

Latest Development on Decommissioning Plans Regulatory Review Process: Malaysia Perspective



Workshop on the Research Reactor Decommissioning Activities: project planning,
management, regulatory review and safety assessment
15 - 19 September 2008, Manila, Philippines



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Hierarchy of Legal System

Atomic Energy Licensing Act, 1984

- **Act:** provides the basic law concerning the development and utilization of atomic energy and safety regulations.

Regulations

- **Regulations:** provides more detailed provisions entrusted by the Act.

Orders and Conditions of License

- **Provides additional requirement** which not stated in the regulations or special matters related to provisions entrusted by the Act

Guidelines, Codes and Standards

- **Provides guides, codes and standards** to comply with and achieve goal impose in regulations

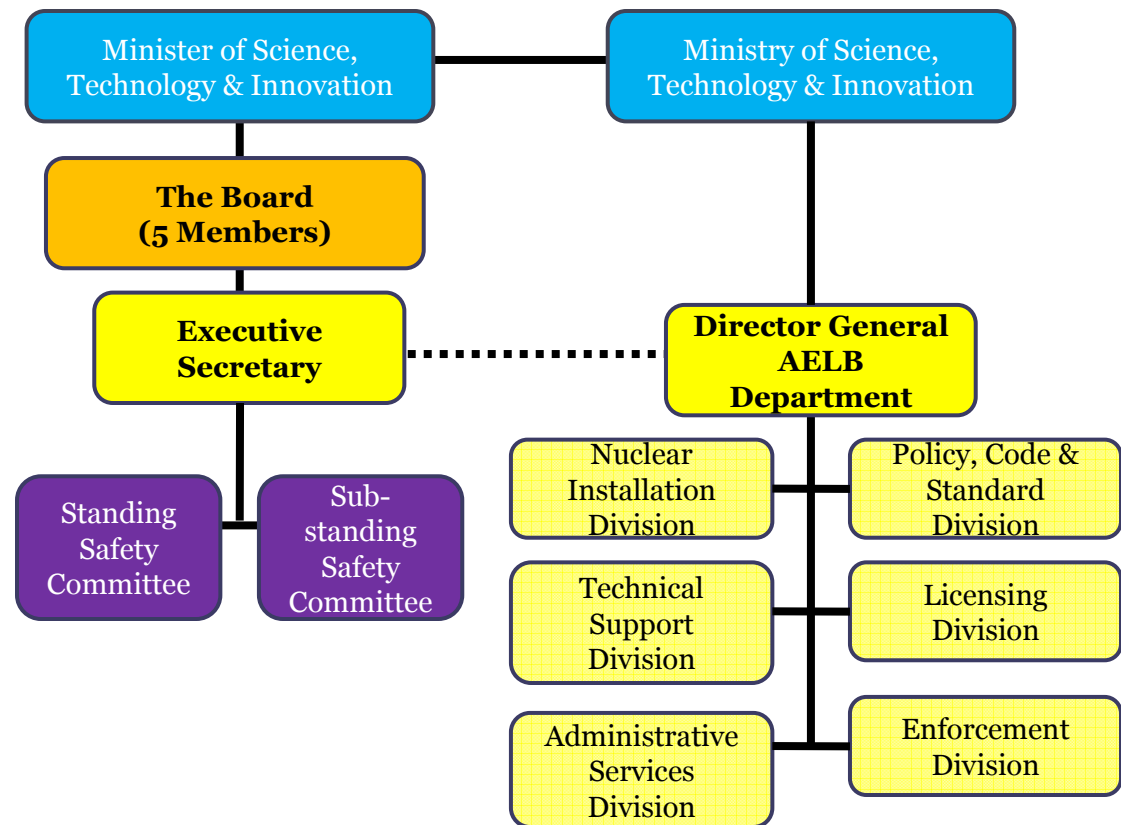
Legal and Regulatory System

- Main Act:
- Atomic Energy Licensing Act 1984 (Act 304)
 - To provide for the regulation and control of atomic energy;
 - For the establishment of standards on liability for nuclear damage; and
 - For matters connected therewith or related thereto.

