URANIUM AND THORIUM EXPLORATION AND THEIR PROCESSING RESEARCH ACTIVITIES IN INDONESIA 2013

Interregional IAEA-CYTED-UNECE Workshop on UNFC for Fossil Energy and Mineral Reserves and Resources – 2009 Applications in Uranium and Thorium Resources: Focus on Comprehensive Extraction.

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by
AGUS SUMARYANTO

CENTRE FOR DEVELOPMENT OF NUCLEAR GEOLOGY
NATIONAL NUCLEAR ENERGY AGENCY (BATAN)
INDONESIA

PRESENTATION CONTENT

THE MAIN ACTIVITIES CARRIED OUT IN INDONESIA 2012-2013 ARE:

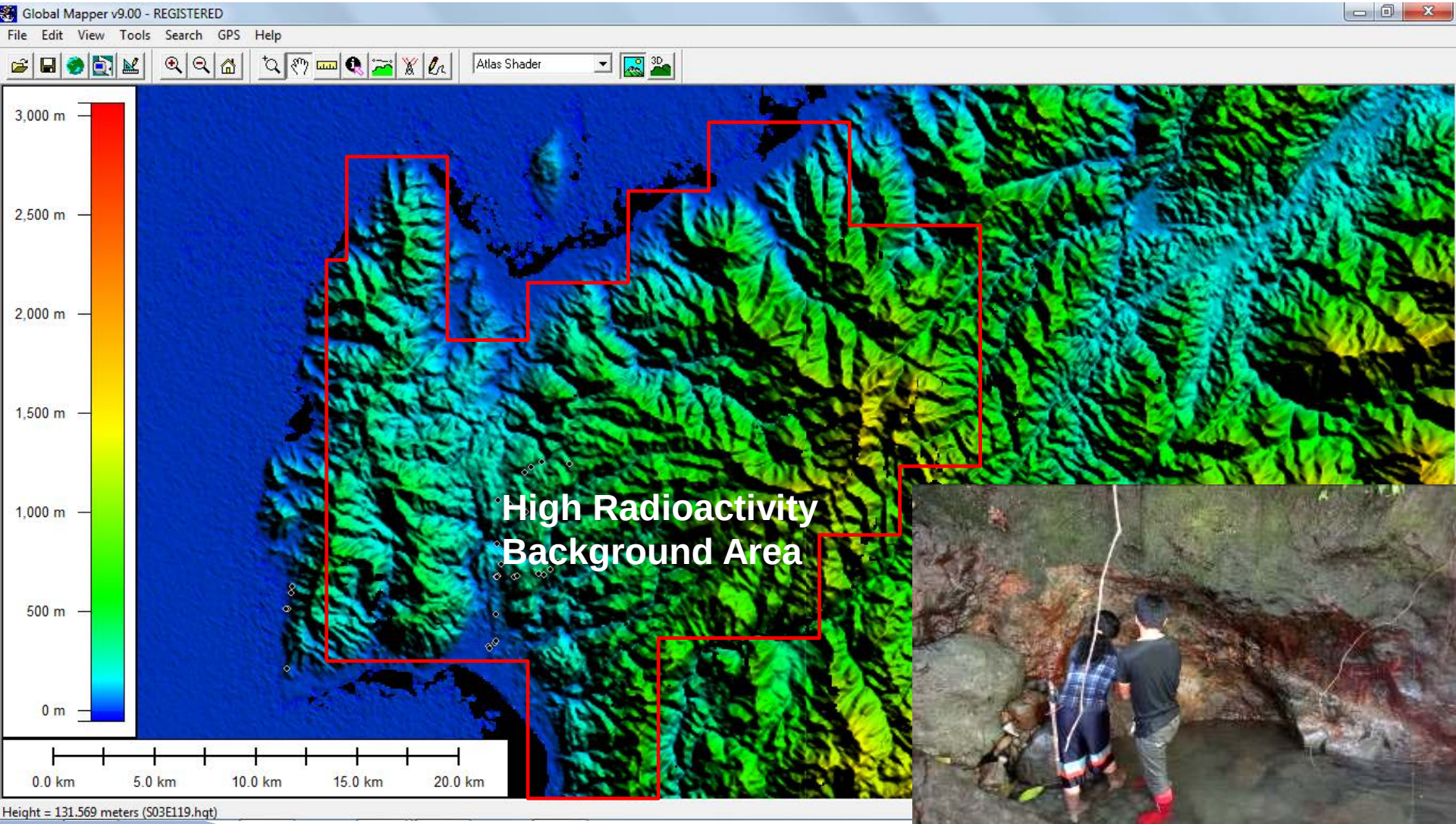
- ✓ **URANIUM DAN THORIUM EXPLORATION**
  1. General Survey In Mamuju, West Sulawesi
  2. Exploration In Bangka Island And Ketapang, West Kalimantan.
- ✓ **URANIUM RESOURCES EVALUATION**
- ✓ **URANIUM AND THRIUM PROCESSING RESEARCH**

