

# **Radioactive Contamination Through Rare Earth Refinery Activities in Malaysia**

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# **Asian Rare Earth (ARE) Incidence and Lynas Rare Earth Refinery Issue**

- Malaysia experienced a **severe radioactive pollution** case, **Asian Rare Earth (ARE) Incidence** some 30 years ago.
- Its legacy remains in the region still now.
- Authors found that there are several **“hot spots.”**
- In those places, **gamma ray level** were **4.30  $\mu\text{Sv/h}$ , 5.29, 4.63, 4.09, 4.48, 4.59, 4.58, 5.34, 4.02** · · · which are similar to that of Atomic Lake which we visited four days ago.

Some readings were **100 times higher**  
**compared with background readings.**



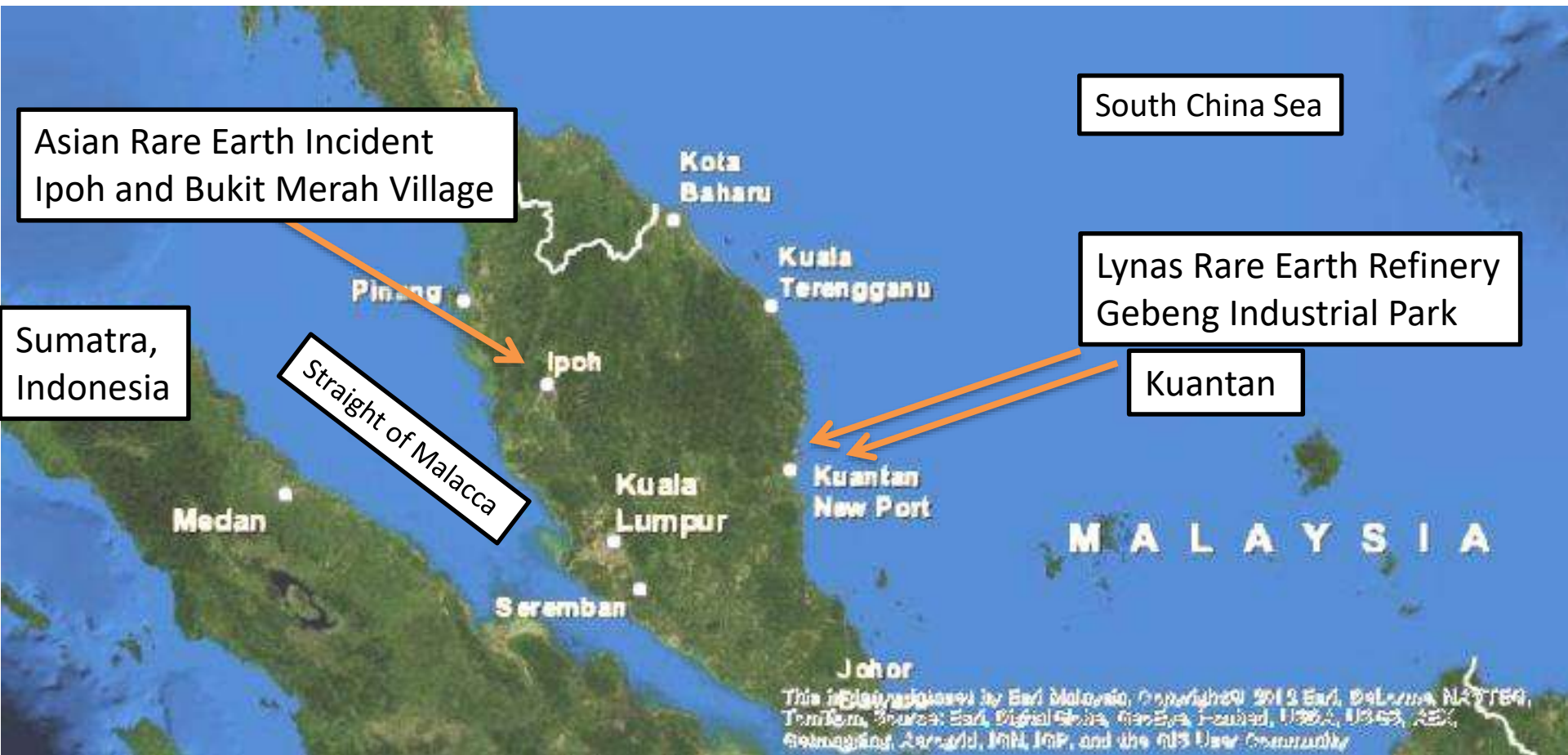
**4.30  $\mu\text{Sv/h}$ , 5.29, 4.63,  
4.09, 4.48, 4.59, 4.58,  
5.34, 4.02 · · · ·**



