Research Reactor Decommissioning in China

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Contents

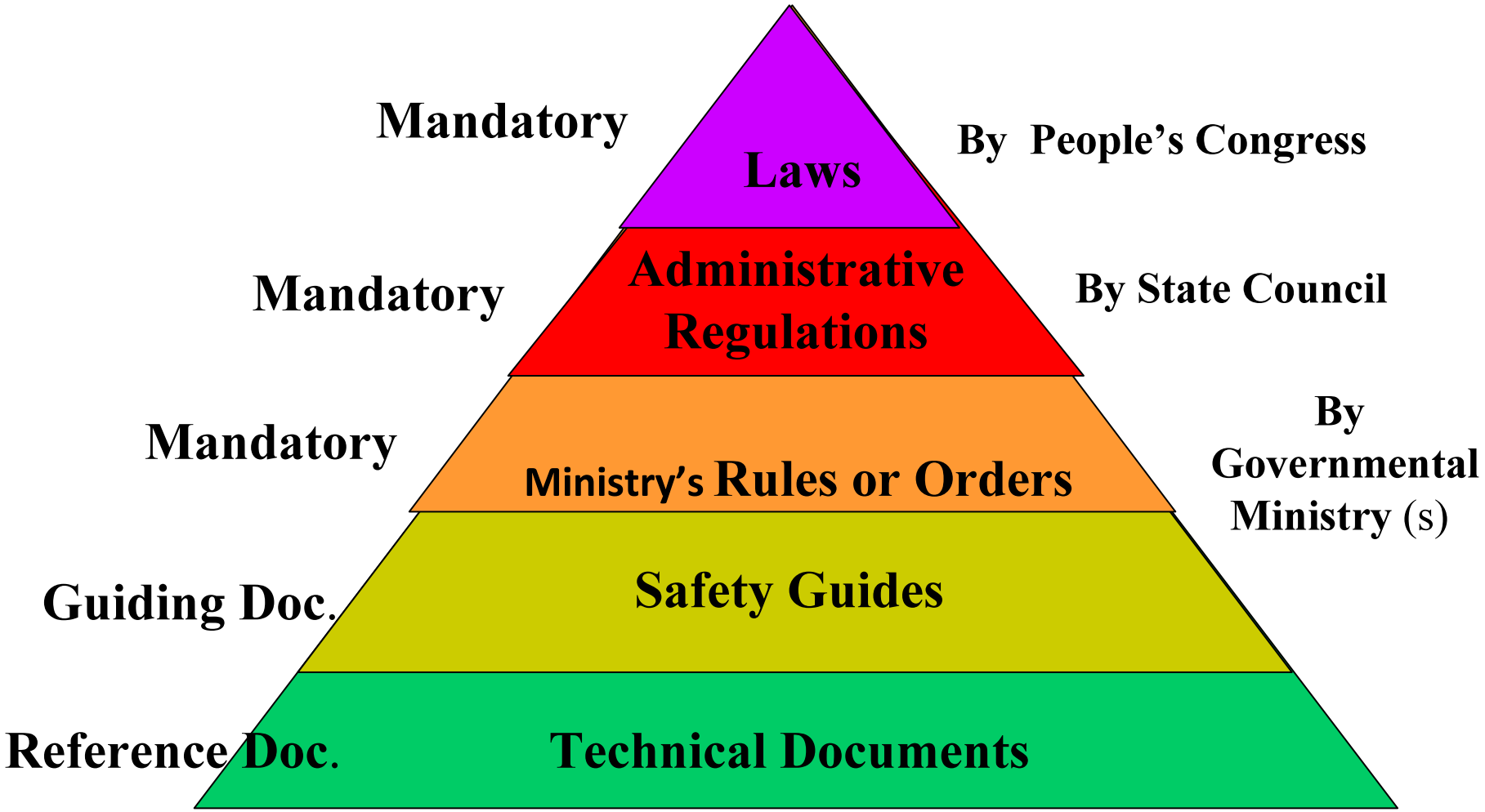
Introduction

- Chinese government has been attaching importance to nuclear facilities decommissioning.
- To regulate nuclear facilities , safety regulatory system including regulatory organizations, legislation and safety management system had been established. The decommissioning of the facilities is considered in this system.
- The regulatory body have defined the types of document to be submitted by the operator to show that decommissioning will be performed safely.

Nuclear Legislation System

- National Laws
- State Council Regulations
- Ministry Orders and Rules
- Safety Guides
- Technical Documents

The Hierarchy of Legislation in China



Nuclear Legislation System

- **National Laws** (Approved by China People's Congress) (related to the decommissioning of facility)
  - **Laws on the Environmental Protection of the People's Republic of China** (Issued by the Standing Committee of the National People's Congress, on December 26, 1989)

    Must comply: environment affected estimate, administration permitted .
  - **Act of Protection and Remedy of Radioactive Contamination of the People's Republic of China** (Promulgated in the Third Meeting of the Standing Committee of the Tenth National People's Congress, on June 28, 2003)

    Must comply: safety review, environment affected estimate, administration permitted.

