สำนักงานปรมาณูเพื่อสันติ
Office of Atoms for Peace

EGAT
Power for Thai Happiness

Thailand

Regional Workshop on Radiological Environmental Impact Assessment for Nuclear Installations
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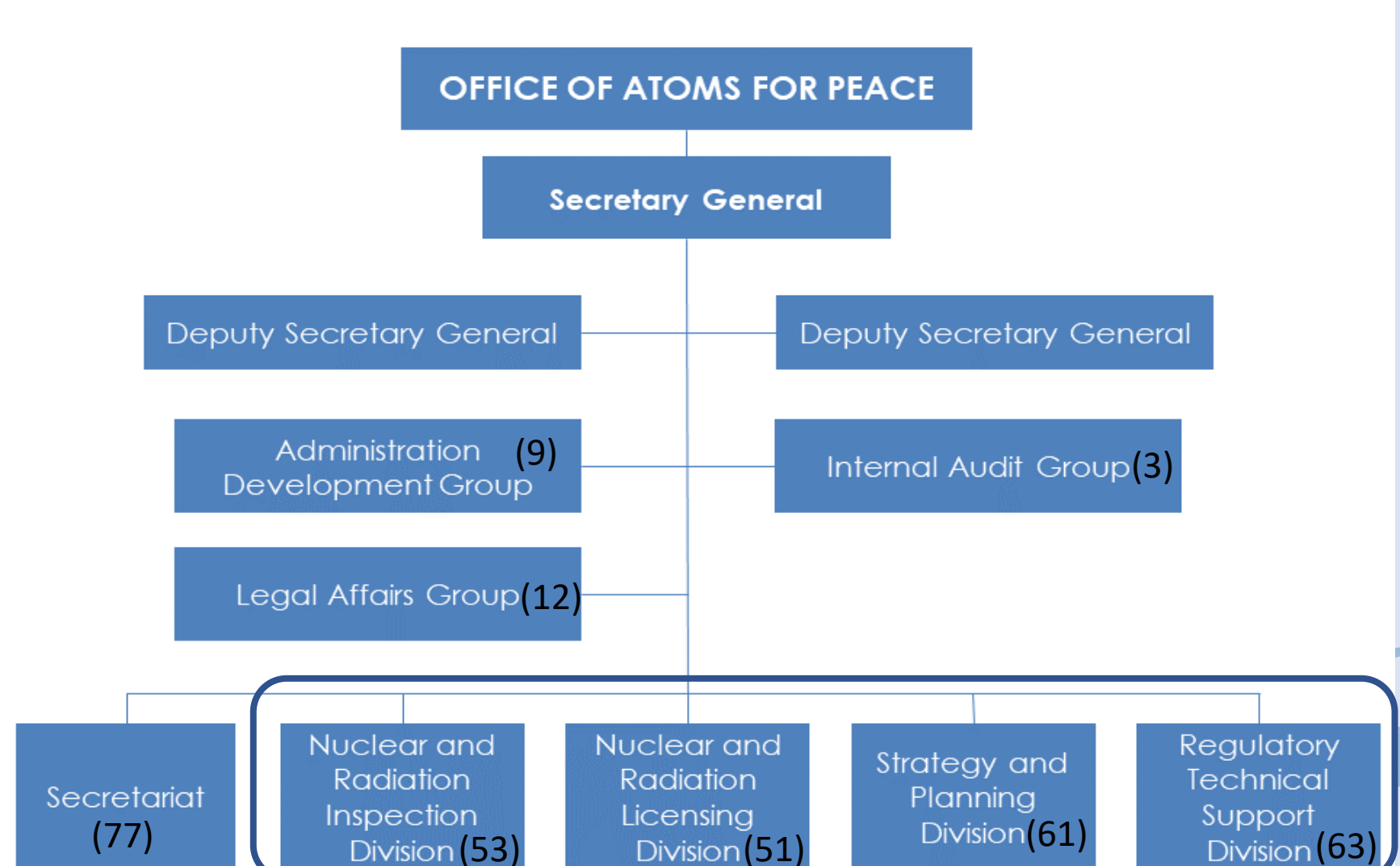
OFFICE OF ATOMS FOR PEACE
SMART OAP