RECENT ACTIVITIES ON URANIUM AND THORIUM EXPLORATION

THORIUM AND URANIUM EXPLORATION

URANIUM EXPLORATION

GENERAL SURVEY IN MAMUJU, WEST SULAWESI



Uranium Occurences as Volcanic Related Type

1. Strcture-bound Volcanic Type

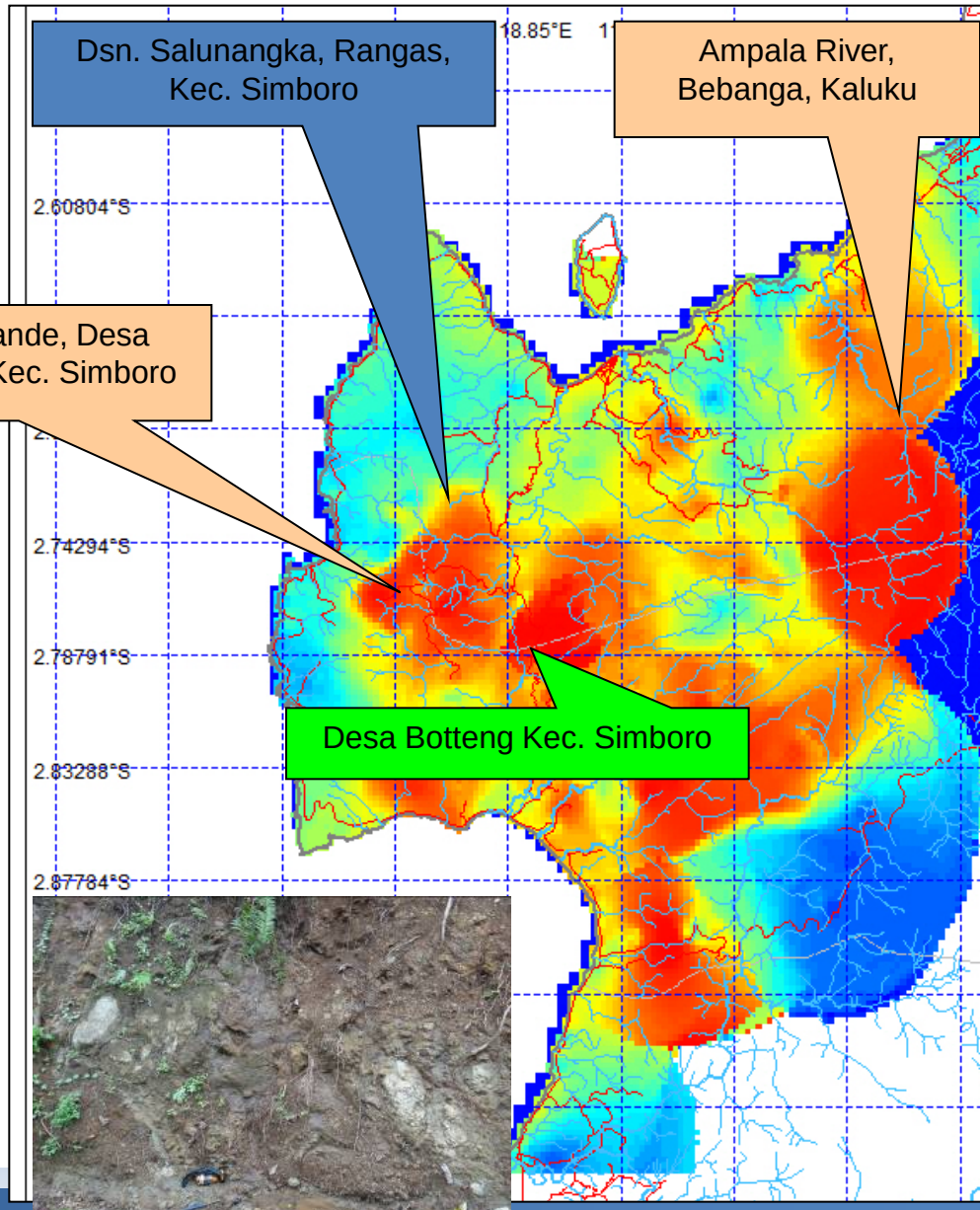
Salunangka, Kec. Simboro, Rad 3.800 cps SPP2NF,content 241,4 ppm eTh,
453,8 ppm eU.