- Regulatory Body:
Atomic Energy Licensing Board (AELB) was established under Section 3 of the Act. 304

Ensuring safety, security and safeguarding peaceful Nuclear Activities

Atomic Energy Licensing Board (AELB)





Subsidiary Regulations

- **Radiation Protection (Licensing) Regulations 1986** [*P.U.(A) 149/86*]
- CORRIGENDUM to Radiation Protection (Licensing) Regulations 1986 [*P.U.(A) 355/86*]
- **Radiation Protection (Basic Safety Standard) Regulations 1988** [*P.U.(A) 61/88*]
- Atomic Energy Licensing (Exemption) Order 1988 [*P.U.(A) 189/89*]
- Atomic Energy Licensing (Exemption) Order 1989 [*P.U.(A) 50/89*]
- Atomic Energy Licensing (Exemption) (Smoke Detectors) Order 1989 [*P.U.(A) 422/89*]
- **Radiation Protection (Transport) Regulations 1989** [*P.U.(A) 456/89*]
- Atomic Energy Licensing (Exemption) (Lightning Arrestor) Order 1990 [*P.U.(A) 12/90*]
- Atomic Energy Licensing (Exemption) (Leasing and Hire Purchase) Order 1990 [*P.U.(A) 205/90*]
- **Atomic Energy Licensing (Appeal) Regulations 1990** [*P.U.(A) 206/90*]
- Radiation Protection (Transport) (Amendment) Regulations 1991 [*P.U.(A) 145/91*]
- CORRIGENDUM to Radiation Protection (Transport) Regulations 1989 [*P.U.(A) 146/91*]
- Atomic Energy Licensing (Small Amang Factory) (Exemption) Order 1994 [*P.U.(A) 435/94*]
- Atomic Energy Licensing (Exemption) (Ceramic Factory) Order 1998 [*P.U.(A) 431/98*]
- **Note: This Order has been repealed by P.U.(A) 182/2002**
- Atomic Energy Licensing (Exemption) (Scanning Electron Microscope) Order 1998 [*P.U.(A) 432/98*]
- Atomic Energy Licensing (Exemption) (Irradiating Apparatus Below 5 Kilo Electron Volt) Order 2002 [*P.U.(A) 181/2002*]
- Atomic Energy Licensing (Exemption) (Low Activity Radioactive Material) Order 2002 [*P.U.(A) 182/2002*]



Atomic Energy Licensing Act 1984 (Act 304) – provision for decommissioning

- **Part III, Control and Licensing:**

Section 12.(1) Without prejudice to the requirements of any other law, no person shall-

- (a) site, construct or operate a nuclear installation;
- (b) deal in, possess or dispose of any radioactive material, nuclear material, prescribed substance or irradiating apparatus,

Unless he is the holder of a valid license issued under section 16(5) by the appropriate authority for such purpose and as specified in the license.

Section 17.(1) Licences issued under this Act shall be subject to such conditions as may, be imposed by the appropriate authority which may in respect of the conditions imposed by it, add to, vary or revoke such conditions at any time.



Atomic Energy Licensing Act 200_ (Projected Act) – provision for decommissioning

- **Section 18(1)**

Without prejudice to the requirements of any other law, no person shall undertake any of the following activities-

- (a) design, siting, constructing, commissioning, operating and **decommissioning** a nuclear installation;
- (b) dealing with any radioactive material, nuclear material, prescribed substance or irradiating apparatus,

unless he is the holder of a valid authorization issued under Section 23(3) by the regulatory body for such purpose and as specified in the authorization.