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:

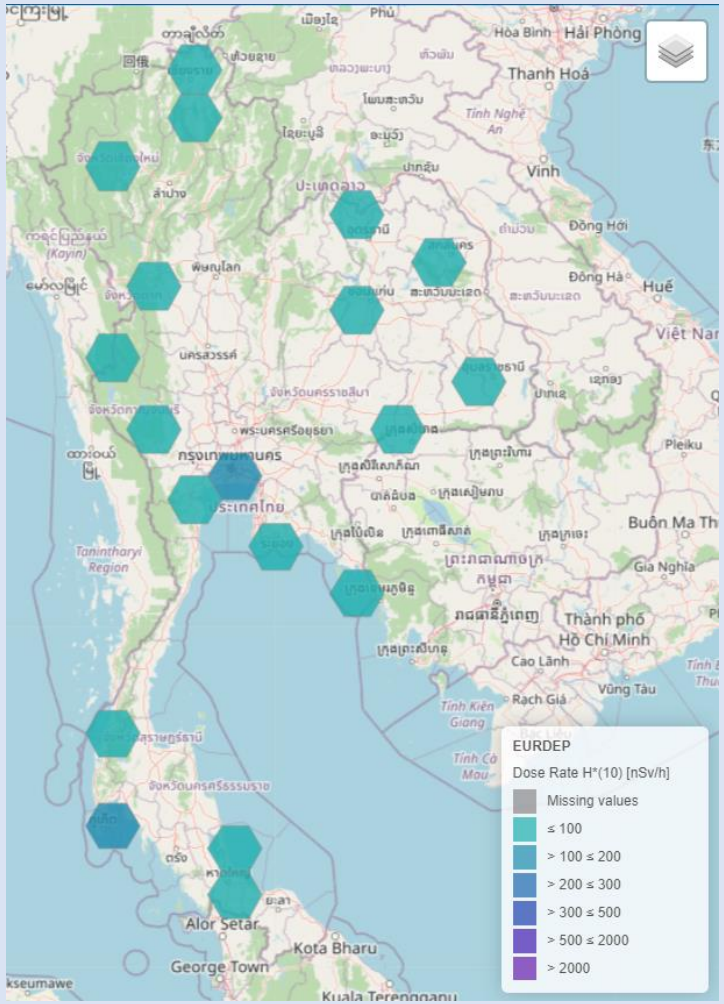
- The effect of external events on the nuclear facility site either of natural origin or human induced
- The characteristics of a site
- A site environmental report
- Population demography surrounding a nuclear facility
- Evacuation routes for the population in the case of radiological or nuclear emergency;
- 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	γ, Gross α, Gross β	Nakhon Nayok province	2 times /year	Safety Reports Series No.64 (collected sample)
Fallout	γ, Gross β	Nakhon Nayok Bangkok (OAP)	12 times /year	
Surface water	γ, Gross α, Gross β	Nakhon Nayok Nakhon Ratsima province	2 times /year	Technical Reports Series No. 295. (Sample prepartation)
Tap water	γ, Gross α, Gross β	Nakhon Nayok Nakhon Ratsima	2 times /year	
Soil	Gross α, Gross β, γ	Nakhon Nayok Nakhon Ratsima	2 times /year	GSG-2 (Radiation emergencies)
Filter	Gross β	Bangkok (OAP)	4 weeks/months	
Milk	Gross α, Gross β, γ	All over Thailand	3 times/ year	CODEX STAN 193-1995
Rice	Gross α, Gross β, γ	All over Thailand	2 times/ year	CODEX STAN 193-1995
Vegetable	Gross α, Gross β, γ	All over Thailand	1 time / year	
Meat	Gross α, Gross β,	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	γ, Gross α, Gross β, Cs-137, Po-210	All over Thailand	2 times / year	

