ATOMIC ENERGY LICENSING ACT 1984 (ACT 304) AND REGULATIONS FOR THE SUPERVISIONS OF THE USE OF ATOMIC ENERGY IN MALAYSIA

ATOMIC ENERGY LICENSING BOARD (AELB)
MINISTRY OF SCIENCE TECHNOLOGY AND INNOVATION

AELB ATOMIC ENERGY LICENSING BOARD

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Introduction

Main Acts

Atomic Energy Licensing Act 1984 (Act 304)

&

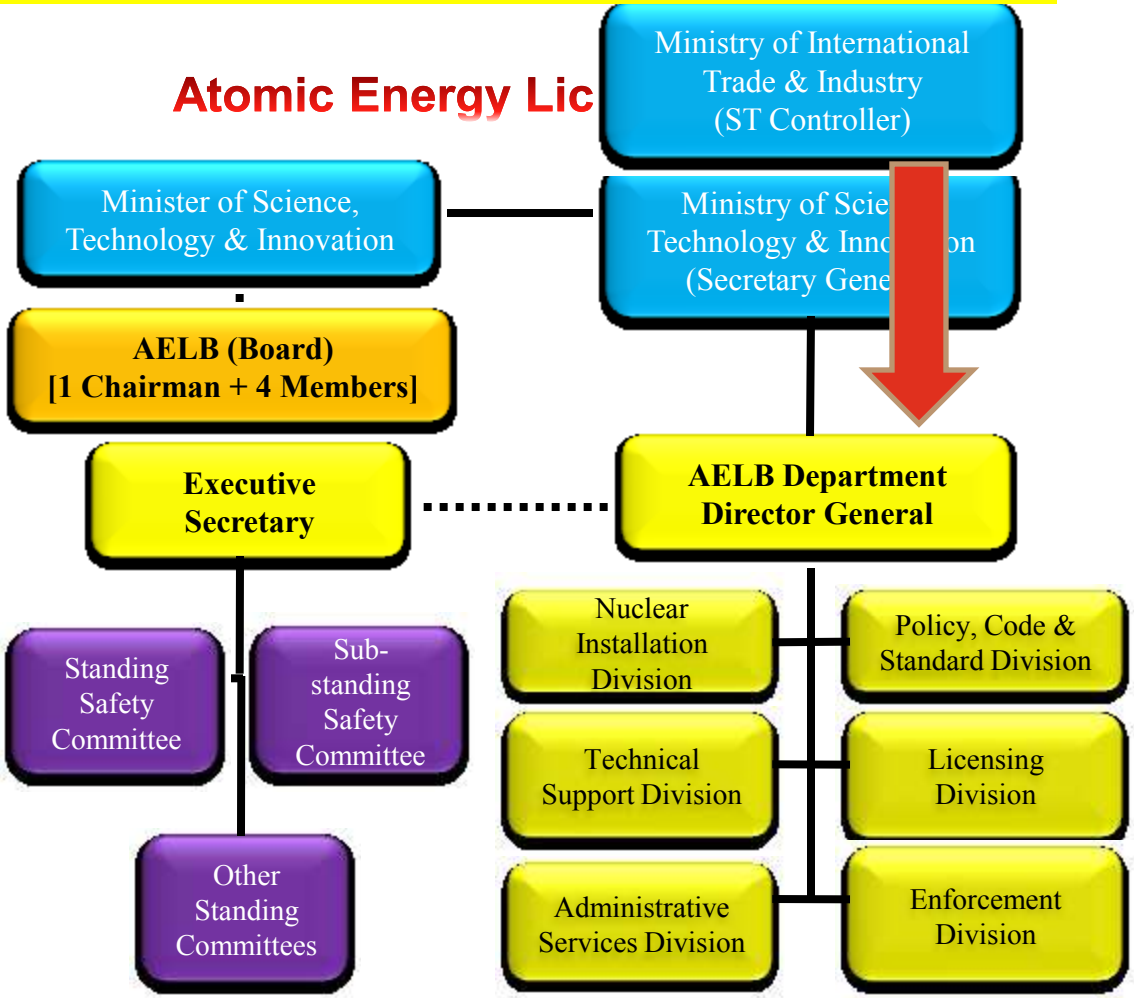
Strategic Trade Act 2010

(Act 708)

- To provide for the regulation and control of atomic energy technology & its trade.
- For the establishment of standards on liability for nuclear damage.
- For matters connected therewith or related thereto.

Regulatory Body & ST Relevant Authority

- Atomic Energy Licensing Board (AELB) was establish under Section 3 of the Act 304.
- Ensuring safety, security and safeguarding peaceful Nuclear Activities.



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AELB FUNCTIONS

1. ENFORCEMENT OF ATOMIC ENERGY LICENSING ACT 1984 (ACT 304)
2. ADVISE THE MINISTER & GOVT OF MALAYSIA ON ANYTHING RELATED TO ACT 304
3. SCIENTIFIC AND TECHNICAL COLABORATION WITH OTHER AGENCIS RELATED NUCLEAR/ ATOMIC ENERGY
4. IMPLEMENTATION OF OBLIGATION ARISE FROM INTERNATIONAL AGREEMENT, TREATY, CONVENSION REGARDING NUCLEAR/ ATOMIC ENERGY
5. OTHERS THAT ARISE FROM THE FUNCTION OF THE BOARD UNDER ACT 304

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Introduction

- **Radioactive Substance Act 1968**
  - First legislation to control the use of ionizing radiation (medical & non medical) in Malaysia.
  - Director General of Health is the Authority.

- **Atomic Energy Licensing Act 1984 (Act 304)**
  - Repeals the Radioactive Substance Act 1968.
  - Provides powers to control nuclear reactor operation in addition to the power given under Radioactive Substances Act 1968.

Introduction

- **Subsidiary Regulations under the Act 304**
  - Radiation Protection (Licensing) Regulations 1986
  - Radiation Protection (Transport) Regulations 1989
  - Atomic Energy Licensing (Appeal) Regulations 1990
  - Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010
  - Atomic Energy Licensing (Radioactive Waste Management) Regulations 2011

Atomic Energy Licensing Act 1984

Scope of the Act 304

- To control any activity dealing with radioactive materials, nuclear materials, prescribed substances or irradiating apparatus in medical and non-medical application.