Atomic Energy Licensing Act 200_ (Projected Act) – provision for decommissioning

- **Section 40-** The Board shall adopt requirements for radiation protection that shall be satisfied before issuing a license. The Board shall require the licensee to do the following:
 - (g) Adequate financial arrangements for radioactive waste disposal, **decommissioning** and potential liability for radiological damage;



Atomic Energy Licensing Act 200_ (Projected Act) – provision for decommissioning

Section 67- The Board shall review and assess the construction of a nuclear power reactor before issuing the license as following:

(g) Arrangements for **decommissioning** and management of radioactive waste;

Section 74- The Board shall establish requirements for the regulatory control of research reactors to include the following:

(a) Criteria for the siting, design, construction, commissioning, operation, maintenance and **decommissioning** of research reactors;

Section 75 – 77 : Extended Shutdown



Atomic Energy Licensing Act 200_ (Projected Act) – provision for decommissioning

PART XIV : DECOMMISSIONING

- **Section 78 - 83** : Requirements;
- **Section 84 – 89** : Decommissioning Plan;
- **Section 90** : Responsibilities of Licensee in Decommissioning; and
- **Section 91 – 93** : Financing of Decommissioning.



Radiation Protection (Licensing) Regulations 1986 – provision for decommissioning

- Part II, Classification of License:

Section 10. A Class G license is a license-

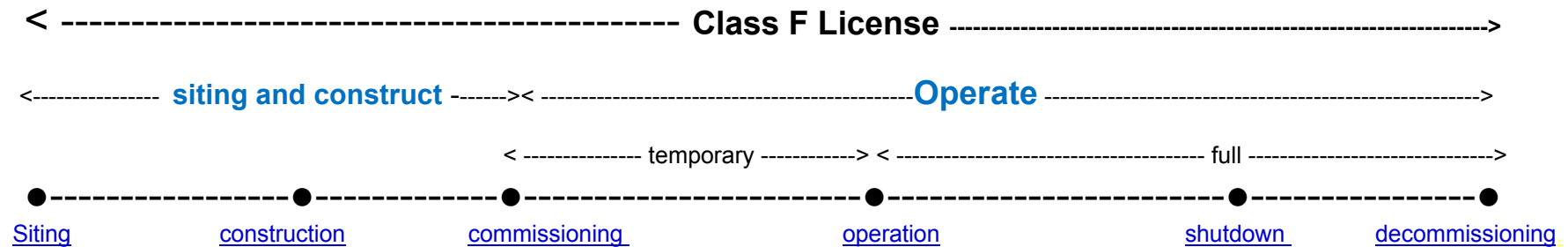
- (a) to dispose a radioactive materials, nuclear materials, prescribed substances or their wastes;
- (b) to store radioactive materials, nuclear materials, prescribed substances or their waste prior to their disposal; or
- (c) to **decommission** a milling installation, nuclear installation, waste treatment facility, irradiating apparatus or sealed source apparatus.



Classification of license for research reactor in accordance with Radiation Protection (Licensing) Regulations, 1986

Class F

-license **to site, to construct** or **to operate** a nuclear installation.





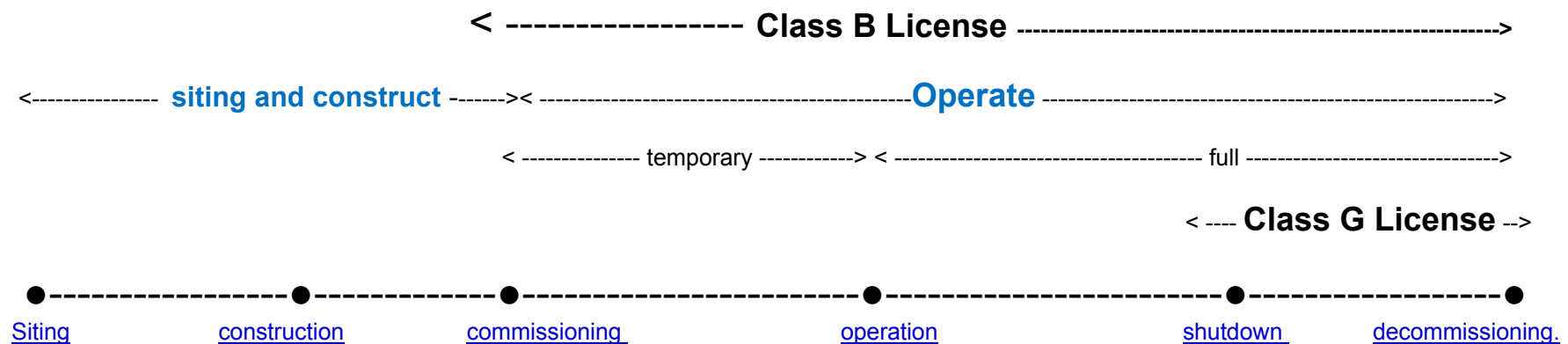
Classification of license for research reactor in accordance with Radiation Protection (Licensing) Regulations, 1986