2. Strata-bound volcanic type

Dsn. Tande Tande, Desa Botteng Utara and ampala river, Bebanga, Kaluku, Rad 5.600 cps SPP2NF, content 725 ppm eU, 220 ppm eTh.

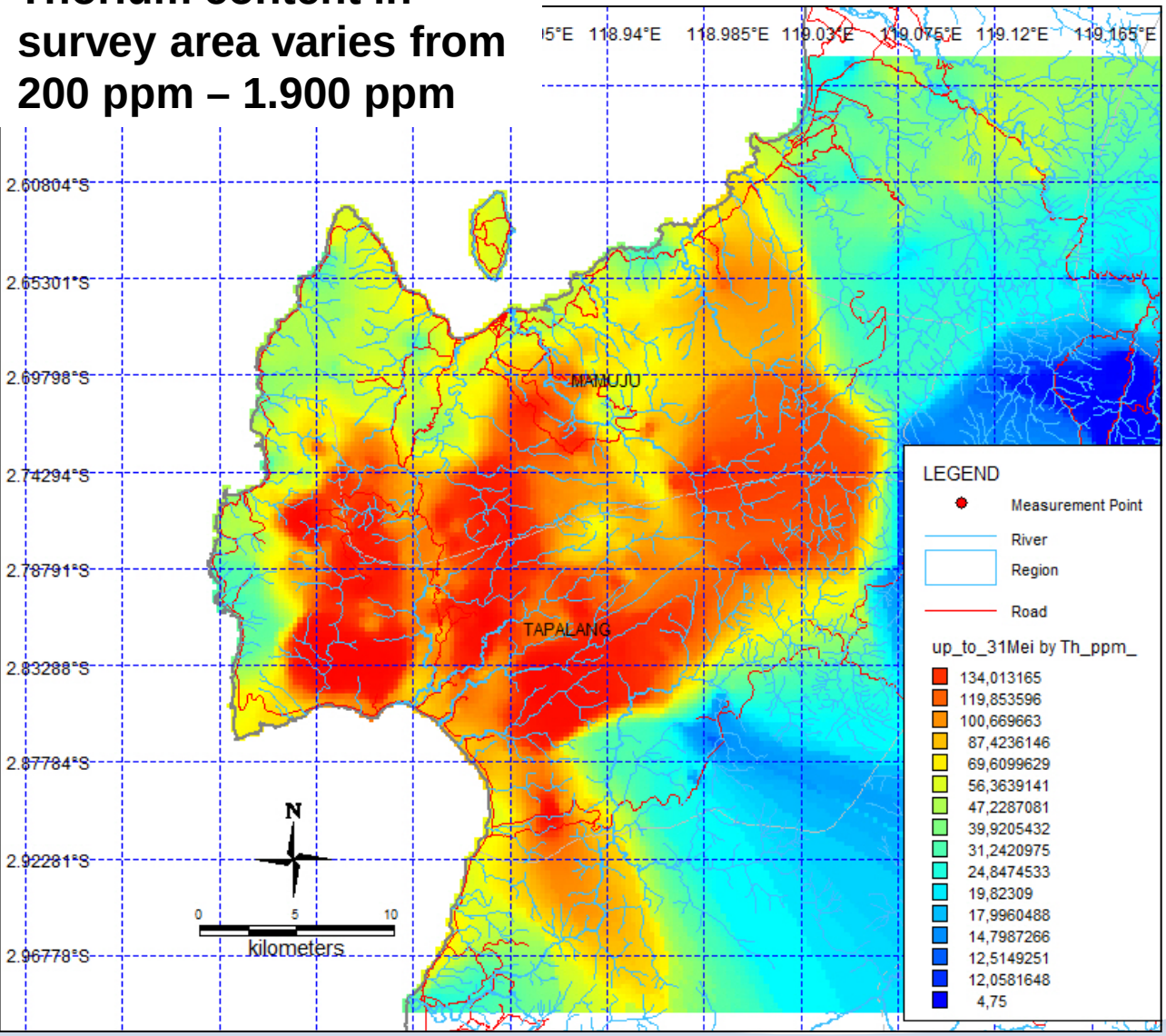
3. Volcano-sedimentary type

