

สำนักงานปรมาณูเพื่อสันติ  
Office of Atoms for Peace



# Thailand

## Regional Workshop on Radiological Environmental Impact Assessment for Nuclear Installations

24-28 October 2022

Manila, Philippines

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SMART OAP

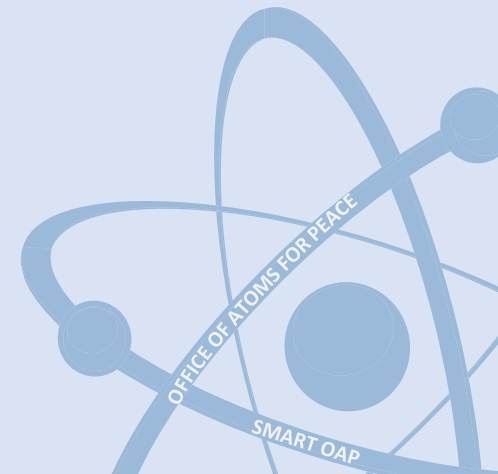
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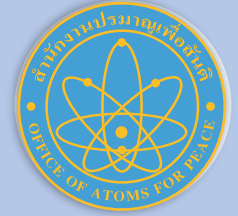
SMART OAP



# Overview

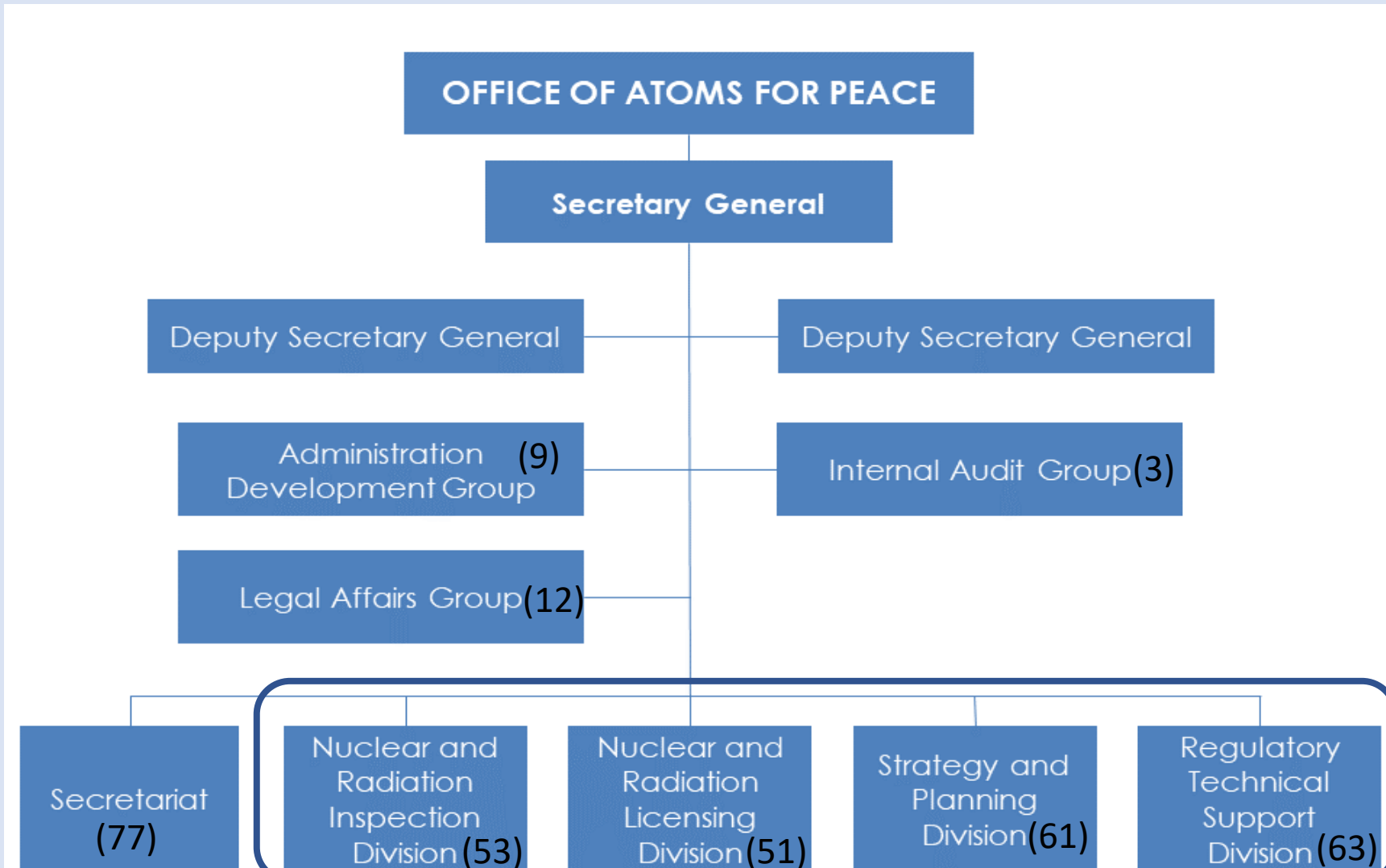
- **Thailand's nuclear regulation**
  - OAP Responsibility
  - Law's related about Nuclear Facility
    - **Status of Thailand's Facility**
      - Research reactor (BKK)
      - Research reactor (NNY)
      - Miniature Neutron Source Reactor
      - Nuclear Power in Thailand
    - **The challenges**





# Thailand's nuclear regulation

**Principle:** To protect life, health and property from the hazards of nuclear energy and from the harmful effects of ionizing radiation.