- To issue licence for using any radioactive materials or irradiating apparatus for medical (diagnostic or therapeutic) purposes only to a registered medical practitioner, registered veterinary surgeon, radiologist, radiotherapist or registered dentist.

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Atomic Energy Licensing Act 1984

- **The Purpose of the Act 304 are to ensure**
  - The safe use of ionising radiation in medical and non-medical fields.
  - That the hazards associated with application of radiation are minimised and within acceptable levels.
  - There is no misused of any radioactive materials, nuclear materials, prescribed substances or irradiating apparatus in relation to the prohibition stated in the Act.

Atomic Energy Licensing Act 1984

- **Appropriate Authority (Sec. 15)**

  - Atomic Energy Licensing Board (AELB) for dealing with ionizing radiation in non-medical applications.

  - Director General of Health for the use of ionizing radiation in medical applications.

Atomic Energy Licensing Act 1984

- **Control and Licensing**
  - No person shall:
    - site, construct or operate a nuclear installation,
    - 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.

Atomic Energy Licensing Act 1984

- **Application for licence (Sec. 16)**

An applicant for a licence under this Act shall first make an application in that behalf to the Board.

Every licence issued under this Act shall, unless sooner cancelled or suspended, continue in force for such period **not exceeding three years** as the appropriate authority may in each case determine.

Atomic Energy Licensing Act 1984

- **Condition of Licenses (Sec. 17)**

Licenses issued under this Act may be renewed and subjected to such condition 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.

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Atomic Energy Licensing Act 1984

Suspension of License (Sec. 22)

The appropriate authority may cancel or suspend any license for such period of the following circumstances:

- The licensee has committed an offence.
- The licensee has committed a breach of any condition of the licence.
- The licensee ceases to work or operate the nuclear installation in respect of which the licence was issued.
- In the opinion of the appropriate authority it would be in the public interest so to do.

Atomic Energy Licensing Act 1984

- **Health and Safety (Sec. 25)**
  - Act 304 requires licensees to be responsible for the protection of the health and safety of workers by complying with all the regulations/ directives given by the appropriate authority, pertaining to:
    - Conditions of exposure
    - Dose limitation
    - Occupational exposure
    - Medical exposure
    - Exposure of members of the public
    - Accidental exposure
    - Emergency exposure and exposure other than any of those specified above

Atomic Energy Licensing Act 1984

- Licensee is responsible for the worker who have been or is likely to be exposed to ionizing radiation to:
  - Provide and require such workers to wear approved personnel-monitoring devices.
  - Keep records of dose and type of ionizing radiation to which such a worker has been exposed.
  - Install or use monitoring devices in workplace to record the amount of ionizing radiation present.
  - Provide medical examination for such workers at such intervals as the appropriate authority may determine.

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Atomic Energy Licensing Act 1984

- **Disposal of Radioactive Waste (Sec. 26)**
  - Any radioactive waste cannot be disposed of, accumulated or transported without prior authorization in writing and subject to such conditions imposed.
  - The appropriate authority may direct the licensee or any person who is responsible for premises, nuclear installation, conveyance or site where any situation or condition endangering life, health, property or the environmental to adopt such measure as would eliminate or protect against such situation or condition.

Atomic Energy Licensing Act 1984

Obstruction Of Inspection, Search Or Investigation An Offence. (Sec. 39)

Imprisonment for a term no exceeding 5 years or a fine not exceeding RM5,000 or both

a) **refuses** any SPO access any premises.
b) **assaults, obstructs, impedes or delays** any SPO in effecting any entry.
c) **fails to comply** any lawful demand/orders.
d) **refuses or neglects** any SPO any inspection.
e) **furnishes** to any SPO as true info. which he knows is false.
f) **conceals or attempt to conceal** or fails to produce.
g) **escapes or attempts to escape** from lawful custody.
h) **rescue or attempts to rescue** or causes to rescue any person duly arrested.
i) before & after **seize, breaks or destroy** to prevent seizure.

Atomic Energy Licensing Act 1984

Offences (Sec. 40)

- Imprisonment for a term not exceeding 10 years or a fine not exceeding RM100,000 or both if there is no penalty is stated.

Radiation Protection (Licensing) Regulations 1986

General Conditions (Regulation 12)

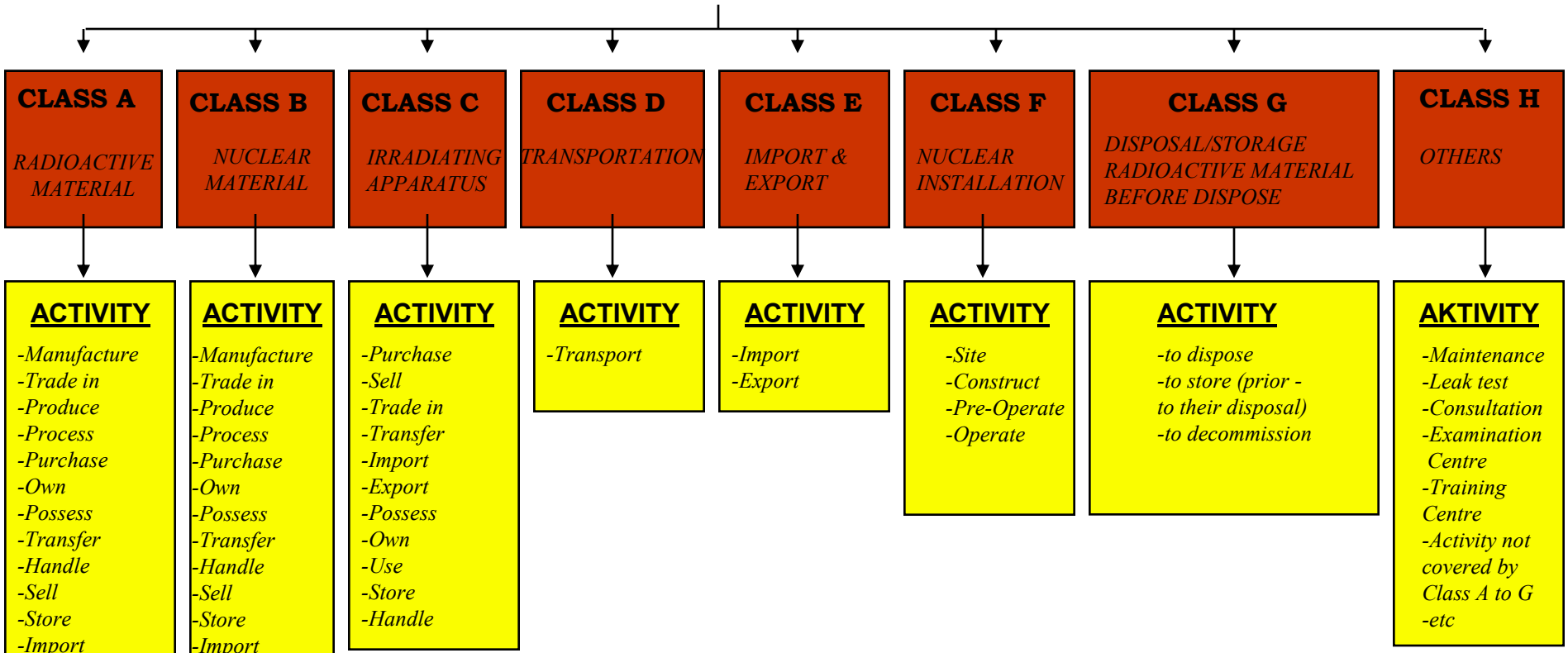
The applicant shall:

- employ a person having the necessary knowledge, skill and training
- the applicant's proposed equipment, facilities and procedures shall be adequate

to protect the health of workers and members of the public and to minimize danger to life, property and the environment.

Radiation Protection (Licensing) Regulations 1986

REGULATION 3: CLASSIFICATION OF LICENCE



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Radiation Protection (Licensing) Regulations 1986

- **Waiver of Fee (Reg. 16)**
  - The transfer or radioactive materials, nuclear materials, prescribed substances or irradiating apparatus for charitable or non-profit purposes; and
  - An amendment which does not relate to the class of the licence; or the details of any apparatus, material or installation.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Introductions

- Under the powers conferred by Section 25(6) and section 68 of Act 304, the Minister makes this following regulations;

  Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010 [P.U.(A) 46]

- Come into operation on 15th February 2010; and

- The Radiation Protection (Basic Safety Standards) Regulations 1988 [P.U.(A) 61/88] are revoked

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

SYSTEM OF DOSE LIMITATION

- Justification
- Optimization
- Annual Dose Limit
- Dose Constraint

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Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

SYSTEM OF RADIOLOGICAL PROTECTION

Reg. 7: Dose limit

(1) every licensee shall ensure that no worker or member of public receives exposure exceeds the relevant Dose Limit;

(2) NWS subreg. (1), the DL shall not apply to —
- a person involve in emergency exposure;
- an exposure from natural background radiation source; or
- medical exposure from a practice.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Reg. 8: Dose limit for worker

(1) the limit on the effective dose shall be **20 millisieverts (mSv) in a calendar year, with the condition the maximum effective dose** averaged over a period of 5 consecutive years shall not exceed 20 mSv.

(2) the limit dose for the lens of the eye shall be 150 mSv in a calendar year.

(3) the limit dose for the skin shall be 500 mSv in a calendar yr.

(4) the limit dose for hands & feet shall be 500 mSv in a calendar yr.

(5) when **female worker confirmed to be pregnant,** the foetus shall, from the date of confirmation, shall **not exceed 1 mSv** for the remaining period of the pregnancy.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

- **Reg. 9: Dose limit for members of the public (MOP)**

(1) the limit dose for a MOP shall be 1 mSv
(2) the mSv limit dose to the lens of the eye shall be 15 mSv
(3) the DL to the skin shall be 50 mSv in a calendar year;
(5) the DL for a person - **knowingly assists in the support of patient shall not exceed 5 mSv**;
(6) a person specified in subreg (5) shall **not be allowed to continue** when he received the effective dose exceeding the limit of 5 mSv **unless have given strong clinical justification**;
(7) the DL for a person < 16 years visiting patient shall not exceed 1mSv .

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Reg. 10: Dose limit for apprentices and students

- The dose limits for **apprentices** aged between 16 years and 18 years who are **training** for employment involving exposure to radiation, and
- **Students** aged between 16 years and 18 years who are required to **use radiation source** in the course of their **studies,**
  - an effective dose of 6 mSv in a calendar year;
  - an equivalent dose to the lens of the eye of 50 mSv in a calendar year;
  - an equivalent dose to the hands and feet of 150 mSv in a calendar year; and
  - an equivalent dose to the skin of 150 mSv in a calendar year, averaged over an area of one square centimeter, regardless of the area exposed.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Reg. 11: Dose limit in special circumstances

(1) a licensee may apply to the appropriate authority (AA) for a temporary change in the DL :

(2) the AA may authorize a temporary change in the DL by — (a) by an extension of the averaging period

- o not more than 10 consecutive years,
- o the effective dose for any worker shall not > 20 mSv/yr averaged
- o shall not > 50 mSv/yr in a calendar year; and
- o shall be reviewed - dose accumulated reaches 100 mSv; OR

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

(3) the AA may authorize a temporary change in the DL by — (b) by change in the limit on average effective dose per year to a value not greater than 50 mSv for a period of not more than 5 years, subject to a limit of 50 mSv in any single year.

(5) any temporary change in the DL shall —

- be reviewed when the dose accumulated by any worker reaches 100 mSv;
- be subject to annual review & not be renewable;
- relate - specified work areas & workers, shall not include pregnant
- workers/apprentices/students between ages 16 & 18 years.

(6) No temporary change in a DL - made by the licensee without prior written approval of the AA

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 15: Responsibilities of the licensee and employer.**

  - (1) every licensee & employer shall be responsible for —
    - ✓ the protection of workers; and
    - ✓ complying with any other relevant requirements - determined by AA.