Class B

-License to manufacture, trade in, produce, process, purchase, own, possess, use, transfer, handle, sell or to store nuclear material.

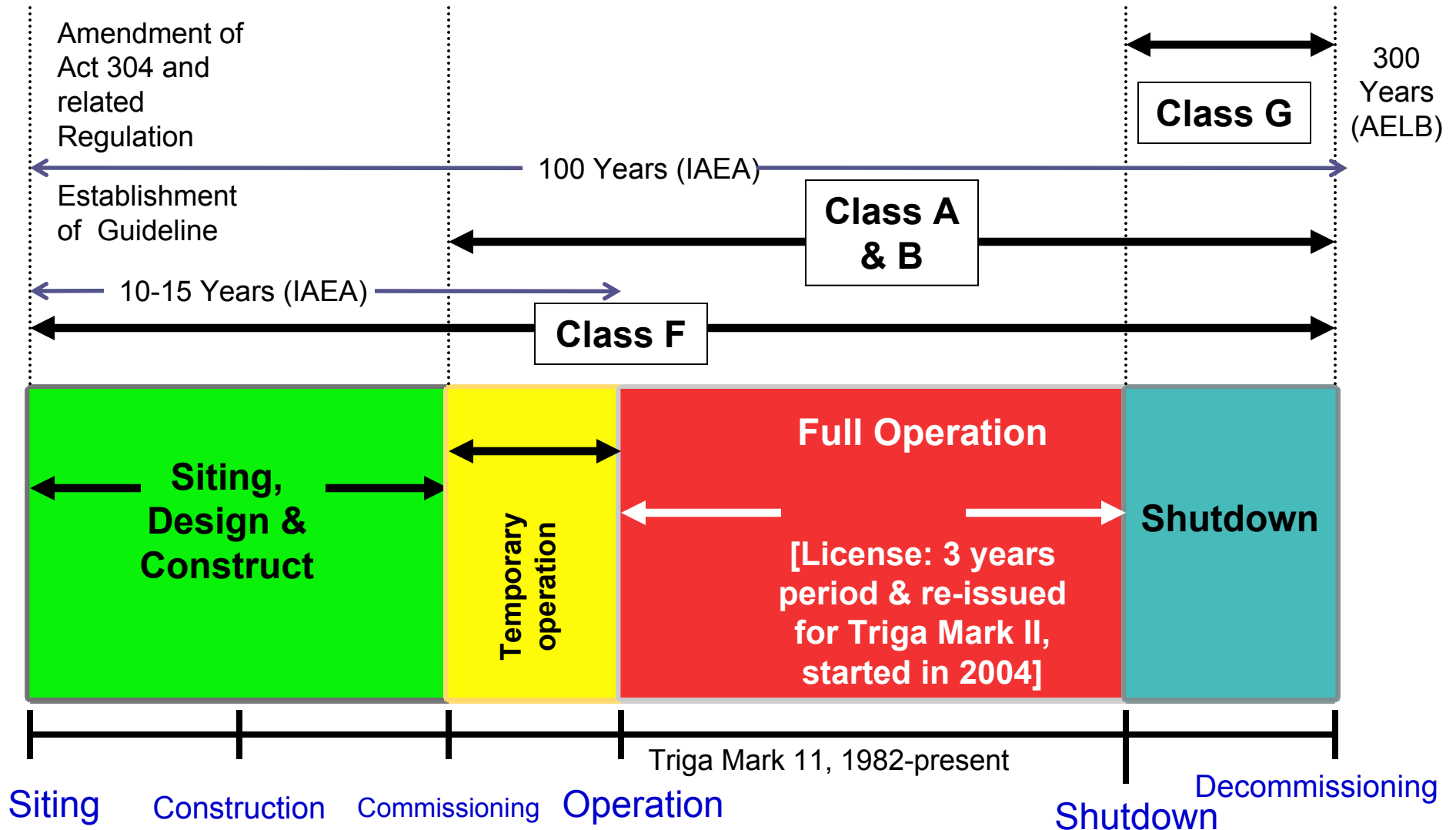
Class G

- License to dispose or to store nuclear waste prior to their disposal or to decommission a nuclear installation.





Licensing Process for Nuclear Installation [Radiation Protection (Licensing) Regulation 1986]





Atomic Energy (Nuclear Installation Licensing) Regulations 200_ – provision for decommissioning



Siting

Type Of License and Stages

Design

“whole life cycle”

Construction

Commissioning

Operations

Extended
Shutdown

Decommissioning

Release