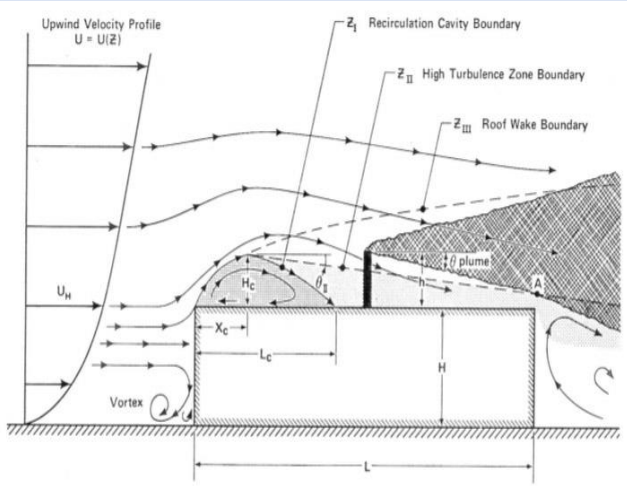
Radiation Monitoring Stations

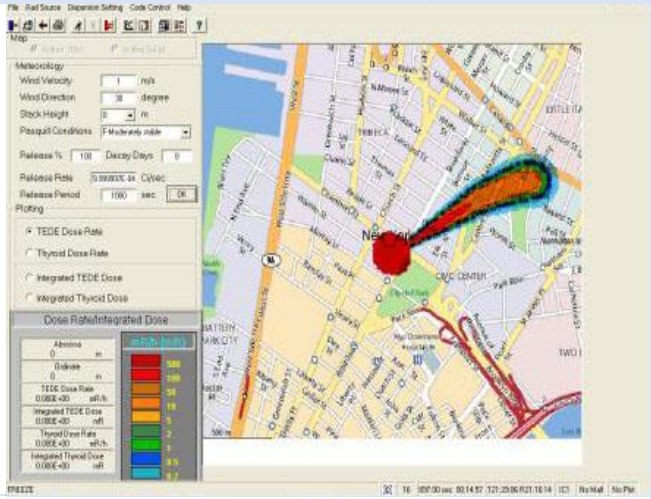


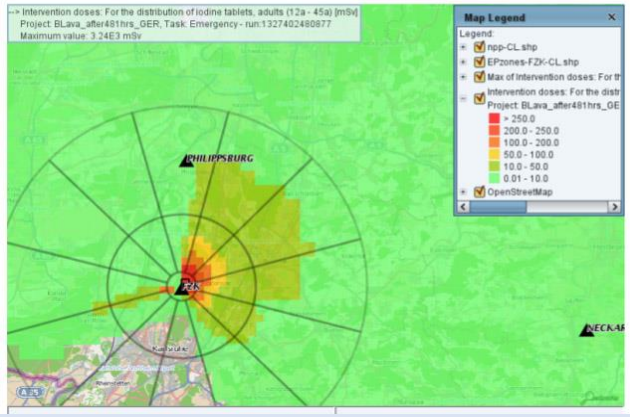
- **Environmental Radiation Monitoring Stations**
  - Gas Detector 8 stations
  - NaI 9 stations
  - Underwater 5 stations

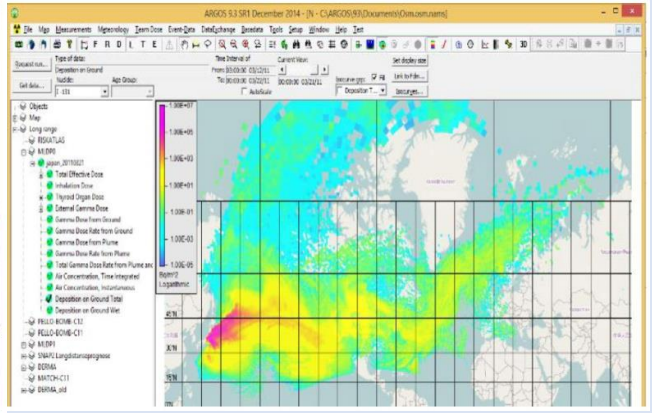
Environmental impact assessment in regularity frameworks