# Roles and Responsibility

- Nuclear and radiation inspection division

- Inspect, control and regulate use of nuclear energy and nuclear facilities.

- Nuclear and Radiation licensing division

- Conduct of licensing process, review and assessment for nuclear research reactors including nuclear materials

- Strategy and planning division

- Be a secretary of Nuclear Energy Commission

- Regulatory technical support division

- Radiation monitoring in environment



# Nuclear Law, 2016

- Chapter 1: General Provisions
  - Chapter 2: Nuclear Regulatory Committee
  - Chapter 3: Radioactive Materials and Radiation Generating Devices
  - Chapter 4: Nuclear Materials
  - **Chapter 5: Nuclear Facilities**
  - Chapter 6: Radioactive Waste
  - Chapter 7: Spent Nuclear Fuel
  - Chapter 8: Safety Security and Safeguards
  - Chapter 9: Transportation
  - Chapter 10: Nuclear and Radiation Emergency
  - Chapter 11: License Revocation and Suspension
  - Chapter 12: Appeal
  - Chapter 13: Inspectors
  - Chapter 14: Penalties
- Transitional Provisions





# Nuclear facilities licenses

Licenses for **Nuclear Facilities** in the Act 2016, issued by Secretary General of the Office of Atoms for Peace with the approval of the Nuclear Regulatory Commission

## Site License

- Section 5, 51, 52, 53

## Construction License

- Section 5, 55, 58

## Commissioning License

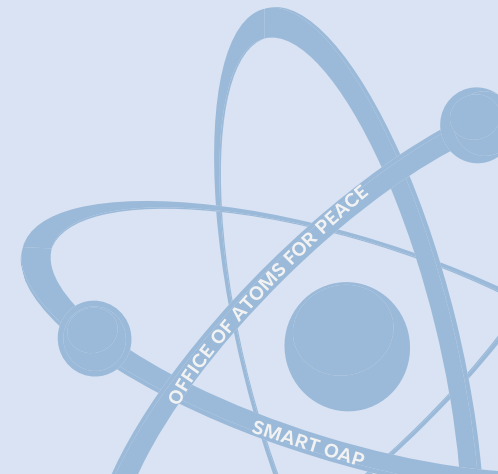
- Section 5, 8(11) , 63

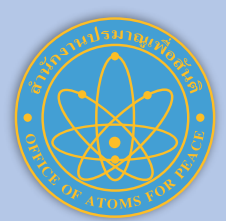
## Operating License

- Section 5, 64, 65

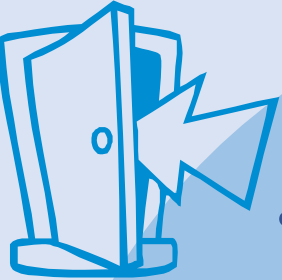
## Decommission License

- Section 5 , 8(12), 72



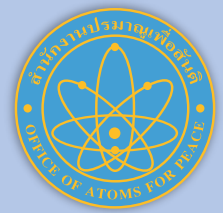


# Site License



- Chapter 5 Nuclear Facility, Part 2  
Nuclear Facility Site,  
Section 51 In establishing a nuclear facility, the establisher shall obtain a site license from the Secretary General with the approval of the Commission.
  - When applying for a license, an applicant shall submit a license application together with a site evaluation report
  - The site evaluation report shall be prepared in accordance with the specification prescribed by the Commission with at least following details:

- ▶ The effect of external events on the nuclear facility site either of natural origin or human induced
- ▶ The characteristics of a site
- ▶ A site environmental report
- ▶ Population demography surrounding a nuclear facility
- ▶ Evacuation routes for the population in the case of radiological or nuclear emergency;
- ▶ Protection and mitigation of possible harm to people and the environment



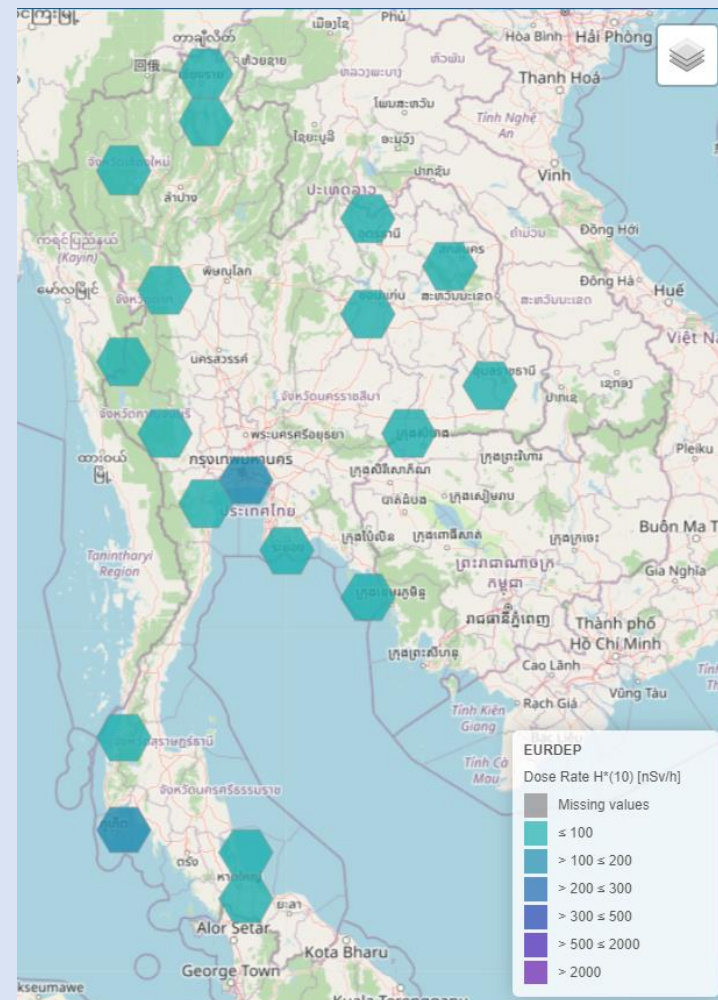
# Environmental impact assessment in regularity frameworks