  The licensee shall —

  - (2) apply the requirements of this regulation, which - specified by AA in accordance - paragraph 7(2)(b) and (c)[nat. b/ground & medical exp];
  - (3) ensure every worker - exposed other than natural sources, receives the same level of protection for the members of the public;
  - (4) establish & maintain radiation protection programme (RPP) & safety procedure;

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 15: Responsibilities of the licensee and employer.**

The licensee shall —

- (5) ensure that any work - is adequately supervised & all reasonable steps have been taken;
- (6) provide the workers with adequate information on health risks due to their occupational exposure, whether
  - ✓ normal or potential exposure,
  - ✓ instruction and training on protection and safety, and
  - ✓ information on the significance of protection and safety of their actions.
- (7) inform female workers of —
  - ✓ the risk to the foetus due to exposure during pregnancy;
  - ✓ the importance of notifying the employer and the licensee as soon as the pregnancy is confirmed; and
  - ✓ the risk to an infant ingesting radioactive material by breast feeding.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 15: Responsibilities of the licensee and employer.**
  - (8) the licensee or employer shall provide appropriate training, retraining and facilities for updating the skills & knowledge;
  - (9) If workers are to be engaged in the work - involves radiation source which not under the control of their employer, the licensee who is responsible for the radiation source shall —
    - ✓ (a) provide appropriate information to the employer;
    - ✓ (b) provide additional information approved by AA as the employer may request prior to, during & after engagement of the workers by the licensee;

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 15: Responsibilities of the licensee and employer.**
  - (9) If workers are to be engaged……..…,the licensee who is responsible for the radiation source shall —
    - ✓ (c) co-operate with employer to achieve a clear allocation & documentation of the respective responsibilities;
    - ✓ co-operate with the employer to develop & use specific exposure restrictions; and
    - ✓ Provide employer with specific assessments of the doses received by the workers.

The licensee shall —

- (10) establish in writing such local rules and procedures;
- (11) establish investigation & intervention levels where appropriate and shall be subject to the approval of AA;

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 15: Responsibilities of the licensee and employer.**

  The licensee shall —

  - (12) include in the **local rules and procedures**, the values of any approved investigation or intervention level, and the procedures to be followed.

  - (13) the licensee or employer shall ensure relevant local rules are communicated to the employees;

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 16: Employment of radiation protection officer and qualified expert**

  - (1) the licensee shall employ a radiation protection officer.
  - (2) NWS subreg. (1), the licensee may employ a qualified expert approved by the AA.

- **Reg. 17: Classification of working areas**

  - (1) the licensee shall classify the working areas into clean, supervised and controlled areas.
  - (2) the licensee shall, in determining the boundaries of any area, take into account —
    - ✓ the likelihood and magnitude of potential exposure; and
    - ✓ the nature and extent of the required protection and safety procedure.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 17: Classification of working areas**
  - (3) NWS subreg. (2), area where the annual dose received by a worker - likely to exceed 3/10 of the ADL shall be classified as a controlled area.
- **Reg. 18: Administrative procedures in supervised & controlled area**
  - (1) the licensee shall **restrict access** to controlled areas by means of administrative procedures –
    - ✓ the use of work permits; and
    - ✓ physical barriers which include locks or interlocks,
  - (5) the licensee shall **periodically review** the conditions –
    - ✓ to determine the possible need to revise the protection measures and safety provisions; and
    - ✓ the boundaries of the supervised & controlled areas.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 20: Personal protective equipment**
  - (1) The licensee shall ensure that —
    - ✓ workers are provided, where appropriate with suitable and adequate PPE; and
    - ✓ when appropriate, workers receive adequate instruction;
    - ✓ all PPE is well-maintained.

- **Reg. 21: Monitoring of the work place**
  - (1) the licensee shall establish, maintain and keep under review a monitoring programme in the supervised area and controlled areas;

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 21: Monitoring of the work place**

  - (2) the monitoring programme shall include —

    - ✓ measurements of external radiation levels and contamination levels (if appropriate) at specified places, times and frequencies at all appropriate locations;
    - ✓ exposure assessments in controlled and supervised areas;
    - ✓ assessment of the levels of radiation risks associated with accident or emergency situations;
    - ✓ specification of the methods and procedures of monitoring; and
    - ✓ the reference levels and the actions to be taken if they are exceeded.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 22: Personnel monitoring**

  - (1) The licensee shall be responsible for arranging —

    - ✓ the assessment of the occupational exposure of workers on the basis of personnel monitoring, where appropriate, using the dosimetry services as approved by the AA.

  - (2) the licensee shall carry out personnel monitoring for all workers who normally work in a controlled area;

  - (3) personnel monitoring shall **not be required** for any worker who normally work in a supervised area, or who enters a controlled area only occasionally.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 23: Personnel monitoring results**

  - (1) the licensee **shall inform** each worker in writing of the worker's personnel monitoring results and radiation exposure status **not later than 14 days** from the date the licensee received.

  - (5) when worker receives exposure > 100 mSv, the employer shall ensure – undergoes medical examination & investigation by the approved registered medical practitioner (ARMP).

  - (6) whenever accident or emergency occurs, the licensee, in co-operation with the employer shall ensure that the results of personnel monitoring are submitted to the ARMP immediately.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 24: Exposure records**

  - (1) the employer **shall immediately transfer** the exposure records of his workers to the appropriate authority —

    - ✓ after the termination or the retirement of the worker; and
    - ✓ when the employer ceases operation.

- **Reg. 25: Investigation of over exposure**

  - If exposure in excess of the DL occurs or is suspected to have occurred—
    - ✓ the licensee shall carry out an investigation to determine the circumstances in which the exposure took place; and
    - ✓ to determine its consequences, and he shall submit a report on the investigation to the appropriate authority.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 26: Notification and report of all accidental exposure and emergency exposure**

  - (1) The licensee shall notify the AA of all accidental exposure and emergency exposure within 24 hours after such accidental and emergency exposures.
  - (2) The licensee shall submit to the appropriate authority a written report of all accidental exposure and emergency exposure within 30 days after such exposures.