Emergency Situation





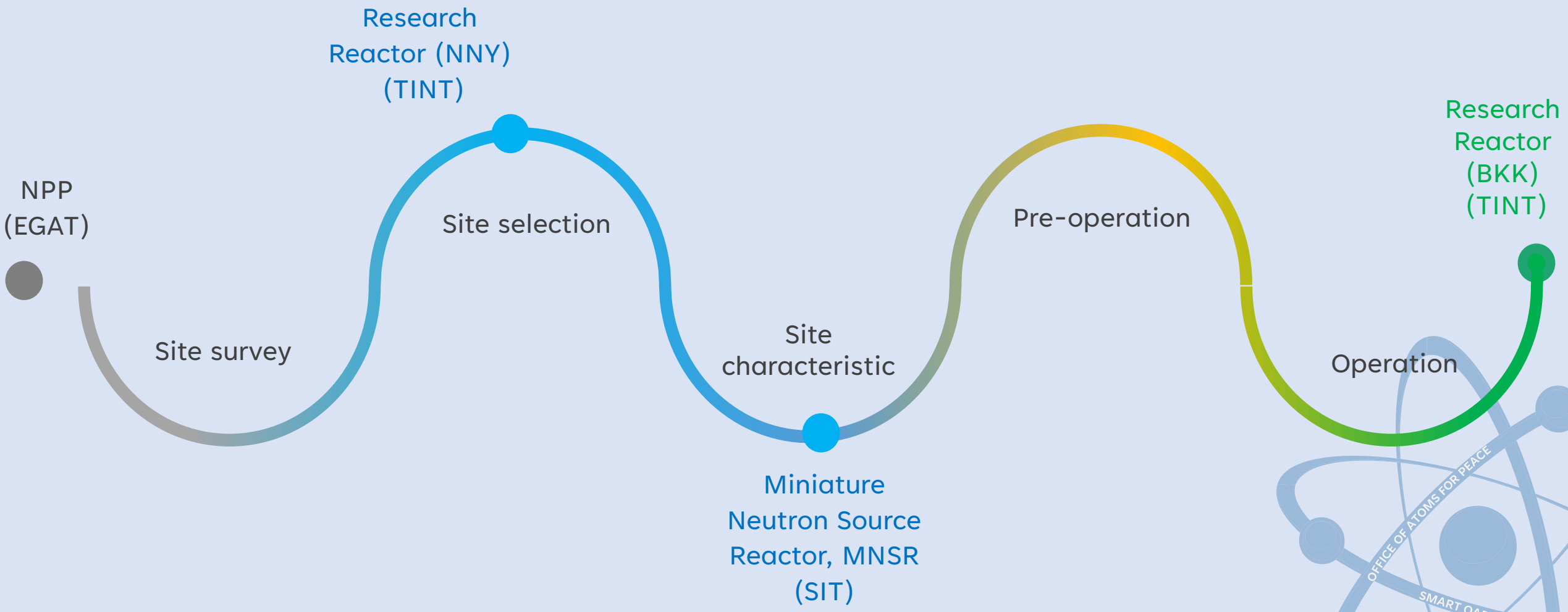




- ✓ RSAC
- ✓ HOTSPOT
- ✓ JRODOS
- ✓ ARGOS

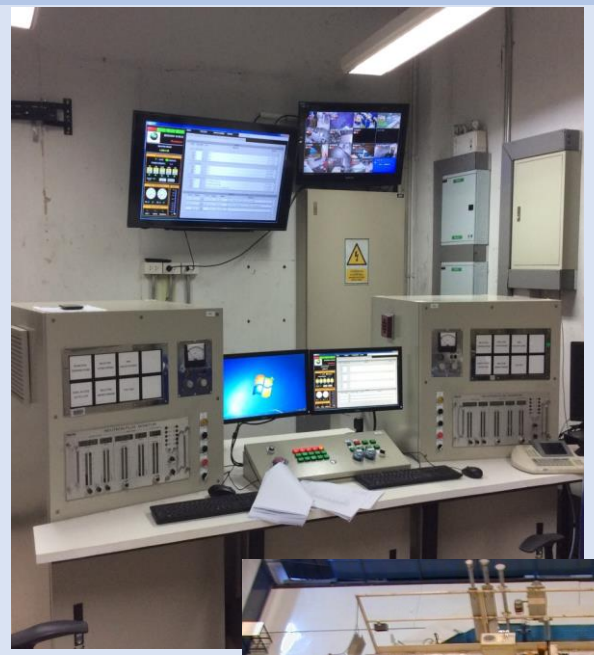
OIL	Default OIL value	Monitoring type
$OIL1_\gamma$	1000 µSv/h	GROUND MONITORING Ambient dose equivalent rate at 1 m above ground level
$OIL2_\gamma$	100 µSv/h (for the first 10 days after reactor shutdown[a]) 25 µSv/h (later than 10 days after reactor shutdown[a] or for spent fuel)	
$OIL3_\gamma$[b]	1 µSv/h	
$OIL4_\gamma$[c]	1 µSv/h	SKIN MONITORING Ambient dose equivalent rate at 10 cm from the bare skin of the hand and face
$OIL4_\beta$[c]	1000 cps[d]	SKIN MONITORING Beta count rate at 2 cm from the bare skin of the hand and face (The use of $OIL4_\gamma$ is preferable over $OIL4_\beta$)
OIL7	1000 Bq/kg of I-131 and 200 Bq/kg of Cs-137	MONITORING OF FOOD, MILK[e] AND DRINKING WATER SAMPLES Activity concentration of I-131[f] and Cs-137[f] in food, milk and drinking water samples
$OIL8_\gamma$	0.5 µSv/h	THYROID MONITORING Ambient dose equivalent rate in front of the thyroid in contact with the skin

