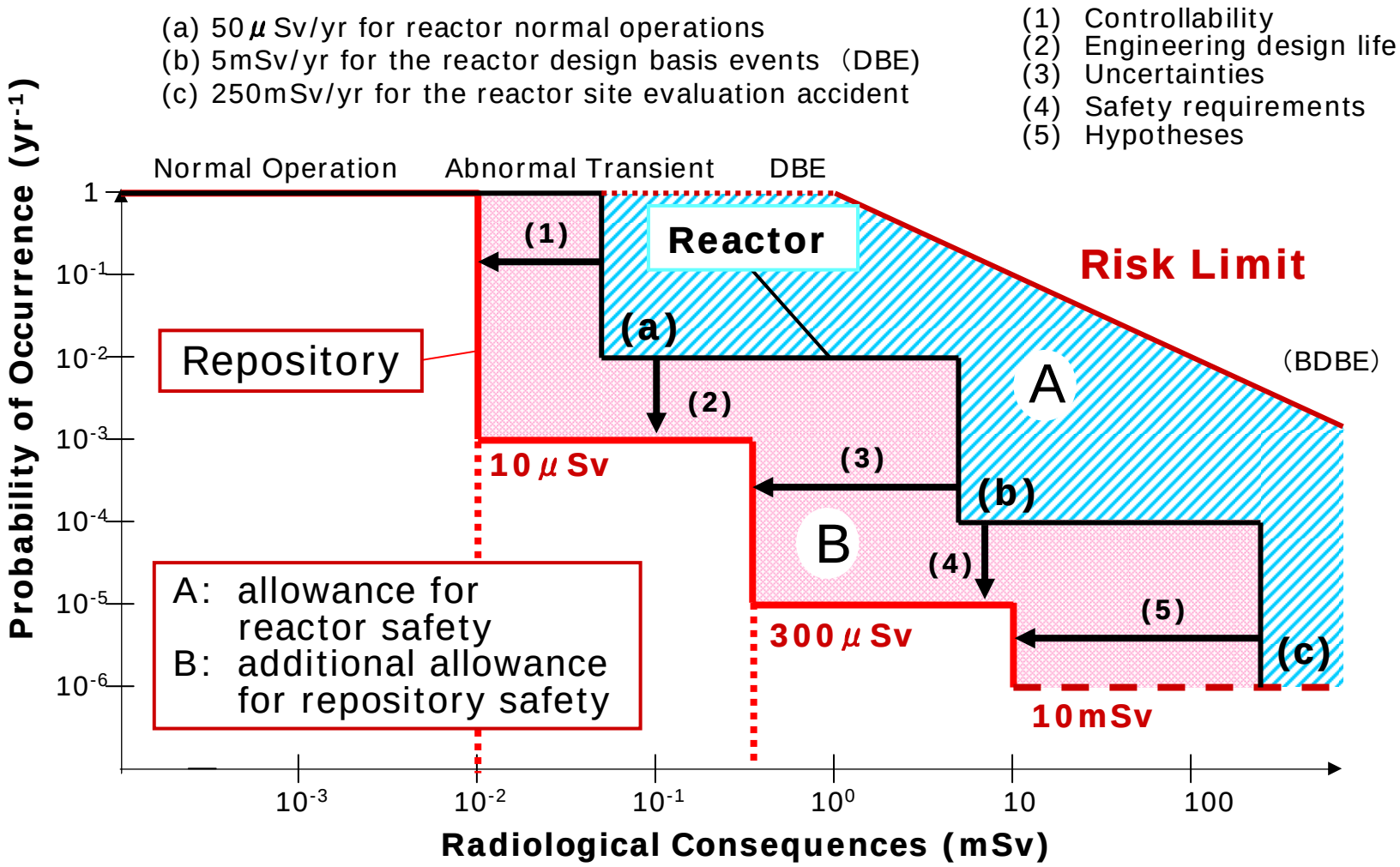
Risk management approach (concept)

- Use of risk information for safety management of NPP
  - Basis of safety objectives and performance objectives
  - Consideration of residual risk (ref. the Seismic safety guide)
  - Taking into account of rare event with extremely low probability such as airplane crash
- Issues for risk management for radioactive waste disposal (concept)
  - Confinement function of facility, Retardation of nuclide migration, Effect of decay of radionuclide
  - Disposal at a depth sufficient to safety margin for conventional use of underground
  - Termination after several hundred years of operation under active institutional control
  - Treatment of uncertainties

Safety Regulations for Disposal of Radioactive Waste

Risk management approach (illustration of concept)

Note: Based on the presentation by Dr. A. Suzuki, Chair, NSC, 2007



Safety Research for RW Disposal

Prioritized Safety Research: Key Area(*)

- Radioactive Waste
  - High-Level radioactive waste
  - Sub-Surface disposal waste among Low-Level radioactive waste
  - Long-lived/Low heat generating radioactive waste
  - Uranium waste
- Decommissioning
  - Processing, Disposal and reuse of waste resulting form dismantling
  - Radiation measurement technology

(*) NSC, "Prioritized Safety Research Program on the Nuclear Safety (Phase II)", August, 2009

Safety Research for RW Disposal

Prioritized Safety Research: Topics(*)