- **Reg. 27: Medical surveillance of workers**

  - (1) The employer shall cause medical surveillance to be carried out on his workers.
  - (2) Medical surveillance of workers shall be carried out by an ARMP.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 29: Requirements of medical surveillance**
  - The following medical surveillance of workers shall be carried out, where applicable —
    - ✓ pre-employment medical examinations;
    - ✓ general health surveillance;
    - ✓ periodic reviews of health; and
    - ✓ medical examination at termination of employment or retirement.
- **Reg. 30: Prohibition on employment of workers**
  - (1) No person shall employ any person as a worker if the person is found to be medically unfit.
  - (2) No person shall continue to employ a worker who is found to be unfit to be a worker after a medical surveillance is carried out on him.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 33: Periodic reviews of health**
  - (1) the employer shall ensure the health of a worker is reviewed regularly to determine whether such worker remains fit.
  - (2) the nature of the periodic reviews of health shall depend on the type & extent of exposure.
  - (3) without prejudice to subregs (1) and (2), the state of health of a worker shall be **reviewed at least once in three years** for a worker in a **controlled area** and more frequent if the worker's exposure conditions & state of health so requires.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 39: Maintenance of medical records of workers**
  - (1) The employer shall keep and maintain a medical record for his worker up to a date he remains his worker.
  - (5) The employer shall immediately transfer the medical records of his workers to the appropriate authority—
    - ✓ after the termination or the retirement of the worker; and
    - ✓ when the employer ceases operation.
  - (6) NWS subreg. (5), employer ceases operations & another employer takes over, the former employer shall transfer all medical records of workers to the new employer.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART III : OCCUPATIONAL EXPOSURE

- **Reg. 40: Responsibilities of a worker**

1. Every worker shall follow all instructions, rules and procedures issued by the licensee
2. Every worker shall use, as instructed by the licensee, all facilities, devices and protective equipment provided by the licensee or the employer to limit any possible exposure.
3. Every worker shall use approved personnel monitoring devices provided by the licensee or the employer for assessing exposure.
4. Every female worker who confirmed to be pregnant) shall inform her employer or licensee as soon as practicable,

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Reg. 40: Responsibilities of a worker

4. Every worker shall immediately report all accidental exposures or intakes or any suspected exposure to his RPS, RPO or QE.
5. Every worker shall immediately report any damage to or malfunction of any safety equipment to his RPS, RPO or QE.
6. Every female worker shall, as soon as she suspects that she is pregnant, seek confirmation of such suspected pregnancy from any approved registered medical practitioner
7. Every worker shall take all reasonable precautions to prevent damage to such equipment

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Reg. 68: Emergency plans

(1) The licensee shall establish an emergency plan for responding to and correcting every reasonably foreseeable emergency situation involving a radiation source.

(5) The licensee shall review and update the emergency plan as determined by the appropriate authority.

(6) The licensee shall provide training for personnel who are or will be

involved in implementing the emergency plan.

-Refer Notis Pemberitahuan AELB Bil. 01/2012 dated 01/02/2012 for further explanation.

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Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

KLIA Drill

Drill (Unsealed source)

National Drill (Putrajaya

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Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART VII: INTERVENTION

➢**Reg. 72: Requirements for intervention**

- (1) the licensee or employer shall carry out an intervention when —
  - ✓ an emergency arises - established or may be exceeded;
  - ✓ the AA issues a directive in any temporary exposure situation,
  - ✓ the AA directs that remedial action be taken.

- (2) the form, extent and duration of any protective actions or remedial action shall be optimized.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

- **PART VII: INTERVENTION**

  - **Reg. 76: Protection for workers undertaking intervention**

  - (1) the licensee and employer shall ensure that no worker undertake intervention - exposed in excess of the maximum dose limit 50 mSv except —

    - ✓ (a) for the purpose of saving a life or preventing serious injury;

    - ✓ (b) when undertaking actions intended to avert a large collective dose; or

    - ✓ (c) when undertaking actions to prevent the development of catastrophic conditions.

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

PART VII: INTERVENTION

➢ **Reg. 76: Protection for workers undertaking intervention**

- (3) for life saving actions, every effort shall be made to keep doses below 10 X the maximum single year dose limit , 50 mSv

- (5) a worker who acts as a volunteer that the dose may exceed 50mSv shall be clearly & comprehensively informed in advance.

- (6) when the emergency phase of intervention ended, all workers undertaking recovery operations - subject to the requirements of occupational exposure

  - (9) a worker received emergency exposure shall **not be precluded** from incurring further occupational exposure but needed to undergo medical examination & investigation. (under subreg. 23(5).

Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

- **Call if Incident/Accident happened within 24 hours/ upon discovery**

- **LEMBAGA PERLESENAN TENAGA ATOM (AELB)**
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Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010

Reg. 78: Cessation of operations

The licensee shall not cease to **operate, decommission or abandon** licensed facility that involves a radiation source or radioactive waste management facility, except with the written approval of and in accordance with the instructions from AELB

Radiation Protection (Transport) Regulations 1989

Regulations need to be followed if any person want to transport radioactive materials, nuclear materials or prescribed substances in Malaysia via land, air or water.

Radioactive materials, Nuclear materials or Prescribed substances

by all modes of transportation

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Radiation Protection (Transport) Regulations 1989

The objective of these Regulations is to protect persons, property and the environment from the effects of radiation during the transport of *radioactive material.* This protection is achieved by requiring:

- containment of the *radioactive content*
- control of *external radiation levels*
- prevention of *criticality*
- prevention of damage caused by *heat*

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Radiation Protection (Transport) Regulations 1989

Basic Principle Regarding Radioactive Material Transport Packages

Controls on:

- contamination
- leaking packages
- limits on
  - ✓radiation levels
  - ✓TI
  - ✓CSI
- marking, labelling and placarding

Radiation Protection (Transport) Regulations 1989

- **Exemption**
  - producing, using or storing of radioactive materials, nuclear materials or prescribed substances within establishments, other than storage in transit;
  - implanting with radioisotopic cardiac pacemakers or other devices to human beings or treating with radiopharmaceuticals; and
  - as an integral part of a conveyance which radioactive materials, nuclear materials or prescribed substances is used.