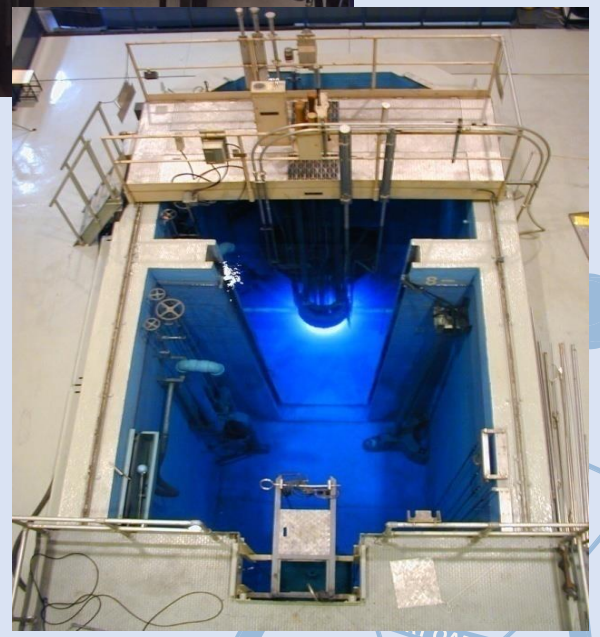
Status of Thailand's Facility



Status of Thailand’s research reactors

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

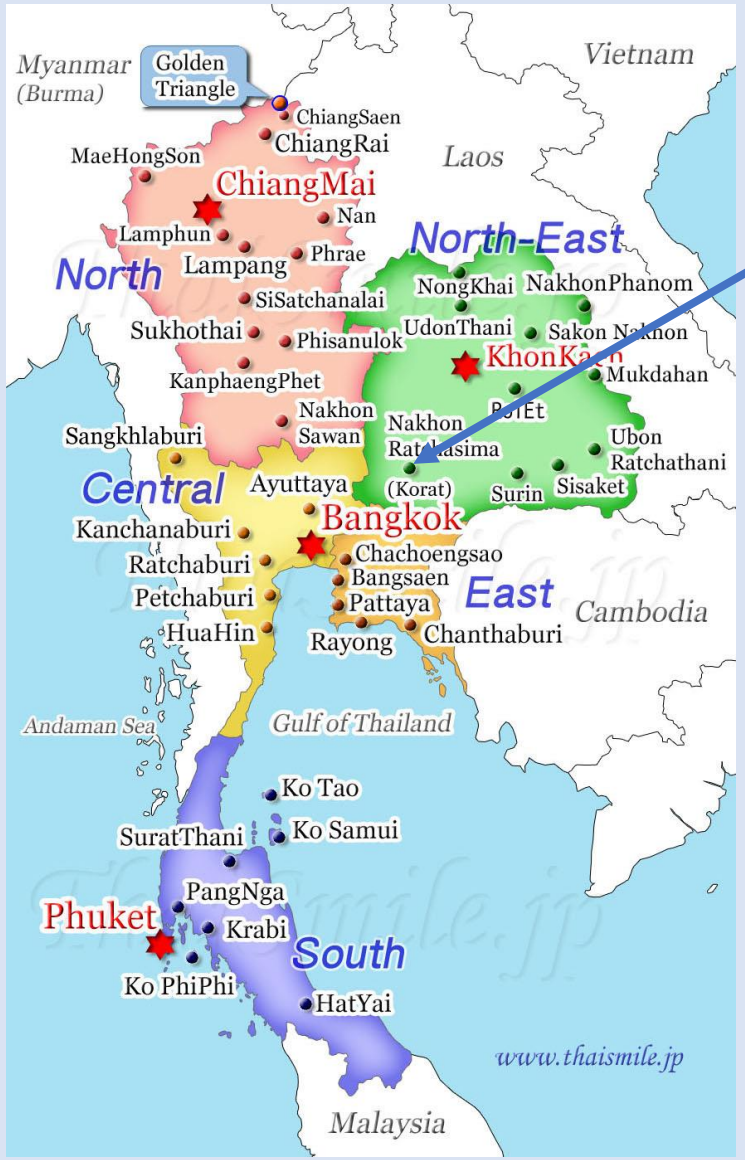