## Normal Situation

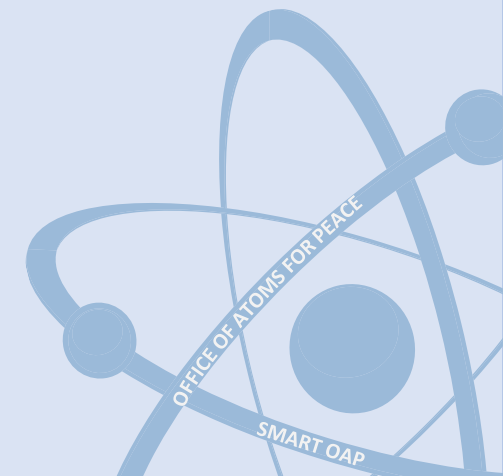
	Parameters	Site	Sample frequency	GL Level /reference standard
Radiation Monitoring Stations		22 station	All Time	
Rainwater	$\gamma$ , Gross $\alpha$ , Gross $\beta$	Nakhon Nayok province	2 times /year	Safety Reports Series No.64 (collected sample)
Fallout	$\gamma$ , Gross $\beta$	Nakhon Nayok Bangkok (OAP)	12 times /year	
Surface water	$\gamma$ , Gross $\alpha$ , Gross $\beta$	Nakhon Nayok Nakhon Ratsima province	2 times /year	Technical Reports Series No. 295. ( Sample preparation)
Tap water	$\gamma$ , Gross $\alpha$ , Gross $\beta$	Nakhon Nayok Nakhon Ratsima	2 times /year	
Soil	Gross $\alpha$ , Gross $\beta$ , $\gamma$	Nakhon Nayok Nakhon Ratsima	2 times /year	GSG-2 (Radiation emergencies)
Filter	Gross $\beta$	Bangkok (OAP)	4 weeks/months	
Milk	Gross $\alpha$ , Gross $\beta$ , $\gamma$	All over Thailand	3 times/ year	CODEX STAN 193-1995
Rice	Gross $\alpha$ , Gross $\beta$ , $\gamma$	All over Thailand	2 times/ year	CODEX STAN 193-1995
Vegetable	Gross $\alpha$ , Gross $\beta$ , $\gamma$	All over Thailand	1 time / year	
Meat	Gross $\alpha$ , Gross $\beta$ ,	All over Thailand	1 time / year	CODEX STAN 193-1995
Seafood	Cs-137	All over Thailand	4 times/ year	CODEX STAN 193-1995
Sea water	$\gamma$ , Gross $\alpha$ , Gross $\beta$ , Cs-137, Po-210	All over Thailand	2 times / year	



# Radiation Monitoring Stations



- ☐ Environmental Radiation Monitoring Stations
  - Gas Detector 8 stations
  - NaI 9 stations
  - Underwater 5 stations