Atomic Energy (Nuclear Installation Licensing) Regulations 200_ – provision for decommissioning

DECOMMISSIONING:

- Decommissioning shall be performed :

A request by operating organization before operation license or combined operation license expired;

- the operating organization doesn't extend its operation license or combined operation license;
- application for operation license extension or combined operation license is rejected by AELB on the ground of safety and/or security reasons; or
- there is a severe accident or situation that is threatening the safety and/or security of a nuclear reactor operation.

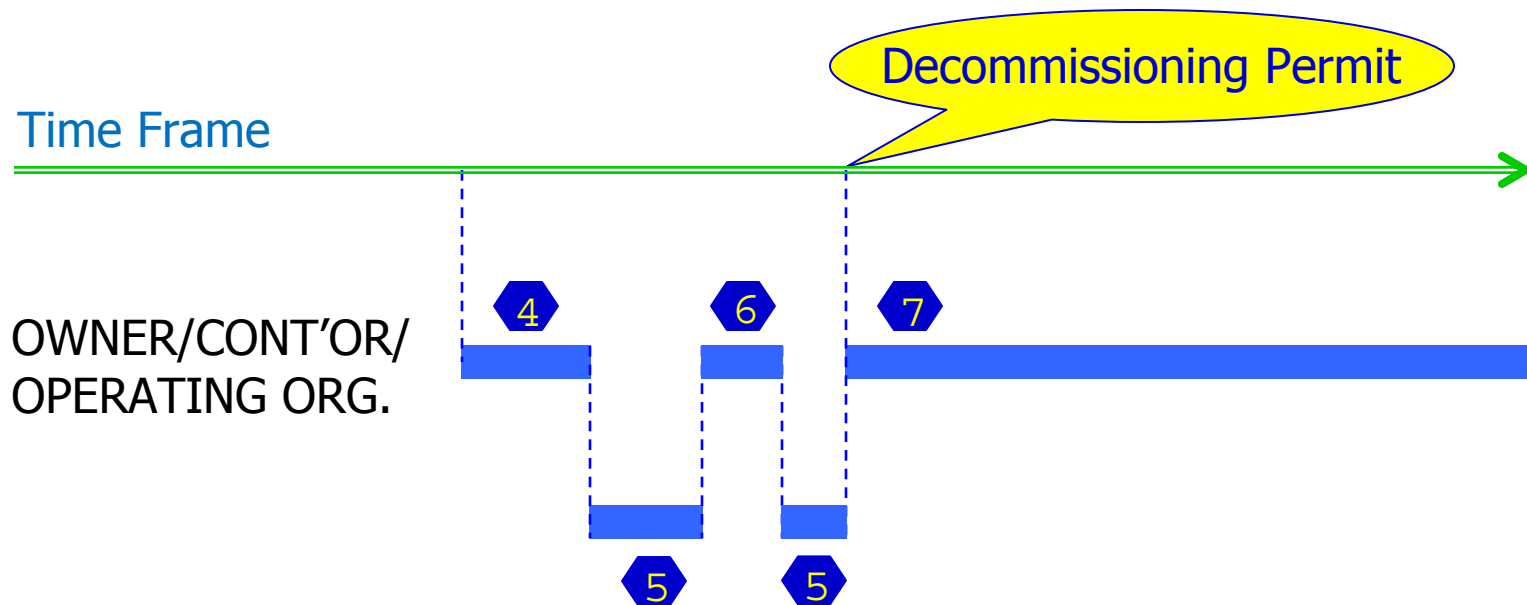
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REQUIREMENTS FOR DECOMMISSIONING PERMIT