    Especially, the decommissioning plan must be ensured at the beginning of facility constructing. And the cost must be arranged in advance for decommissioning of facility and for radioactive waste storage and disposal.
  - Atomic Energy Act (to be promulgated)

Nuclear Legislation System

- **Administrative Regulations** (detailed and complementarity for the national law) (related to the decommissioning of facility)
  - Regulations on the Safety Regulation for Civilian Nuclear Installations (HAF001, NNSA, 1986-10-29)

Must comply: safety review, administration permitted. All the stage, such as site selecting, design, constructing, commissioning, Operation and decommissioning, must be conformed to the law regulations and national technical standards.

Nuclear Legislation System

- **Safety Guides and Rules (related to the decommissioning of facility)**
  - Guides for decommissioning of research reactor and Nuclear critical Installations (HAD202/04， NNSA, 1992-4-18)

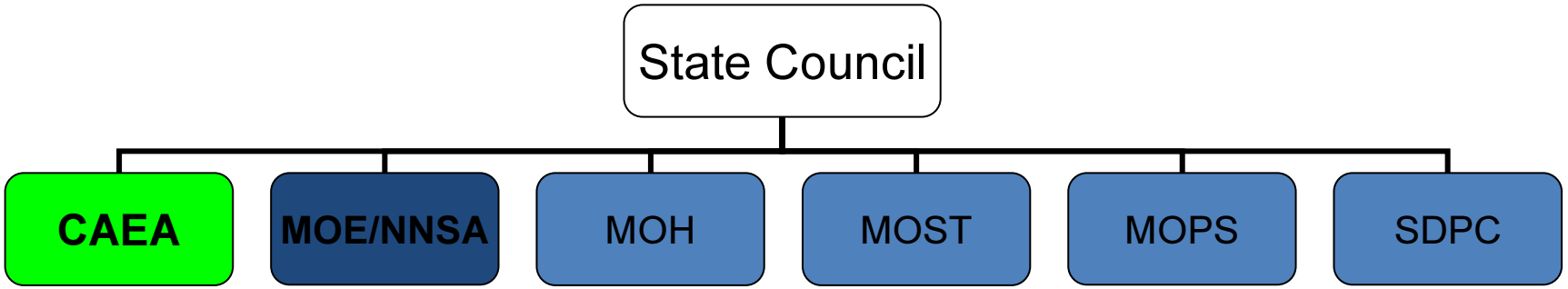
  Emphasize: Decommissioning organize, management, plan, implement, safety, etc.

Nuclear Legislation System

- **National technical standards (related to the decommissioning of research reactor) (Safety requirements for licensing)**
  - basic standards for protection against ionizing radiation and for the safety of radiation source (GB18871-2002)
  - Classification of radioactive waste (GB9133-1995)
  - Regulations for the safe transport of radioactive material (GB11806-1989)
  - Regulation for radioactive waste management (GB14500-2002)
  - Technical regulations for environmental management of reactor decommissioning (GB14588-1993)
  - regulation for radiation of reactor decommissioning (GB11850- 1989)

Regulatory Authority

Organizational Structure of the Government
(nuclear and radiation related)



CAEA: China Atomic Energy Authority

MOE: Ministry of Environment Protection

NNSA: National Nuclear Safety Administration

MOH: Ministry of Health

MOST: Ministry of Science & Technology

MOPS: Ministry of Public Security

SDPC: State Development & Planning Commission

Regulatory Authority

- Ministry of Environment Protection (National Nuclear Safety Administration, **MOE/NNSA**)
- China Atomic Energy Authority (**CAEA**).

Regulatory Authority

- **National Nuclear Safety Administration(NNSA)**
  - established in 1984
  - In 1998 merged into State Environmental Protection Administration (SEPA), (2008 MOE)
  - Responsible for safety regulations related to civilian nuclear installations and reviewing technical standards of nuclear safety
  - in charge of the supervision on **radioactive sources** (production, import, export, sale, transportation, storage and disposal) from December 2003.

Regulatory Authority

- **China Atomic Energy Authority (CAEA)**
  - competent authority of nuclear industry.
  - taking overall responsibilities for
    - all nuclear facilities and activities associated with nuclear fuel cycle and
    - radioactive waste management.
  - responsible for emergency preparedness of nuclear facilities and activities