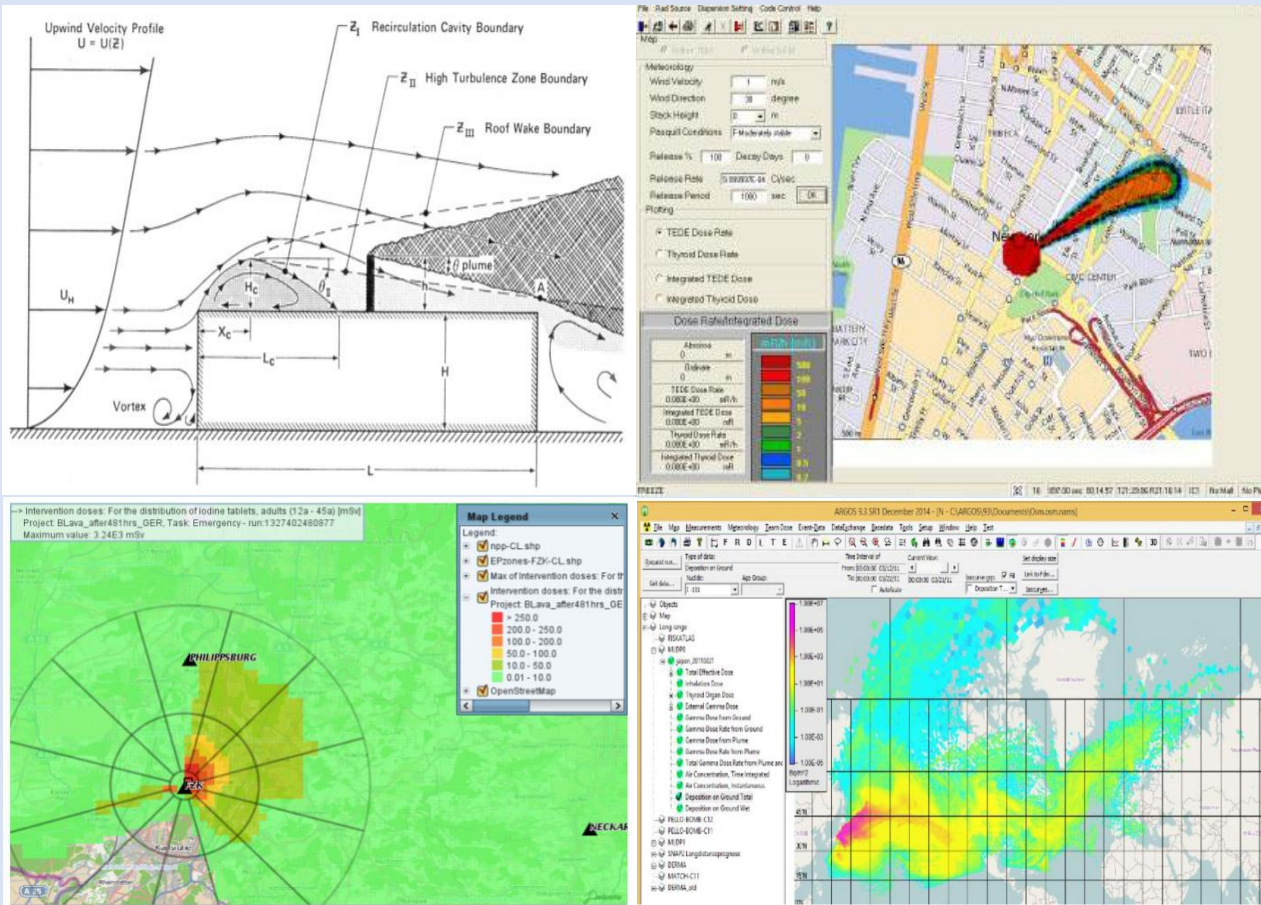


# Environmental impact assessment in regularity frameworks

## Emergency Situation



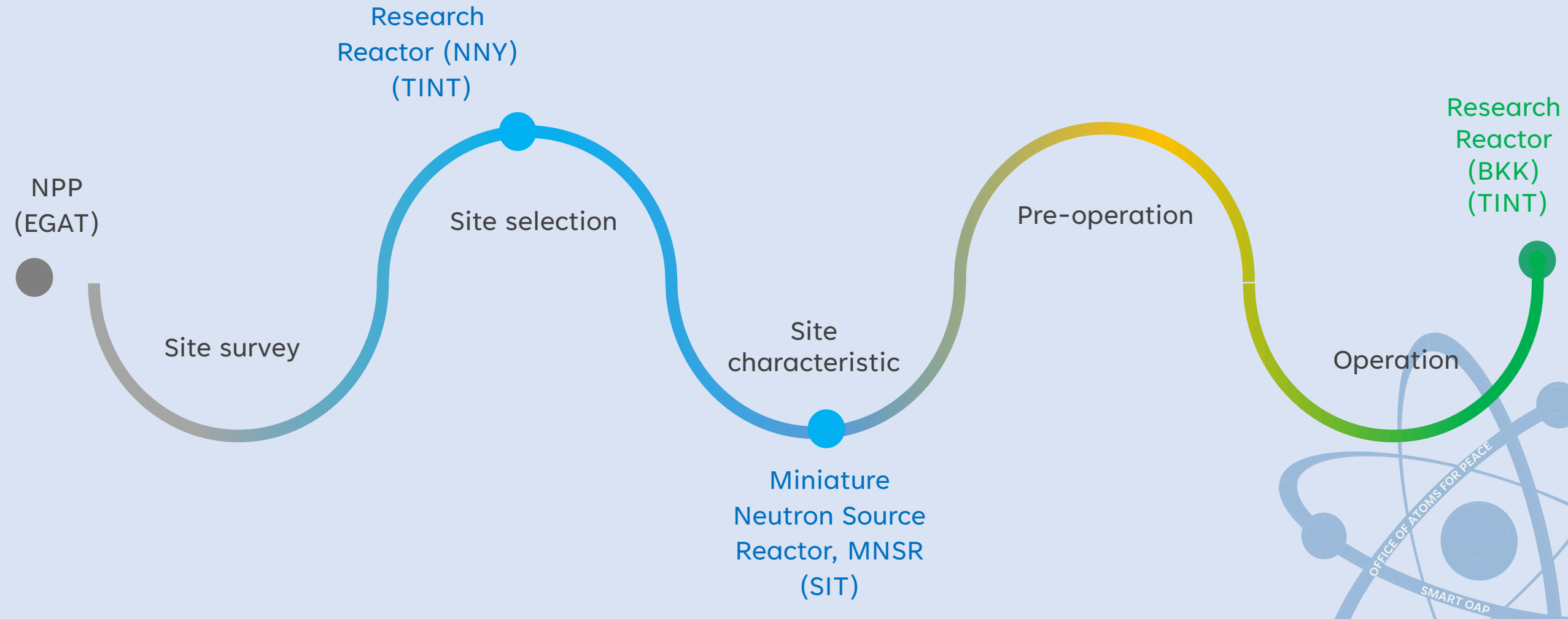
- ✓ RSAC
- ✓ HOTSPOT
- ✓ JRODOS
- ✓ ARGOS



