

# Thailand and Uranium Deposits

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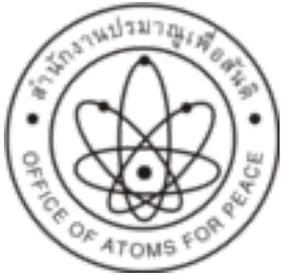
Thailand Institute of Nuclear Technology

**UNFC Workshop**

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# Organization related to nuclear activities in Thailand

At least 3 major organizations



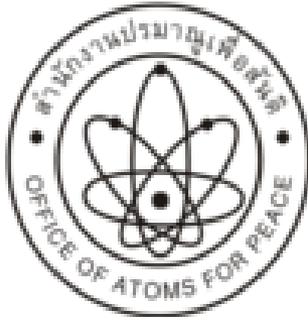
- Office of Atoms For Peace (OAP)



- Thailand Institute of Nuclear Technology (TINT)



- Nuclear Society of Thailand (NST)



## Office of Atoms For Peace (OAP)

formerly known as the Office of Atomic Energy for Peace (OAEP). The organization was formed on 25 April 1961, under the Atomic Energy for Peace Act of 1961. In 1962, the Thai Research Reactor (TRR-1) began operation. It was the first crucial step in development of nuclear technology for education, medicine, agriculture, and industry in the country. OAP, as national authority, is responsible for ensuring safety of users and public from radiation and nuclear utilizations by educating the public, and regulating the use of nuclear energy.



## Thailand Institute of Nuclear Technology (TINT)

is an independent organization established by Royal Decree. It is a public organization effective on April 21, 2006. The main objectives of the institute are to carry out research and development on nuclear technology for national development and to disseminate the utilization of nuclear technology to gain public acceptance. The institute is under the supervision of Ministry of Science and technology.



## Nuclear Society of Thailand (NST)

promote nuclear learning and applications to Thai public as well as recognize that education on nuclear science and technology is very important for a developing country like Thailand.