Radiation Protection (Transport) Regulations 1989

- *Excepted packages*
- *Industrial packages Types IP-1, IP-2, IP-3*
- *Type A packages*
- *Type B packages*

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Radiation Protection (Transport) Regulations 1989

Excepted packages

- A Class 7 (radioactive) material with an activity per package which does not exceed the limited quantity package limits specified as follows:
- Its packaging, are excepted from requirements packaging, labeling, marking (except for the UN identification number).
- The radiation level at any point on the external surface of the package does not exceed 0.005 mSv/hour (0.5 mrem/hour);
- The outside of the inner packaging or, if there is no inner packaging, the outside of the packaging itself bears the marking "Radioactive";

Isotope	A_1 (TBq)	A_1 (Ci)	A_2 (TBq)	A_2 (Ci)	Specific Activity	
					(TBq/g)	(Ci/g)
C-14	4.0×10^{1}	1.1×10^{3}	3.0	8.1×10^{1}	1.6×10^{-1}	4.5
Ca-45	4.0×10^{1}	1.1×10^{3}	1.0	2.7×10^{1}	6.6×10^{2}	1.8×10^{4}
Ce-141	2.0×10^{1}	5.4×10^{2}	6.0×10^{-1}	1.6×10^{1}	1.1×10^{3}	2.8×10^{4}
Co-57	1.0×10^{1}	2.7×10^{2}	1.0×10^{1}	2.7×10^{2}	3.1×10^{2}	8.4×10^{3}
Cr-51	3.0×10^{1}	8.1×10^{2}	3.0×10^{1}	8.1×10^{2}	3.4×10^{3}	9.2×10^{4}
F-18	1.0	2.7×10^{1}	6.0×10^{-1}	1.6×10^{1}	3.5×10^{6}	9.5×10^{7}
Fe-59	9.0×10^{-1}	2.4×10^{1}	9.0×10^{-1}	2.4×10^{1}	1.8×10^{3}	5.0×10^{4}
Ga-67	7.0	1.9×10^{2}	3.0	8.1×10^{1}	2.2×10^{4}	6.0×10^{5}
I-125	2.0×10^{1}	5.4×10^{2}	3.0	8.1×10^{1}	6.4×10^{2}	1.7×10^{4}
I-131	3.0	8.1×10^{1}	7.0×10^{-1}	1.9×10^{1}	4.6×10^{3}	1.2×10^{5}
In-111	3.0	8.1×10^{1}	3.0	8.1×10^{1}	1.5×10^{4}	4.2×10^{5}
Ir-192	1.0	2.7×10^{1}	6.0×10^{-1}	1.6×10^{1}	3.4×10^{2}	9.2×10^{3}
Na-22	5.0×10^{-1}	1.4×10^{1}	5.0×10^{-1}	1.4×10^{1}	2.3×10^{2}	6.3×10^{3}
Nb-95	1.0	2.7×10^{1}	1.0	2.7×10^{1}	1.5×10^{3}	3.9×10^{4}
P-32	5.0×10^{-1}	1.4×10^{1}	5.0×10^{-1}	1.4×10^{1}	1.1×10^{4}	2.9×10^{5}
P-33	4.0×10^{1}	1.1×10^{3}	1.0	2.7×10^{1}	5.8×10^{3}	1.6×10^{5}
Rb-86	5.0×10^{-1}	1.4×10^{1}	5.0×10^{-1}	1.4×10^{1}	3.0×10^{3}	8.1×10^{4}
Ru-103	2.0	5.4×10^{1}	2.0	5.4×10^{1}	1.2×10^{3}	3.2×10^{4}
S-35	4.0×10^{1}	1.1×10^{3}	3.0	8.1×10^{1}	1.6×10^{3}	4.3×10^{4}

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Radiation Protection (Transport) Regulations 1989

Industrial Packaging (IP)

- **Industrial Packingings (IP)** are designed to survive normal conditions of transport and at least the DROP test and stacking test for Type A packingings
- Industrial packingings (IP) are used for transportation of materials with very small amounts of radioacitivity
  - **(Low Specific Activity [LSA]**
  - **Surface Contaminated Objects [SCO]).**
- Industrial packaging (IP) are usually metal boxes or drums

Radiation Protection (Transport) Regulations 1989

Type A Package

- Designed to withstand normal conditions of transport.
- In the event of a severe accident radiological consequences from damage to a *Type A package* are acceptable
- Package contents limited to low quantity

Graded approach: Package withstanding Normal conditions of transport

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Radiation Protection (Transport) Regulations 1989

Graded approach:

Package withstanding Accident conditions of transport

Type B Package

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Radiation Protection (Transport) Regulations 1989

-PROHIBITION (Reg. 31) Regulation (Transport) 1989

Not any person can transport radioactive materials unless:

i. Its been package in the packaging that comply with the requirements of the transportation regulations.

ii. Consignment of radioactive materials package, label, marked, categorized and placards as required in the regulations.

-No person can transport any radioactive materials via post in Malaysia.

Radiation Protection (Transport) Regulations 1989

1 m

1 m

1 m

1 m

- Transport Index (TI) = maximum dose rate (mSv/hr) at 1 meter from the package surface x 100

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Radiation Protection (Transport) Regulations 1989

TABLE VII. CATEGORIES OF PACKAGES AND OVERPACKS

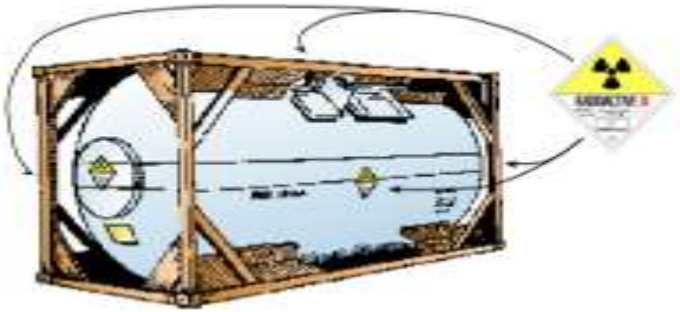
Conditions		
Transport Index	Maximum *radiation level* at any point on external surface	Category
0[a]	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1[a]	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2 mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III-YELLOW[b]

[a] If the measured *TI* is not greater than 0.05, the value quoted my be zero in accordance with para. 526(c).
[b] Shall also be transported under *exclusive use*.