Desa Botteng, Kec. Simboro Rad.12.500 cps SPP2NF, content 205 ppm eTh, 719 – 1.500 ppm eU. Lab. 3.000 ppm U



THORIUM ANOMALY AREA

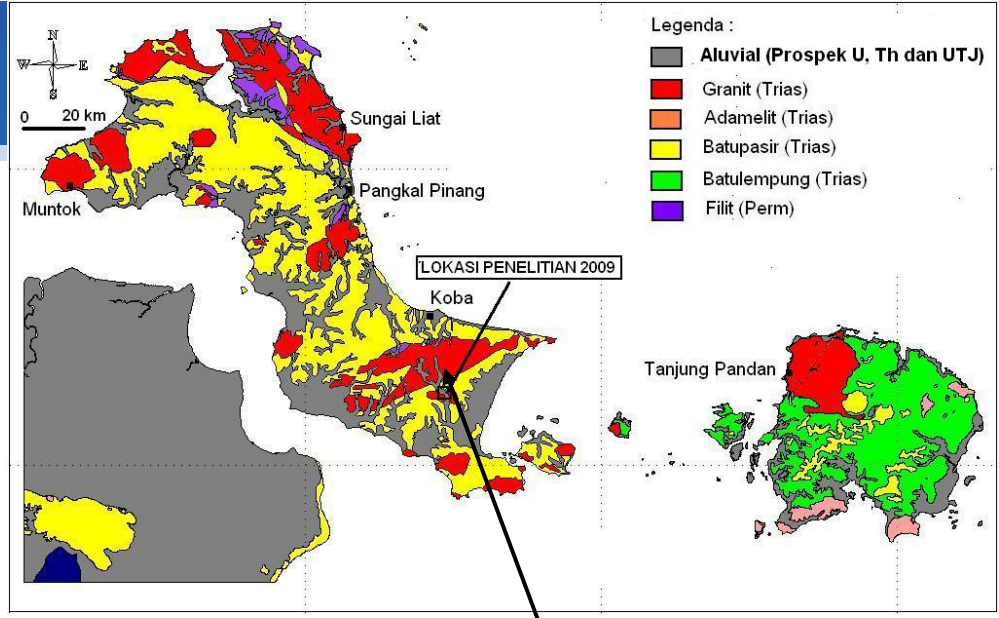
Thorium content in survey area varies from 200 ppm – 1.900 ppm