# Thailand at a glance

SE Asia

518,000 km<sup>2</sup>

2015 ASEAN



# Physiography and Geology of Thailand

Mountain - N,W

Plateau - NE

Plain – Central

Penninsular - S



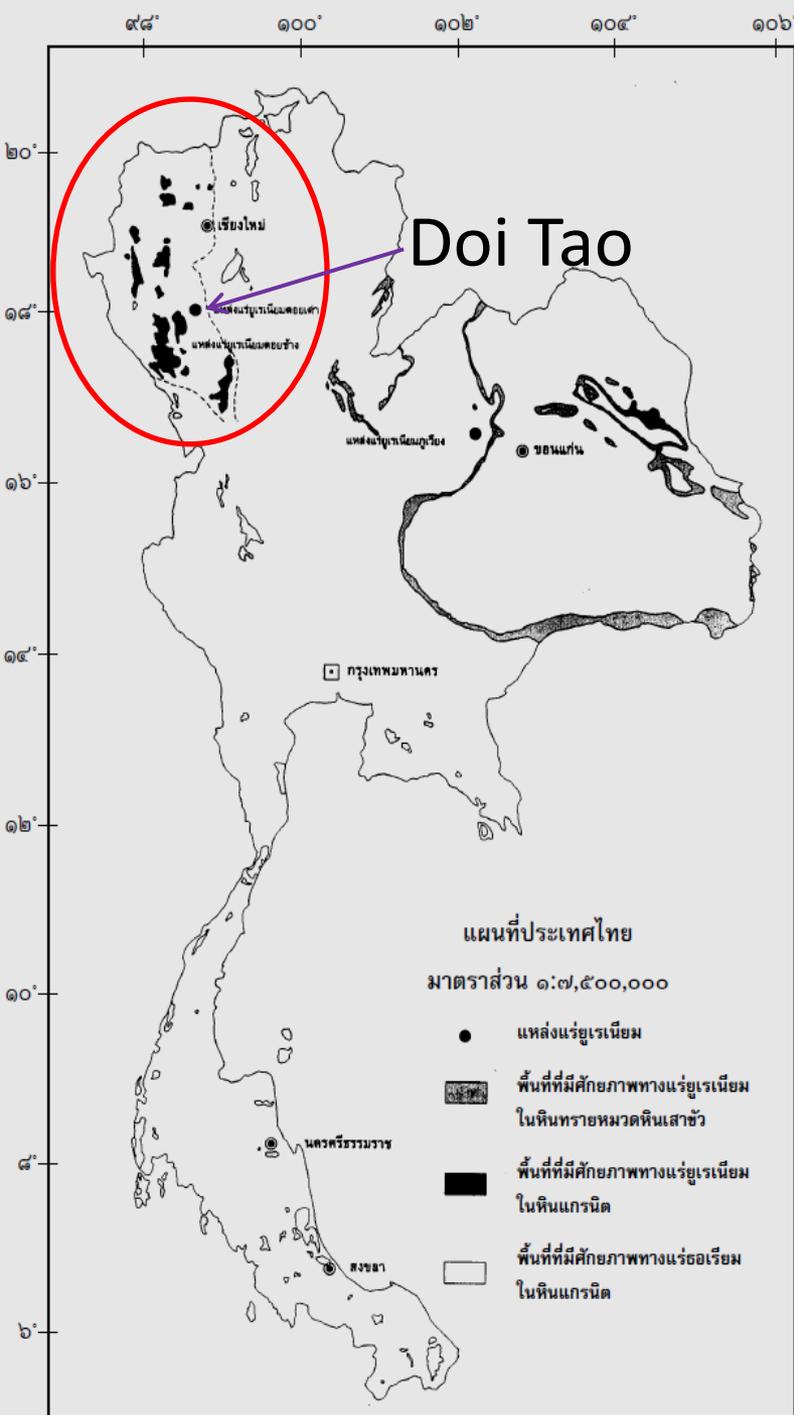
# Uranium Deposits of Thailand

In the past more than 50 years ago, Uranium had been found because of intensive tin and heavy minerals exploration.

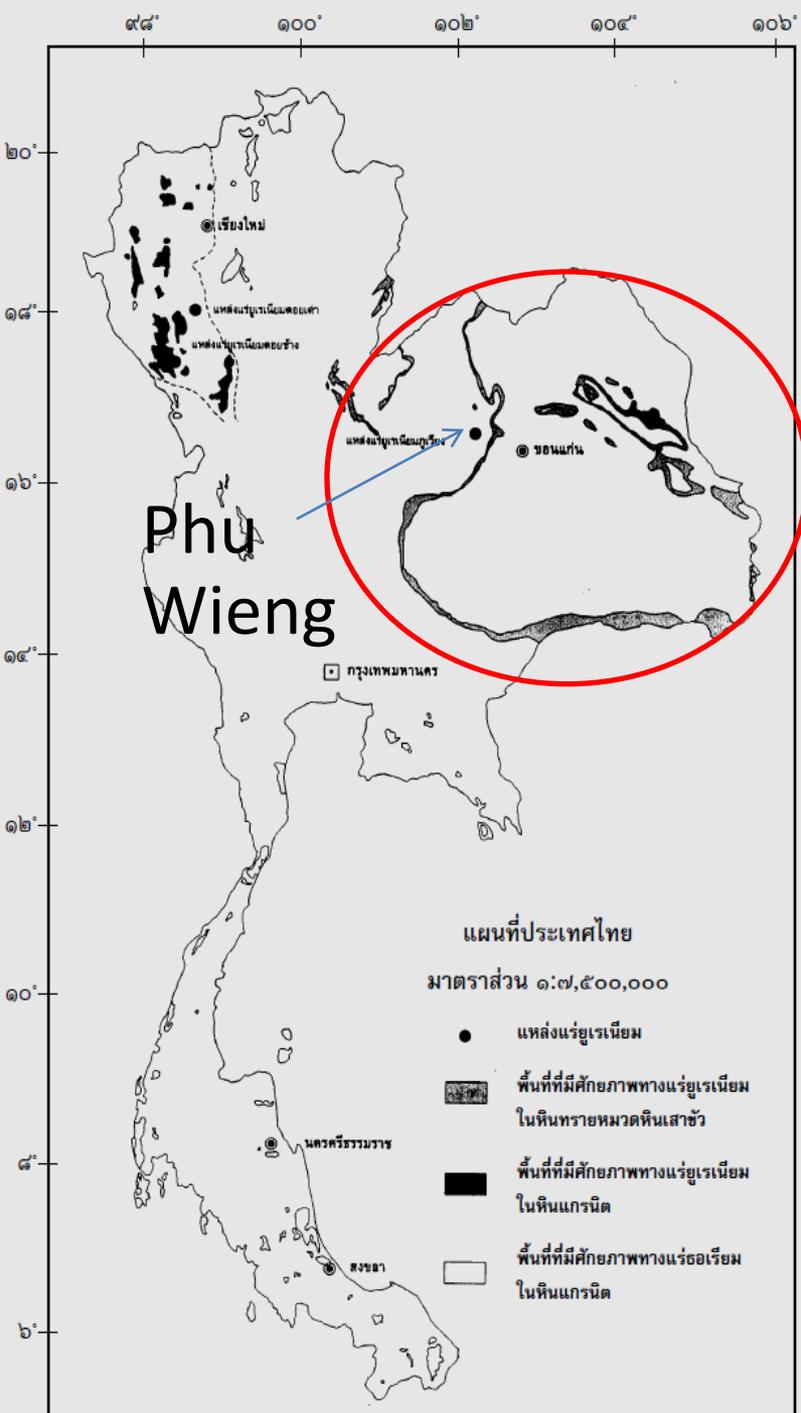
Since 1960s up until 2000, there were several uranium explorations in Thailand funding by Thailand government and foreign grant, especially IAEA.