OIL	Default OIL value	Monitoring type
OIL1 <sub>γ</sub>	1000 μSv/h	 GROUND MONITORING Ambient dose equivalent rate at 1 m above ground level
OIL2 <sub>γ</sub>	100 μSv/h (for the first 10 days after reactor shutdown) 25 μSv/h (later than 10 days after reactor shutdown <sup>3</sup> or for spent fuel)	
OIL3 <sub>γ</sub> <sup>b</sup>	1 μSv/h	
OIL4 <sub>γ</sub> <sup>c</sup>	1 μSv/h	 SKIN MONITORING Ambient dose equivalent rate at 10 cm from the bare skin of the hand and face
OIL4 <sub>β</sub> <sup>c</sup>	1000 cps <sup>d</sup>	 SKIN MONITORING Beta count rate at 2 cm from the bare skin of the hand and face (The use of OIL4 <sub>γ</sub> is preferable over OIL4 <sub>β</sub> )
OIL7	1000 Bq/kg of I-131 and 200 Bq/kg of Cs-137	 MONITORING OF FOOD, MILK* AND DRINKING WATER SAMPLES Activity concentration of I-131 <sup>f</sup> and Cs-137 <sup>f</sup> in food, milk and drinking water samples
OIL8 <sub>γ</sub>	0.5 μSv/h	 THYROID MONITORING Ambient dose equivalent rate in front of the thyroid in contact with the skin

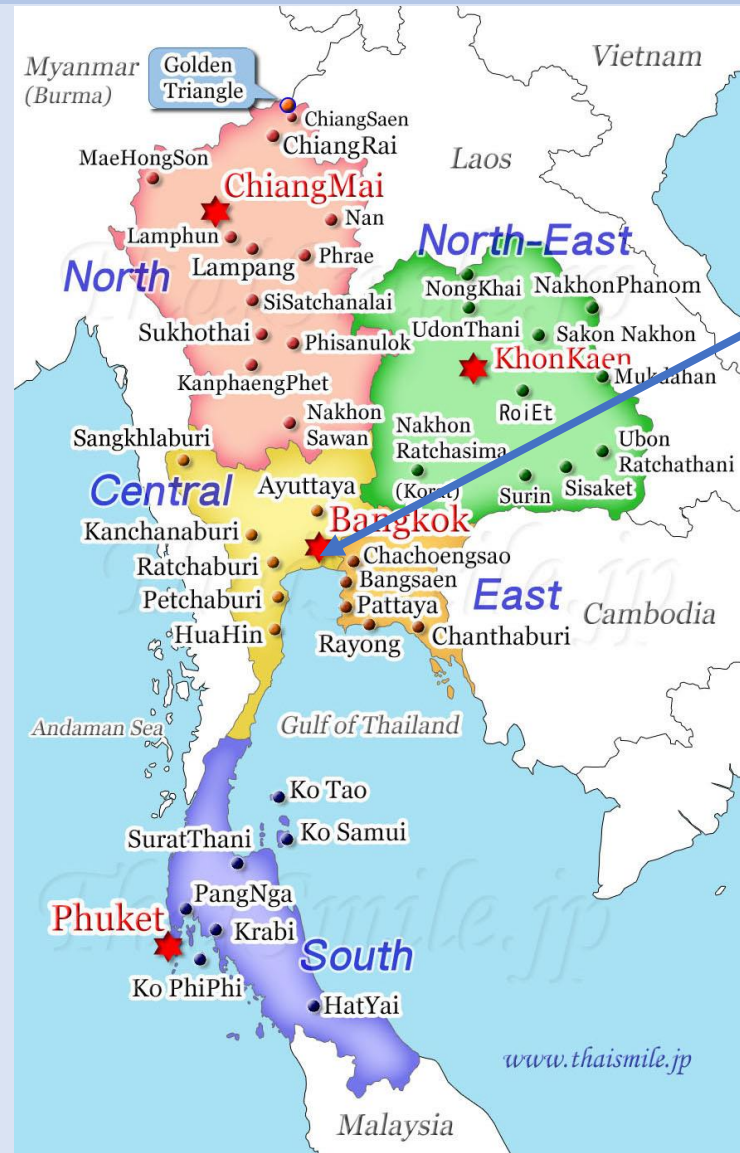


# Status of Thailand's Facility





# Status of Thailand's research reactors



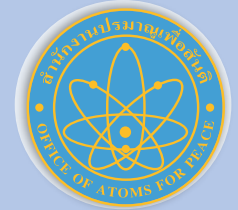
- **Location:** TINT, Bangkok
- **Power:** 1.3 MW(th)
- **Utilization:** Multipurpose
- **1<sup>st</sup> critical:** 1962
- **Status :** operated