- Administrative requirements;
- Technical Requirements;
 - Decommissioning Program
 - Quality Assurance Program for Decommissioning

DECOMMISSIONING



- 4 Preparation Of Decommissioning Program
- 5 REVIEW
- 6 Revision Of Decommissioning Program
- 7 **DECOMMISSIONING**



References for the Development of Projected Nuclear Installation Regulations 200_

- Canadian Nuclear Safety Commission:
 - *Nuclear Control and Safety Act;*
 - *General Nuclear Safety and Control Regulation;*
 - *Class I Nuclear Facilities Regulation;*

- US Nuclear Regulatory Control (USNRC)
 - *10 CFR 50*
 - *10 CFR 52*
 - *10 CFR 100*

- IAEA
 - *Licensing Process for Nuclear Installation (DS 416)*



Licence Condition – provision for decommissioning

- **Licence Condition No. 7: Safety Analysis Report (SAR) Document**

7.1 Licensee shall establish a Safety Analysis Report (SAR) document based on the LEM/TEK/55, *Guidelines for the Preparation and Assessment of Safety Analysis Report Document for Research Reactor*.

7.2 Licensee shall comply and implement the Safety Analysis Report (SAR) document as what has been submitted to the Board. This document shall be updated in accordance to any changes/amendment to the operational procedure or on instruction by the Board.

(Chapter 19 of SAR : Decommissioning)

- **Licence Condition No. 36: Decommissioning**

Licensee shall officially inform the Board on the intention to decommission nuclear installation not later than 30 working days after the official decision has been made by the person responsible to the licence, together with a complete decommissioning program.



Initiative on legal infrastructure:

- A comprehensive Nuclear Act is being reviewed (IAEA Standard) and AELB is discussing with various agencies in strengthening legal infrastructure of nuclear activities in Malaysia;
- Anticipate to come out with a more comprehensive and effective Act on nuclear activities e.g. CPPNM, AP, export control, compoundable offences or its criminalization etc;
- Adoption of 49 IAEA Standards related to research reactor and NPP;
- Developing more guidance documents for licensee.