However those explorations were mainly preliminary works at regional scale.

Department of Mineral Resources (DMR) of Thailand is the main institute responsible for uranium exploration. In Thailand, there are 2 potential deposit types for uranium-bearing deposits, i.e. Intrusive (granite) and sandstones.



Granite : Thailand was one of the major producers of tin in the past because there are several tin-bearing granites exposed extensively from the north to the south of Thailand. However, those granites in the northwest are the most potential ones, especially at Doi Tao, Chiang Mai Province. Uranium have been found as pitchblende associated with fluorite ore in granite. DMR reported preliminarily that uranium concentration is 500 ppm and may be as high as 0.25% with resource estimation at 5-6 tons uranium oxide. (334)



Sandstone : The most likely host rocks for uranium deposits appear to be carbonaceous fluvial sandstones and conglomeratic sandstones of the Jurassic Phra Wihan, Sao Khua, and Phu Phan Formations making up the middle part of the Khorat Group of Triassic, Jurassic, and Cretaceous age according to geological similarity between the Khorat Plateau of northeastern Thailand and the Colorado Plateau of the western United States. At Phu Wieng, Khon Khen, western part of Khorat Plateau, uranium resource was estimated at 4.5 tons of uranium oxide with  $U_3O_8$  0.01% grade. (334)

# Recent U and Th extraction from Monazite

In the southern peninsular of Thailand, uranium bearing minerals namely, monazite and xenotime, were found in association with tin deposits which were mainly mined in Phuket and Phang-nga provinces. Traditional ore dressing techniques were used to separate monazite, xenotime and other heavy minerals from the tailings of tin ore. Separation of uranium, thorium and rare earth elements in the minerals has been studied.

# Recent U and Th extraction from Monazite

Domestic monazite contains uranium and thorium in the ranges of 0.3-0.8 and 5-10%, respectively. Monazite is a phosphate ore composing mainly of combined rare earth oxides in the range of 50–60%. The break-down of monazite ore at the institute was carried out using alkali process.

# Concluding remarks

- Thailand has some small uranium-bearing deposits. However, the vast area of Khorat Plateau might contain undiscovered big uranium deposits.
- It had been told that ash from lignite power plant contains uranium. More than 1 million tons of either flyash or bottom ashes has been produced each year. This might be another target for uranium source in this country.
- Thailand government has studied and planned to build nuclear power plants for more than 30 years. But it has been postponed several times because mainly of political and social issues.

# Concluding remarks (Con'd)

- The main activities carried out in 2012-2013 are studies on the purification of uranium from yellow cake obtained from monazite ore using solvent extraction process.
- INT/2/015 Project has created inspiration and realization relating to the need of new uranium resources for the sustainable nuclear energy in the future. A 5-year project for intensive exploration on uranium resources in Thailand has been proposed in 2014-2018 fiscal years.

# Concluding remarks (Con'd)

The project will be the cooperation between Thailand Institute of Nuclear Technology (Ministry of Science and Technology), Department of Mineral Resources (Ministry of Natural Resources and Environment) and Department of Mining and Petroleum Engineering (Chulalongkorn University). The proposed project may require some support from IAEA expertise. An investigation and study on the extraction of uranium from phosphate rocks in fertilizer plant in Thailand will also be initiated.