Environmental monitoring during operate

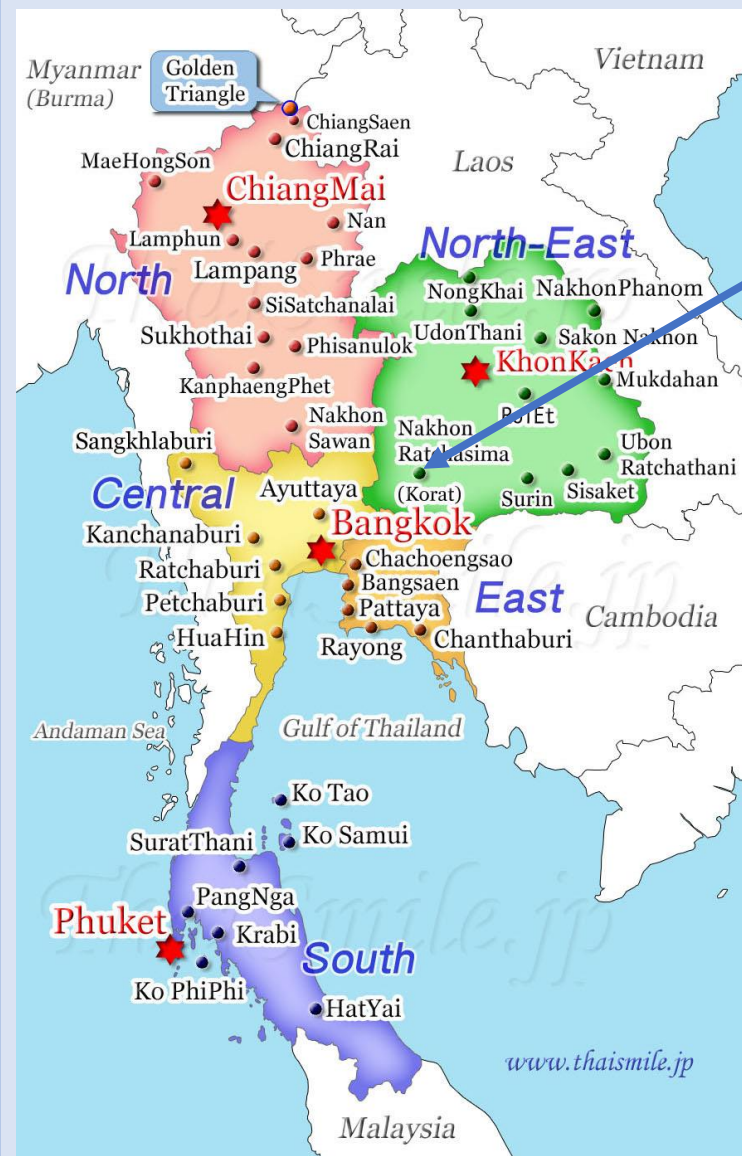
	Parameter
Fallout	Gross $\beta$ , $\gamma$
Fillter	Gross $\beta$ , $\gamma$



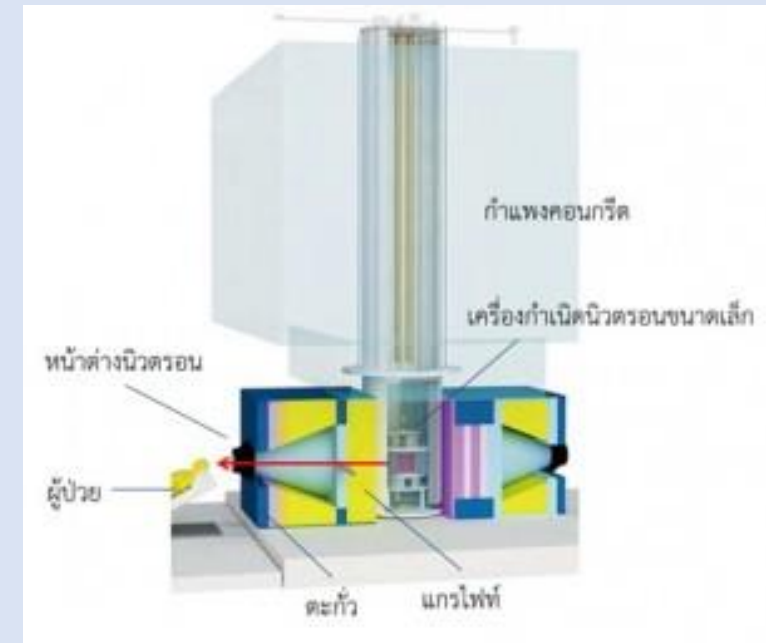




# Status of Thailand's research reactors

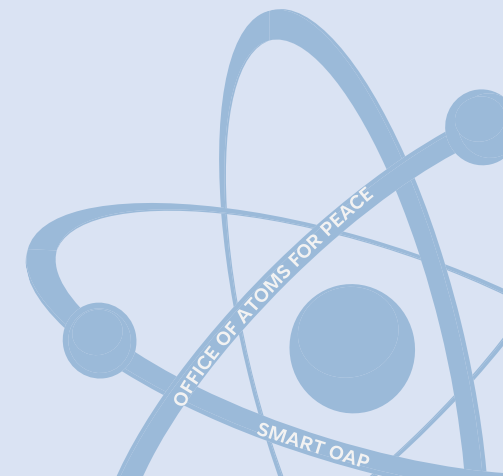


- **Reactor Model:** Miniature Neutron Source Reactor, MNSR
- **Design :** China Institute Atomic Energy (CIAE)
- **Location:** Suranaree U. of Technology
- **Power:** 45 kW(th)
- **Utilization:** BNCT
- **Status :** Site licensing