Radiation Protection (Transport) Regulations 1989

Labelling

- Label configuration on *packages* shall be:
  - affixed on two opposite sides of the outside of a:
    - ✓ *package*
    - ✓ *overpack*
  - affixed on all four sides of a:
    - ✓ *freight container*
    - ✓ *tank*



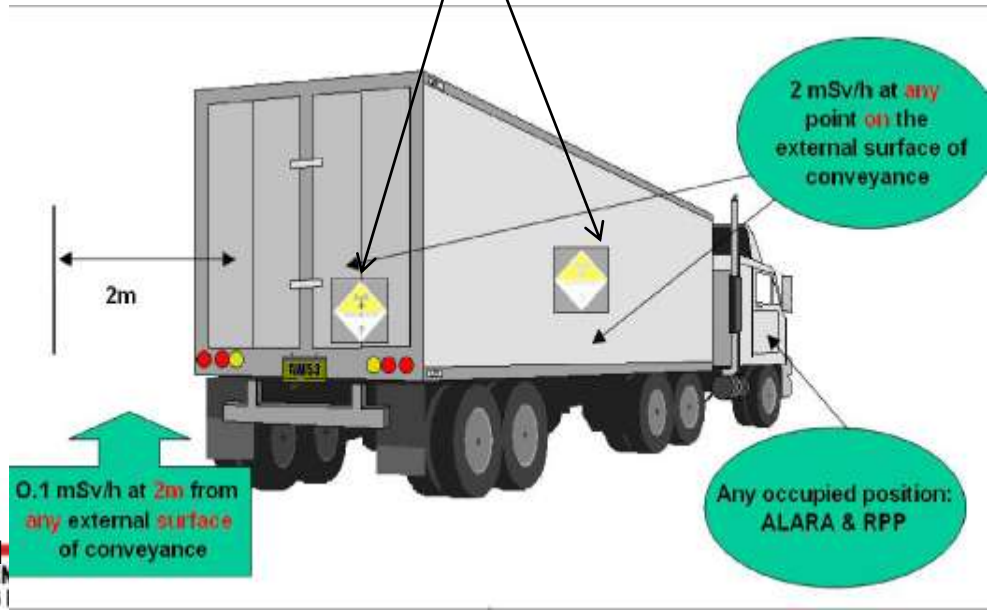
Radiation Protection (Transport) Regulations 1989

Placarding

Radioactive material placards apply to:

- Large *freight containers*
- *Tanks*
- Rail and road *vehicles* carrying *packages*, *overpacks* or *freight containers* (other than excepted packages)
- Rail and road *vehicles* carrying *consignments* under *exclusive use*
- Unpackaged *LSA Material* or *SCO consignments* in or on a *vehicle*

Radiation Protection (Transport) Regulations 1989



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Radiation Protection (Transport) Regulations 1989

Determining Where to Place the Placards

- Placement for road and rail vehicles
  - Rail *vehicle*: 2 external lateral walls
  - Road *vehicle*: 2 external lateral walls and external rear wall
  - In the case of *vehicles* without sides:
    - affix directly on cargo carrying unit (must be readily visible)
  - In the case of *vehicles* carrying physically large *tanks* or *freight containers*
    - Placard on *tank* or *freight container* sufficient

Radiation Protection (Transport) Regulations 1989

DUTIES AND RESPONSIBILITIES OF CARRIER

1. The levels of radiation in normal conditions of transport does not exceed 2 mSv / hr at any point outside the vehicle surface and 0.1 mSv / h at a distance of 2 meters from the surface of the vehicle.

2. the radiation level at any point of 2 meters from the outer surface does not exceed 0.1 mSv / hr.

3. at any normally occupied seats, the radiation level must be below the 0.02 mSv / hr.

4. immediate response should be done by carriers in the event of an accident and notify the Radiation Protection Officer (RPO) as soon as possible regarding an accident.

Radiation Protection (Transport) Regulations 1989

4. if a package is suspected or has been damaged or leaking, the carrier shall:
   a. Notify AELB and RPO immediately.
   b. restricting access to the package immediately.
   c. evaluation of the resulting level of contamination and
   d. measurement of radiation level on the packaging, vehicles, surrounding areas

5. leaking packages or packages that have physical damage that can cause contamination and radiation levels exceed allowable limits only can not be removed under the supervision of AELB

6. packaging category YELLOW-II, YELLOW-III or over packs shall not be carried in the passenger compartment, except the space reserved exclusively

Radiation Protection (Transport) Regulations 1989

7. packaging with a transport index greater than 10 or have a external radiation level greater than 2 mSv / hr is only allowed to be transported under exclusive use or special arrangements.

8. number of packaging of category YELLOW-II, YELLOW-III, over packs, tanks, freight containers and vehicles that are grouped together in a confined area so that the total transport index (TI) does not exceed 50.

9. a distance of 6 meters is required for the different packages to limit the transport index does not exceed 50 for each group

Radiation Protection (Transport) Regulations 1989

9. Placard must be pasted on the outside of each side wall and the wall behind the vehicle and if the vehicle is not transporting a radioactive material/nuclear material, its must be removed.

10. No person other than the driver and his assistant can be in the vehicle transporting packages, over packs, tanks or freight containers labeled with the labels category YELLOW-II or YELLOW-III category.

11. During transportation, carrier shall isolate packaging, over pack, container and freight container:
    a. from place/location occupied by transportation worker and public.
    b. from unexposed radiographic film.
    c. other dangerous goods.

Atomic Energy Licensing (Appeal) Regulations 1989

Any person who is dissatisfied with any decision of the appropriate authority made under this Act may within thirty days after being notified of such decision give notice of appeal in writing to the Minister.