Initiatives On Act, Regulations, Standards and Guides

As of 31st August 2008

Act - 1984

Regulations- 1986- to date

Standard - 2007

Act 304, 1984

Radiation Protection (Basic Safety Standard) 1988*
*Approved by AG in Jun 2007

Radiation Protection (Nuclear Installation Licensing) Regulation 200_

Radiation Protection (Radioactive Waste Management) Regulation 200_

Radiation Protection (Nuclear Non Proliferation Import & Export) Regulation 200_

Radiation Protection (Security of Radioactive Material) Regulation 200_

Radiation Protection (Medical Devices) Regulation 200_

Radiation Protection (Transport) Regulation 1989

Radiation Protection (Licensing) Regulations 1986

Radiation Protection (Appeal) Regulation 1990

GS-G-1.6 Seismic Design and Qualification for NPP
GS-G-3.3 Evaluation of Seismic Hazard for NPP
GS-G-4.1 Format and Content of SAR for NPP
NS-G-1.1 Software for Computer Based System Important to Safety in NPP
NS-G-1.2 Safety Assessment and Verification for NPP
NS-G-1.4 Design of Fuel Handling and Storage System For NPP
NS-G-1.5 External Event Excluding Earthquake
NS-G-1.7 Protection Against Internal Fires and Explosion In the Design of NPP
NS-G-1.8 Design of Emergency Power System for NPP
NS-G-1.9 Design of Reactor Coolant System and Associated System in NPP
NS-G-1.10 Design of Reactor Containment System for NPP
NS-R-1 Safety for NPP Design

2007

National Guideline on Safety Assessment And Preparation of SAR
Standard for Certification and Re-certification of Research Reactor Operator
Guideline for Approval Application of Transit Of Nuclear Material
Guideline for IAEA Safeguard Inspector Designation and Issuance of Multi-entrance Visa

2008

Guideline of Inspection Procedure for Research Reactors
Guideline for Approval Application of Transshipment for Nuclear Material
Standard For Certification of Inspector and Assessor
Guideline of Licensing Process for Nuclear Installation

NS-G-1.11 Protection against Internal Hazard Other than Fire and Explosion Design of NPP
NS-G-1.12 Design of Reactor Core for NPP
NS-G-1.13 Radiation Protection Aspect of Design for NPP
NS-G-2.1 Fire Safety in the Operation of NPP
NS-G-2.2 Operation Limit & Condition and Operating Procedures For NPP
NS-G-2.3 Modification to NPP
NS-G-2.4 The Operating Organization for NPP
NS-G-2.7 Radiation Protection and Radioactive Waste Management in the Operation of NPP
NS-G-2.8 Recruitment, Qualification & Training of Personnel for NPP
NS-G-2.9 Commissioning for NPP
NS-G-2.10 Periodic Safety Review for NPP

2009

Guideline for the Assessment of Reactor Modification
Guideline on the Site Evaluation For Nuclear Installation
Guideline on National Emergency Preparedness and Response

2010

Guideline on Physical Protection of Nuclear Installation
TBD

NS-G-2.11 A System for the Feedback of Experience From Events in Nuclear Installation
NS-G-3.1 External Human Induce Event in Site Evaluation for NPP
NS-G-3.2 Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation For NPP
NS-G-3.5 Flood Hazard for NPP on Coastal and River Site
NS-G-3.6 Geotechnical Aspect of Site Evaluation and Foundation for NPP
WS-G-2.1 Decommissioning for Research Reactor and NPP
NS-R-2 Safety of NPP Operation
NS-R-3 Site Evaluation for Nuclear Installation
NS-G-2.5 Core Management and Fuel Handling for NPP
NS-G-3.4 Meteorological Event in Site Evaluation for NPP