U & Th in Alluvial Deposits

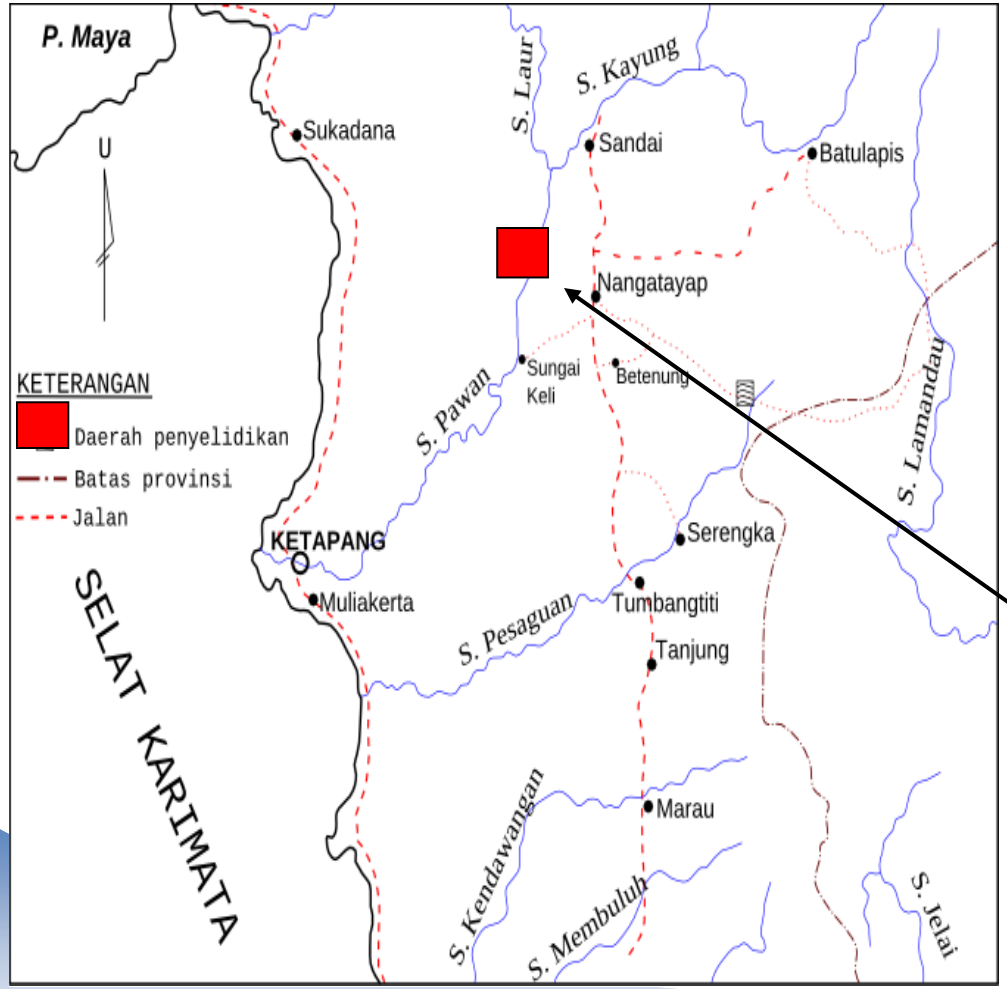
Hypothetic Reserve Estimation in Bangka Belitung Island

Based on Regional geological map alluvial wide area in Bangka island about ± 400.000 hectare, with alluvial thickness average about 12 m, grade U 100 ppm, Th 500 ppm and REE 3%.



URANIUM AND THORIUM OCCURENCESS IN KETAPANG, WEST KALIMANTAN

Monazite minerals on Ketapang, west Kalimantan occurrence related with zircon and spread in the fine – coarse sand alluvial deposits.



Based on Regional geological map alluvial debris that result from granitic rocks that contain monazite and deposited in the area around the river has a very wide distribution.

URANIUM AND THORIUM PROCESSING RESEARCH IN INDONESIA

- BATAN's Experiences in Uranium (U), Thorium (Th), Rare Earth (RE) Extraction:

  a. Conventional U Ore:

- U Ore (Uraninite), Kalan, West Kalimantan

  a. Unconventional Th and U Ore:

  - Monazite mineral, West Kalimantan and Bangka Island
  - Slag II (from tin smelter), Bangka Island

- Status of Research and Development for U, Th, and RE extraction :

Completed:

- U Ore of Kalan; pilot-plant with 2 tons ore/day of capacity

Ongoing:

- Monazite; prototipe with 3 kgs monazite/day of capacity, joint-cooperation in pilot-plant project with PT Timah (persero) Tbk.
- Slag II; research and development in laboratory scale.