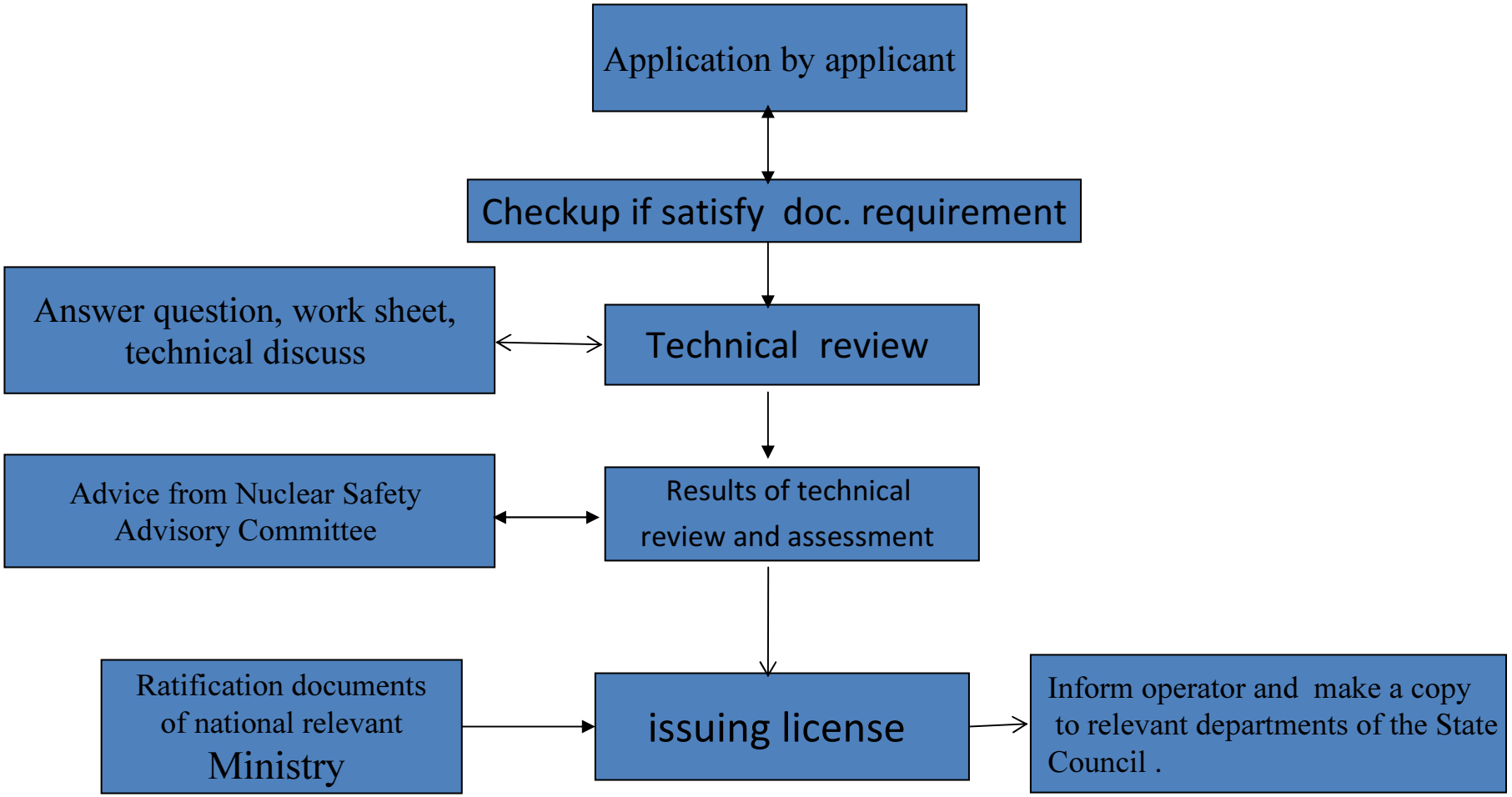
Regulatory Authority

- **China Atomic Energy Authority** (cont.)
  - Carries out and promotes international cooperation and exchange on behalf of China.
  - responsible for training and examination of nuclear facility operators and their qualifications

licensing system

- **Licensing requirements apply to all stages of nuclear facilities**:
  - Siting
  - Design/construction
  - Commissioning
  - Operation
  - Decommissioning
  - Personnel Qualification/Certification

The procedure of application and issuance of license for decommissioning (2008-02-25)



Example of research reactor decommissioning in China

As a example, I’d like to introduce China HWRR decommissioning.

Heavy Water Research Reactor (HWRR) , 10 MW multi-purpose reactor, was constructed and put in operation in 1958 at China Institute of Atomic Energy in the suburbs of Beijing.

It was the first nuclear reactor in China. Since long operating history and aged equipment, it was permanently shut down by the end of 2007.

DECOMMISSIONING STRATEGY

After HWRR is final shut down and after the transition period of 2-3 years, HWRR will be carried out immediate dismantling .

The final HWRR decommissioning goal is reuse of the facility for public exhibition.

Preliminary Decommissioning planning

Permanently shut down (2007).

Transition Period (2008-2010): fuel discharging; coolant draining; transport of spent fuel; clean-up of operation waste; reconstruction of special decommissioning facilities (e.g., ventilation and radiation protection systems); characterization survey; application for decommissioning license.

Preliminary Decommissioning planning

Implementation Period I (2011-2015): dismantling and removal of systems and equipment outside of reactor; disposal of water in spent fuel pool; decontamination of radioactive structures.

Implementation Period II (2016-2020): dismantling and removal of reactor core, inner components, experimental tubes, graphite reflector and bio-shield water tank; decontamination of reactor concrete body; site decontamination and restoration.

Thank You

Very Much!