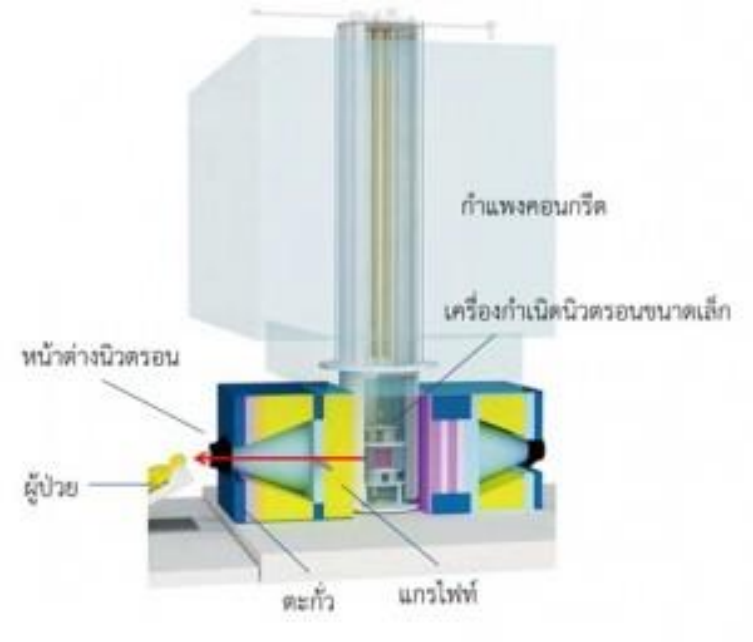
Environmental monitoring during operate

	Parameter
Fallout	Gross β, γ
Fillter	Gross β, γ

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 β, γ
surface Water	Gross β, γ
Grass	Gross β, γ