U, Th, and RE Extraction from Monazite

Monazite as by-product/tailing from tin mining (physical processing unit/washing plant)

Physical Processing Unit (Washing Plant) : Cyclone, Jig, Evaporator, High Tension Separator, Magnetic Separator.

→ **Light Minerals**

↓ **Heavy Minerals**

→ **Tin Concentrate → Smelter(*)**

→ **Zircon Concentrate → stockpile**

→ **Ilmenite concentrate → stockpile**

→ **Monazite Concentrate → stockpile (RE ± 60%, U ± 0,3%, Th ± 3%, PO_4 ± 20%)**

	Country: *INDONESIA*		
Main activities carried out at the country 2012-2013	**Major Achievements January 2012-June 2013 within the INT/2/015 Project**	**Major Constraints and Lessons Learned**	**Future interests/ expectation 2014-2015 cycle**
• **Uranium and Thorium Exploration:** - **Exploration in metamorphic type deposits in west Kalimantan** - **Exploration in volcanic related type deposits in Mamuju, West Sulawesi** - **Exploration of accessories minerals as monazite in Bangka Belitung Island and Ketapang Region, West Kalimantan**	• **Knowledge from the training course give us opportunity and experience sharing with some expert and other country to develop our exploration method and increase our human resources capabilities**	• **The young geologist with lack experience in uranium and thorium exploration in our country needs more knowledge and experience sharing with experts and other country.**	**Uranium and thorium exploration in volcanic related type deposits, metamorphic type deposits, carbonate type deposits and other.**

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• **Uranium and Thorium Resources Evaluation:** - **Evaluation Drilling in some sectors in West Kalimantan to increase the resources category** - **Evaluation all resources bay new methods and adjust our resources to UNFC classifications**	• **Evaluation of uranium and thorium resources category by new methods according to the type of mineralization and models and adjustment of resources category to UNFC classification**	• **Difficulties of all consideration factors from the classification and local condition need experience and expertise sharing with other country.**	**Uranium and thorium resources in UNFC and IAEA classifications and increase our resources number in high confidential category.**

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• **Uranium and Thorium Mining Research:** - **Mining research Development on Metamorphic type deposits in Eko-Remaja West Kalimantan** - **Ore Modeling and mining research in other sectors in west Kalimantan** - **Mining waste management**	• **Mining technique and ore modelling from all type of mineralization still developed to get the best mining methods** •**Waste management still studied according to the local environment factors.**	• **Tropical conditions with high weathering and local environment factors make specific difficulties to mining development in our country**	**Uranium and thorium mining methods and mining waste management**

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Main activities carried out at the country 2012-2013	**Major Achievements January 2012-June 2013 within the INT/2/015 Project**	**Major Constraints and Lessons Learned**	**Future interests/ expectation 2014-2015 cycle**
• **Uranium and Thorium Processing Research:** - **U and Th processing in conventional ore from west Kalimantan** - **U and Th processing in accessories minerals as monazite also tin slag II from Bangka Belitung Island**	**•Even though Indonesia doesn't have phosphate rocks as a natural resources, but there are so many fertilizer industry that using phosphoric acid, particularly imported from Middle East's country.** **•The training course give us a knowledge and lesson about the separation of uranium and REE from phosphoric acid, and also how to utilize the waste (phospogypsum) that produced by its process. This knowledge**	**•Uranium and thorium in Indonesia contained in primary, secondary and accessories minerals and needed more expertise in their processing**	**The Processing of Uranium and Thorium Ores and uranium and thorium separation from rare earth in monazite and xenotime or other accessories minerals.**

BRIEF INFORMATION OF NEXT YEAR PROGRAM ACTIVITIES (2014)

- Evaluation drilling in Eko-Remaja Sector, Lembah Hitam and Jeronang Sector, Kalan Area
- Detailled exploration in Mamuju, West Sulawesi
- General survey in West Papua based on radiation environtment measurement result with high radium content.
- Comisioning the pilot plan of Uranium and thorium processing from monazite

For your kind attention

TERIMA KASIH