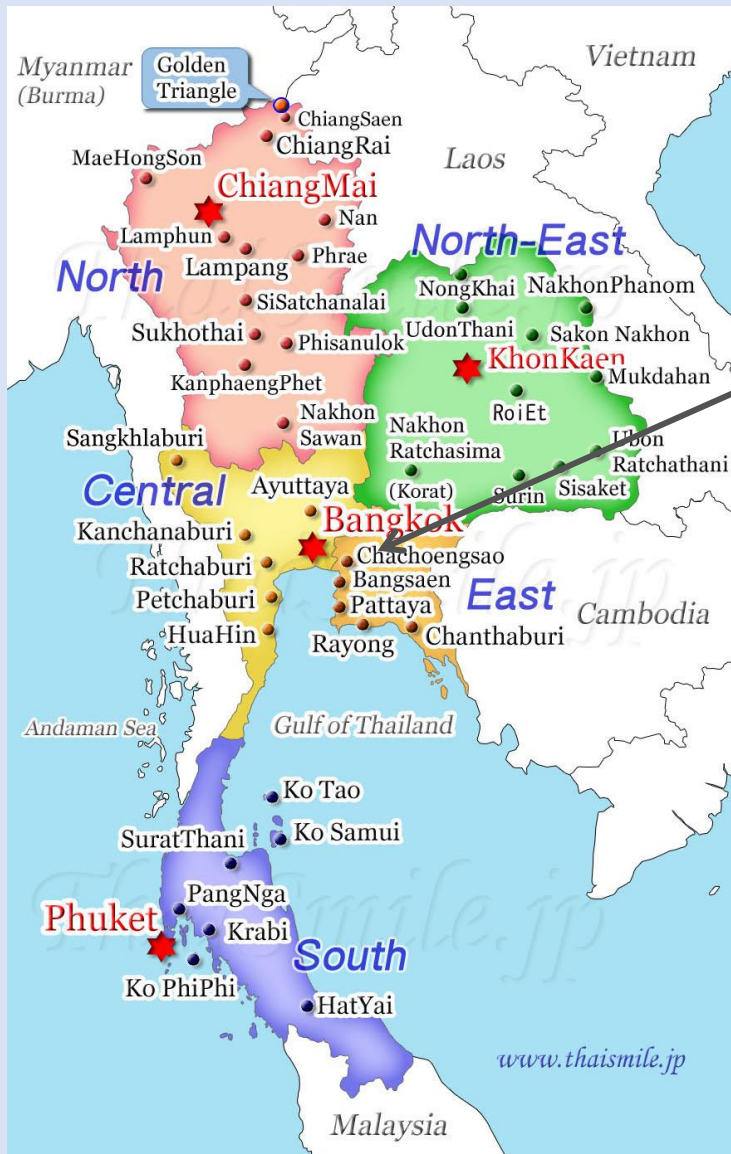


## Environmental monitoring during pre-construction

	Parameter
soil	Gross $\beta$ , $\gamma$
surface Water	Gross $\beta$ , $\gamma$
Grass	Gross $\beta$ , $\gamma$



# Status of Thailand's research reactors



- **Location:** TINT, Nakhon Nayok Province ( $\approx 100$  km from Bangkok)
- **Power:**  $\geq 10$  MW(th)
- **Utilization:** Multipurpose
- **Status :** **Planned**

Environmental monitoring during pre-construction

	Parameter
soil	Gross $\beta$ , $\gamma$
surface Water	Gross $\beta$ , $\gamma$
Grass	Gross $\beta$ , $\gamma$
Fallout	Gross $\beta$
Filter	Gross $\beta$

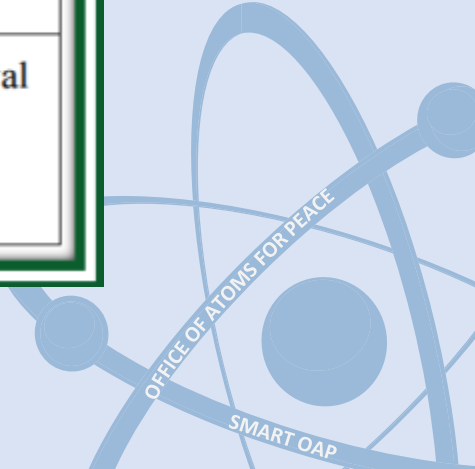




Notification of Ministry of National Resources and Environment about defining type, size and procedure for Project or Activity which May affect community severely in respect of both the quality of Environment, Natural Resources and Health that Government agency, State Enterprise Or Private Sector should prepare environmental impact assessment report (4 January 2019) B.E. 2562.

- 12 types of projects or activities; severe impact to natural resources, environmental, social, quality of life or health