Status of Thailand's research reactors

- **Location**: TINT, Nakhon Nayok Province (≈100 km from Bangkok)
- **Power**: ≥ 10 MW(th)
- **Utilization**: Multipurpose
- **Status** : **Planned**

Environmental monitoring during pre-construction

	Parameter
soil	Gross β, γ
surface Water	Gross β, γ
Grass	Gross β, γ
Fallout	Gross β
Filter	Gross β

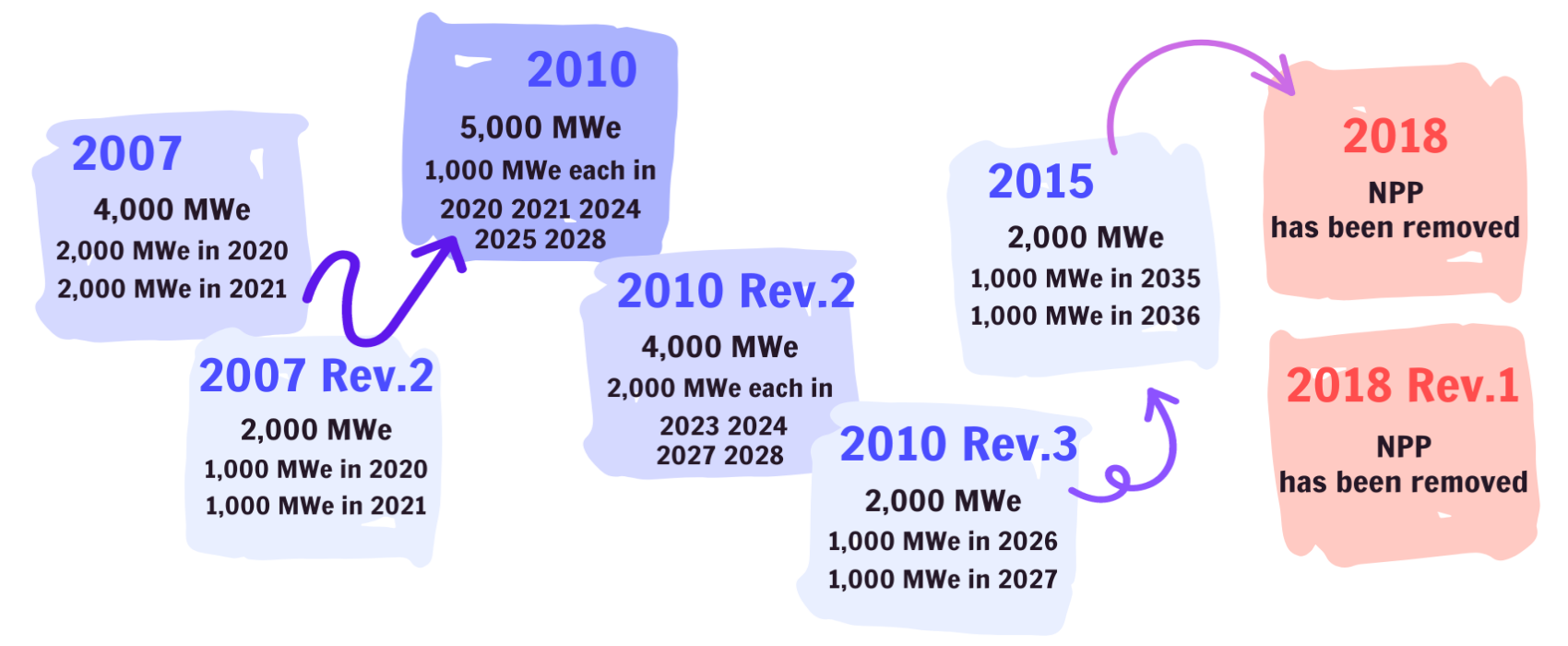
Notification of Ministry of National Resources and Environment about defining type, size and procedure for Project or Activity which May affect community severely in respect of both the quality of Environment, Natural Resources and Health that Government agency, State Enterprise Or Private Sector should 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