- Geological Disposal
  - Investigation and evaluation methodology for site characterization, engineering technologies for EBS, safety assessment research for pre- and post-closure period
- Sub-Surface, Near-Surface Disposal
  - Investigation and evaluation methodologies for geological environment, engineering technologies, safety assessment, evaluation of institutional control, long term safety assessment, data to be obtained for safety assessment, data-base development
- Decommissioning
  - Development of the standard for clearance R&D of radioactivity measurement for clearance

(*) NSC, "Prioritized Safety Research Program on the Nuclear Safety (Phase II)", August, 2009

International Coordination for Nuclear Safety

International Organization & Safety Conventions

- International Organization
  - IAEA
    - Basic Guides for Licensing Review, Peer Review among the Contracting Parties, support etc.
  - NEA
    - CSNI、CNRA、RWMC、CRPPH etc.
  - Regional Cooperation
    - FNCA、ASEAN+3、IAEA/ANSN etc.
- Safety Convention
  - Convention on Nuclear Safety
  - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

International Coordination for Nuclear Safety

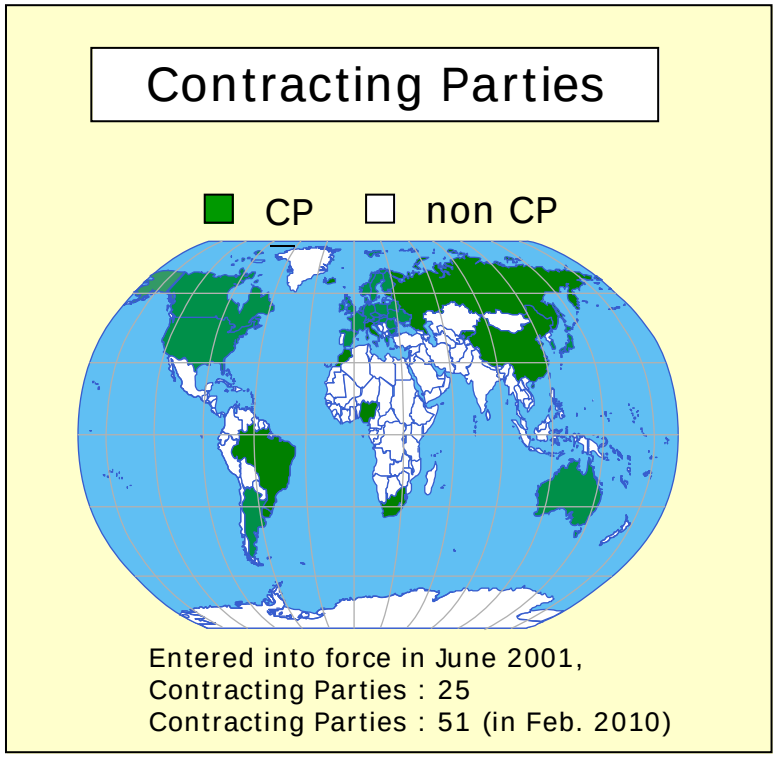
International Organization & Safety Convention(*)

Objectives of JC

- To achieve and maintain a high level of safety
- To ensure effective defences against potential hazards
- To prevent accidents with radiological consequences and to mitigate their consequences

Review meeting

- Mutual review among the contracting parties
- General meeting of JC is held every 3years (2003, 2006, 2009)



Ref. IAEA

(*) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Over View of Policy and Practice on Spent Fuel Management and Radio-active Waste Management in Japan (*)

Type of Liability	Long-term management policy	Funding	Current practice / Facilities	Planned Facilities
Spent fuel	Reprocessing	Utility pays fund for reprocessing	Domestic reprocessing plants	Interim storage facility
Nuclear fuel cycle waste	Geological, intermediate depth or near surface disposal	Utility pays fund for disposal of waste	HLW Storage Facility / LLW Disposal Facility	Geological, intermediate depth or near surface disposal facilities
Non-power waste	Geological, intermediate depth or near surface disposal	Under discussion	On site storage	Under discussion
Decommission-ing liabilities	Immediate decommissioning of NPP	Operators pays into reserve fund	Decommissionin g underway	—
Disused Sealed Source	Return to manufacture / Long-term storage	User	Return to manufactures / Storage inside facilities	—

(*) National report of Japan for the 3rd review meeting of JC, Oct 2008

International Coordination for Nuclear Safety

The 3rd Joint Convention (May 2009)

- Common Observation-Challenges (Third Review Meeting, May 2009)
  - The implementation of national policies for the long-term management of SF, including disposal of high level waste and/or SF
  - Siting, construction and operation of SF and RW disposal facilities
  - Management of legacy wastes
  - Monitoring of disused sealed sources and recovery of orphan sources
  - Knowledge management and human resources
  - Financial resources for liabilities.
- The Fourth Review Meeting is to be held in May 2012
  - Actions to increase the contracting parties

NSRF2010：Program

Session 1　Status of Safety Regulation

- *International activities (IAEA etc.)*
- *Safety regulation in Japan (NSC etc.)*

Session 2　Current Technology and the Regulatory Safety Research for Geological Disposal

Session 3　Regulatory Safety Research for Sub-Surface and Near-Surface Disposal

Thank you for your attention