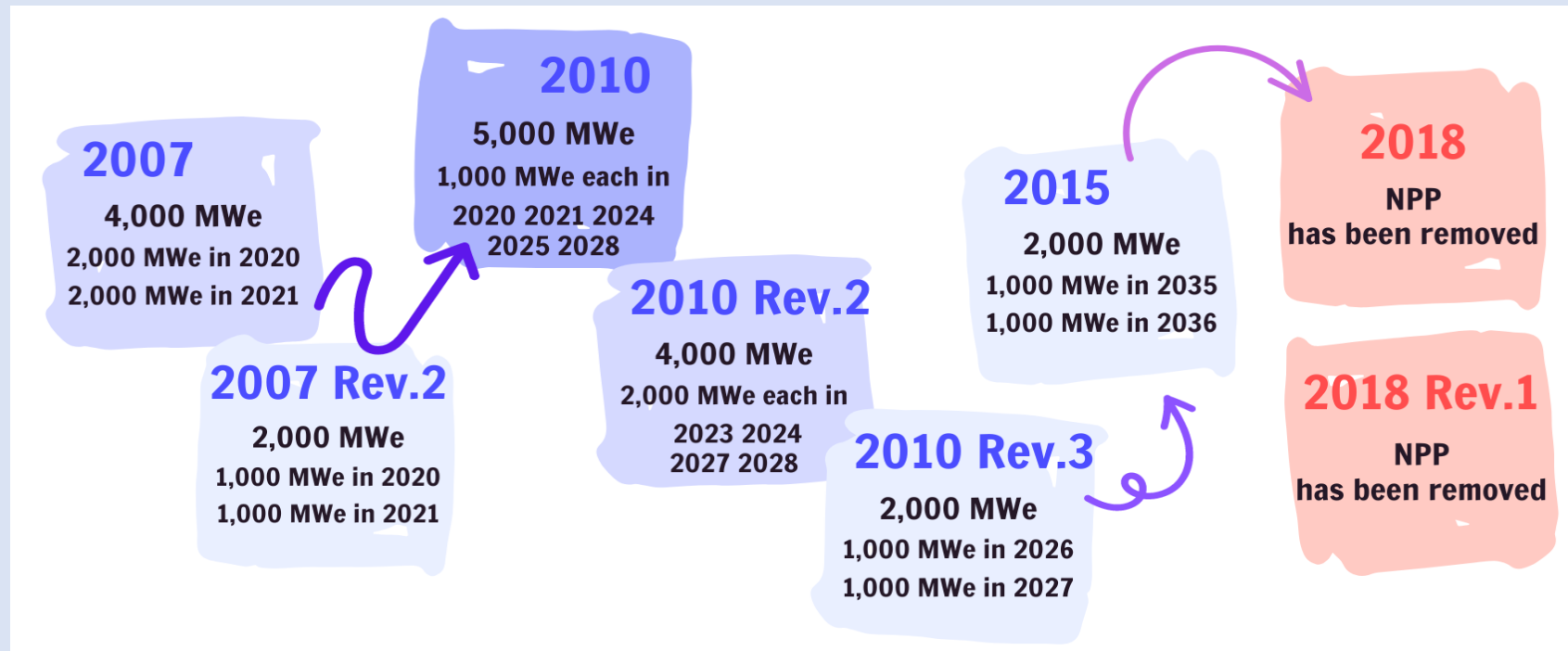
No.	Type of Projects or Activities	Size	Rules, Procedures, Practices
6	Production, possession or use of nuclear energy from nuclear reactors	Production capacity of 2 megawatts or more	Submitted when applying for approval or permission of the project



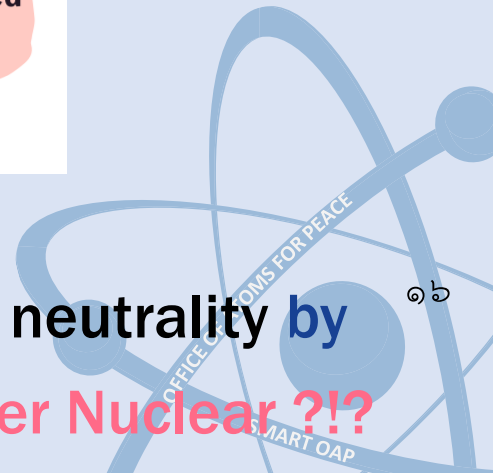


# Nuclear Energy in Thailand

- ▶ Nuclear power in **Power Development Plan** or **PDP** (master plan for the country's power generation and supply in long term for 15 - 20 years)



- ▶ **PDP 2022** is under consideration...
- ▶ COP26 (2021) - announcing about climate change to reach carbon neutrality by 2050 & net zero greenhouse gas emissions by 2065 ➡ **Reconsider Nuclear ???**







# Current Challenges of Nuclear Energy in Thailand

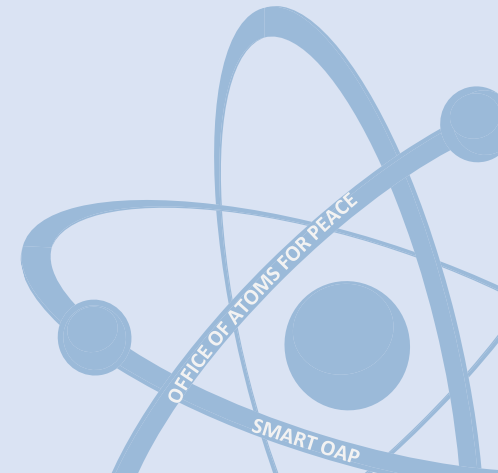
- **National position**

- ↳ Political instability

- ↳ Government commitment ➡ Focusing on RE + Hybrid technologies

- **Public acceptance**

- ↳ Promoting and participating in sharing Nuclear information

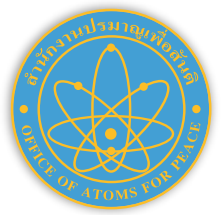




# The challenges



- ▶ Education and communication to increase public knowledge, understanding, awareness and acceptance of nuclear technology peaceful uses.
- ▶ In present, the guidance/guideline is adopted from International guideline, we try to develop as much as we can to specific site data.
- ▶ We have many authorities in Thailand, It's quite complicated to enforce the law.
- ▶ If the research reactor at Nakhon Nayok province install, the national emergency preparedness and response plan will be revise due to the present plan is suitable for nuclear < 2MW.



Thank you for your kind attention

- Status of Thailand's research reactors
- Environmental impact assessment in regularity frameworks, environmental impact assessment process within licensing process, organizations involvement, decision making organizations, staffing etc.
- Regulations on environmental impact assessment
- What are the challenges in this area,
- Other issues