Every appellant shall-

- State precisely in the notice of appeal the decision with which he is dissatisfied;
- State in the notice of appeal his full name and address;
- Send a copy of the notice of appeal to the appropriate authority
- Every notice or other document relating to an appeal shall be sent by registered post.

Conditions Of License

- Made under Section 17 Act 304.
- Enclosed with the license.
- Additional to the items which not stated in the regulations.

Dispose

- The licensee shall obtain prior permission from AELB at least 14 days prior to the disposal of radiation equipment either by way of:
  (a) return the equipment to a licensed supplier / recognized by AELB only; or
  (b) (b) other methods allowed by AELB.
- The licensee shall send a complete return of possession to AELB LPTA/BM/3 at least 14 days from the date of disposal is made.
- The licensee shall notify in writing by submitting AELB specific information from the disposal facility / supplier / a letter of confirmation the acceptance of donations.

Conditions Of License

Change / Recruitment / Termination

- The licensee shall obtain authorization from AELB at least 14 days prior to any exchange / recruitment / termination OBTL, PPS, PY or P do.
- The licensee shall ensure that recruitment is done according to establish procedures such as background check up and conduct of the employee's security clearance.
- For radiation workers who have completely terminate, the licensee shall prevent the further entry and access to any information related to the licensee.

Import / export

- The licensee shall obtain the prior written permission from AELB at least 14 days before the date of the radiation equipment to be imported / exported by using the online application system ('on-line') of e-permit system.
- The license shall only be allowed to import / export of radiation equipment as shown in Appendix A for personal use only.

Conditions Of License

RESPONSIBLITY OF LICENSEE (OBTL)

1. Appoint Responsible Person For Licence (RPFL) from the Board of Director
2. Ensure that only the RPFL and RPO can deal with AELB
3. Ensure that all activities done by the company related to ionizing radiation followed the ACT 304 and its subsidiary legislation.
4. Deal in all of the related matters with AELB
5. nominates the name of the worker to AELB that fulfill the requirements to be recognize as RPO.
6. Explain to the RPO for his responsibility.
7. Ensure that all activities of the company related to ionizing radiation follow the Act 304 and its subsidiary legislation.

Conditions Of License

RESPONSIBILITY OF RPO

1. Establish and updating the Radiation Protection Programme base on current practice in radiation protection.
2. Preparing planning programme and emergency preparedness, reporting any radiological emergency to AELB and investigate the incident/accident occur.
3. Identify and analyze the radiological hazards at workplace and surroundings.
4. Specify the needs of infrastructure and implementation of programme for the storage of source, calibration and maintenance of radiation equipment, and planning for the appropriate methods of radioactive waste disposal.
5. Arrange the programme for the medical surveillance for worker.
6. Preparing adequate instruction and training for all personnel exposed to

Conditions Of License

7. Classification and labeling of working areas following the Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010.
8. Preparing and implementation of the monitoring programme for workers, areas and environment.
9. Ensure that radiation monitoring equipment in good working order and always used by the worker.
10. Ensure the transportation of RAM, NM, IA be implemented as Radiation Protection (Transport) Regulations 1989.
11. Ensure that the employment, cease and retirement of workers followed the procedure imposed by AELB.
12. Ensure any changes of the location must get prior approval from AELB.
13. Supervise all works involving radiation.
14. Inspect, store and update all related records

Atomic Energy Licensing (Radioactive Waste Management) Regulations 2011

The Regulations was prepared and drafted base on the *IAEA Working Material* named; "Radioactive Waste Management Model Regulations and Their Implementation"; 1997 and has been reviewed by the IAEA expert.

Part I: Application

- Apply to all aspects of radioactive waste management,
- Radioactive waste arises from medical, industrial and research applications and any other applications which may be specified by the Board*

*The Board is the solely authority in controlling the disposal of radioactive waste.
(LEM/KK/229 Mei 2008 – Delegation of power to Setiausaha Eksekutif from the Board)

Atomic Energy Licensing (Radioactive Waste Management) Regulations 2011

Part IV : Radioactive Waste Management Officer (RWMO)

- Technically qualified and competent person.
- Recognized by the Board.
- Responsibility of RWMO

  Ensuring – safety, security (managing, handling, transporting, discharging, releasing etc.)

  Keeping – Record and inventory

  Reporting – accident and abnormality

Atomic Energy Licensing (Radioactive Waste Management) Regulations 2011

Part VI : Reuse and Recycle of Radioactive Material

- Reuse and Recycle
  Before declaring radioactive material including a sealed source as radioactive waste, the licensee need to consider whether he or any other person can make use of or recycle the radioactive material.

- Transfer of Rad. Waste
  Get an approval from the Board (to other licensee or Radioactive Waste Management Facility)

Atomic Energy Licensing (Radioactive Waste Management) Regulations 2011

Return of Used Sealed Source

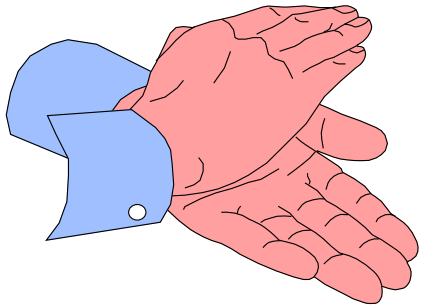
- Activity greater than 100 MBq:
  I. Require the supplier to receive the source back within three months* of the recipient requesting such return;
  II. submit a copy of relevant parts of the contract or acceptance document to the Board and obtain its written approval before entering into a contract or accepting the source; or
  III. send to radioactive waste facility approved by the Board

Part VIII : Discharge and Disposal of Rad. Waste

- Not more than 1 cubic metre (m^3) of radioactive waste or such larger volumes as may be authorised in a licence
- In accordance with Clearance level – Second Schedule

Summary

- Act 304 is 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 there to.
- Act 304 and subsidiary legislations made thereunder is to ensure the use of radiation applications in a safe manner without endangering the public, radiation workers and the environment.
- Act 304 provides guidelines on the use of radiation application in accordance with the standards adopted at the international level
- Act 304 and subsidiary legislations made thereunder is a regulatory document and compulsory to follow.



Thank You

for your attention

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