2011 -2015

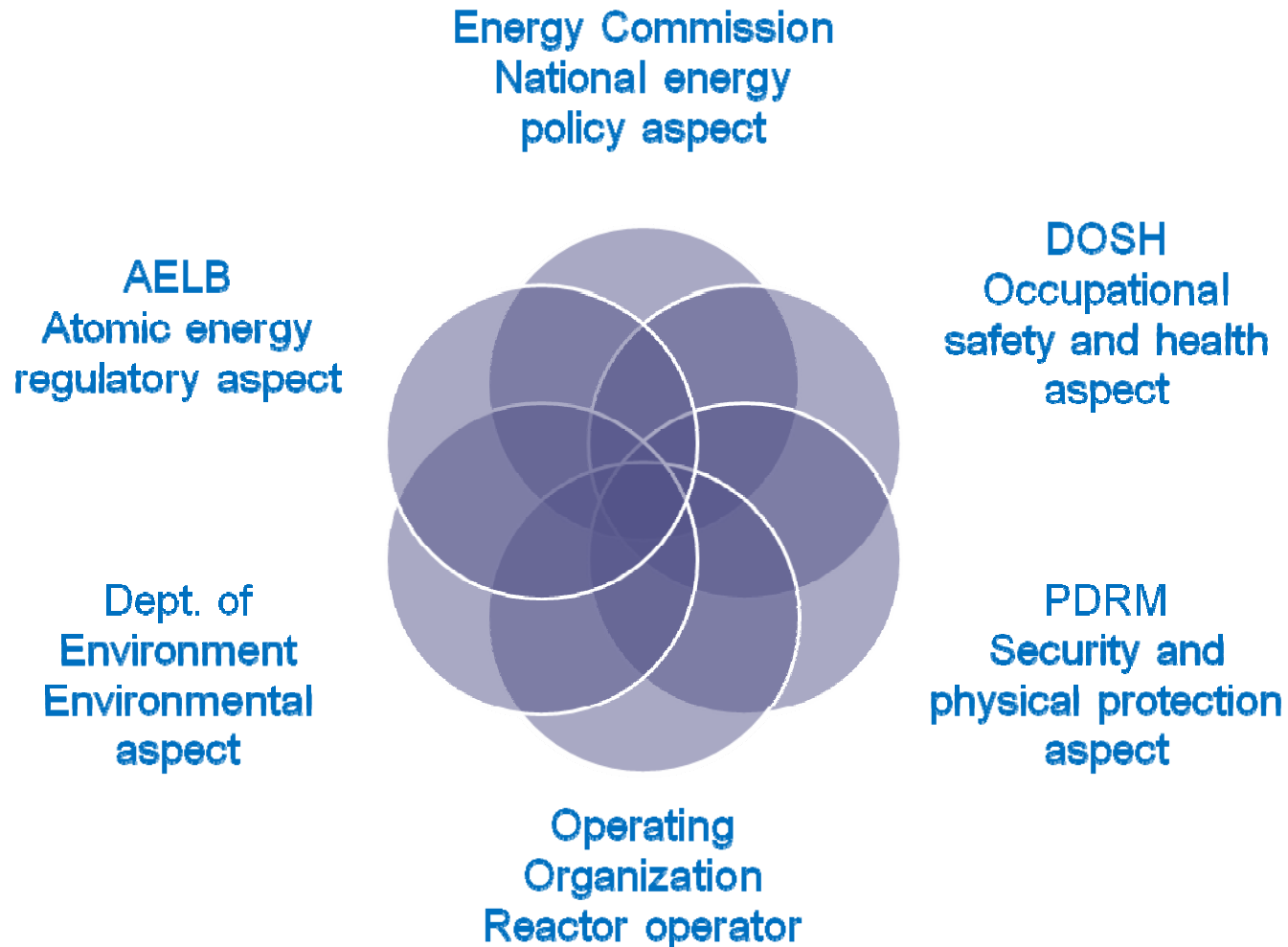
TBD for 10th Malaysia Planning

Legend

- Adopted (IAEA document)
- Preparation
- Planning
- Revision
- Published



Initiatives on Involvement of Various Government Agencies in Research Reactor Licensing





Conclusion

Every stages of reactor lifetime is equally important. The regulatory body is in the position to ensure radiation workers, people of public and the environment are safe and protected from any radiation hazard coming from nuclear installation. Malaysia are fully aware of this and from time to time, we are putting our continuous effort in building more competent regulatory body and operators; produced and documenting clear procedures and guidelines; adopt and adapt IAEA/ International documentations; and to comply with whatever agreement, treaties, convention etc which Malaysia has become the signatories, in order to ensure nuclear safety, security and non-proliferation in particular its safeguards.

Thank you.