# Lynas Rare Earth Refinery Issue

- **In recent years, Lynas Company** started extracting Rare Earth elements in its refinery near **Kuantan City** in **2012**.
- Citizens groups are strongly against this operation, because they are afraid that the **similar radioactive pollution** might take place.
- **Lynas, Co.**, an Australian Mining Company mines Rare Earth ore in **Mount Weld mine site** in Western Australia.
- Ore is shipped to Malaysia and processed in the refinery “**Lynas Advanced Materials Plant, LAMP**” (started on Dec. 7, 2012, AR. 2012.)
- **LAMP** is located in Gebeng Industrial Park in Pehang Province.

# The Malay Peninsula



Map created by Mr. Noboru Zama





Gebeng Industrial Park ゲベン工業団地の近接航空写真  
(Compiled by Noboru Zama 作成協力: 坐間昇)

# Lynas Advanced Material Plant, LAMP

## ライナス先進物質製錬工場









# Gebeng Industrial Park

- Large Population in the surrounding area:  
10km North: Kemamman City  
10 km South: Kuantan City

Pristine Natural Environment:

Sea Turtle egg laying beach, Club Med. Etc.

**Japanese government (METI), and Japan Oil, Gas, and Metal National Corporation (JOGMEC) offered a loan facility of 225 million US\$, and invested 25 million US\$ to Lynas Co. In return, Japan will receive the supply of 8,500 tonnes of rare earth minerals per year for 10 years.**

# **Citizens Movement against LAMP**

## **Fear of Radioactive Contamination**

Lynas planed to start operation of LAMP in May 2012

However, right before **Fukushima Nuclear Disaster** took place on March 11, 2011, **an engineer revealed that LAMP facility was being built with poor quality control.**

At that time, construction of LAMP was 80 % complete.

**New York Times** published a report on this.

Citizens movement was activated. For example,

### **Save Malaysia Stop Lynas (SMSL)**

President, Mr. Bun Teet Tan is a retired high school teacher in science and math. Others are business men, doctors, accountant, engineer, etc.



# Are Lynas's Claims Right?

- Lynas plans to produce RE products **22,000 tons per year**.
- The Director of LAMP says that the radiation level of the wastes is **6.2Bq/g**. This can be safely accommodated by the **Tailings Dam with the layers of clay (30 cm) and HDPE (plastic)(1mm)**. Sensor can detect the leakage if there is.

However, a German scientist states that this is **not adequate**. In Germany, even **non-radioactive wastes cannot be allowed** to dispose of in such poor facility (Oeko-Institut. 2013).

- An Australian engineer, **Dr. Gavin Mudd** of Monach University claims that in such situation, **there should be THREE clay and plastic layers**, and that in-between, **sand layers** should be also inserted.

- According to Mr. **Hiroaki Koide** of Kyoto University, The Thorium contents of the LAMP waste (**6.2Bq/g**) means that the concentration ratio of Thorium is **1,500 ppm**.
- Koide thinks that it is serious enough to pay attention.
- So the claim of the Lynas Director seems invalid.

# Lynas Facility Waste Water Discharge Area (upper left), Fishing Village 5 km down stream (right)



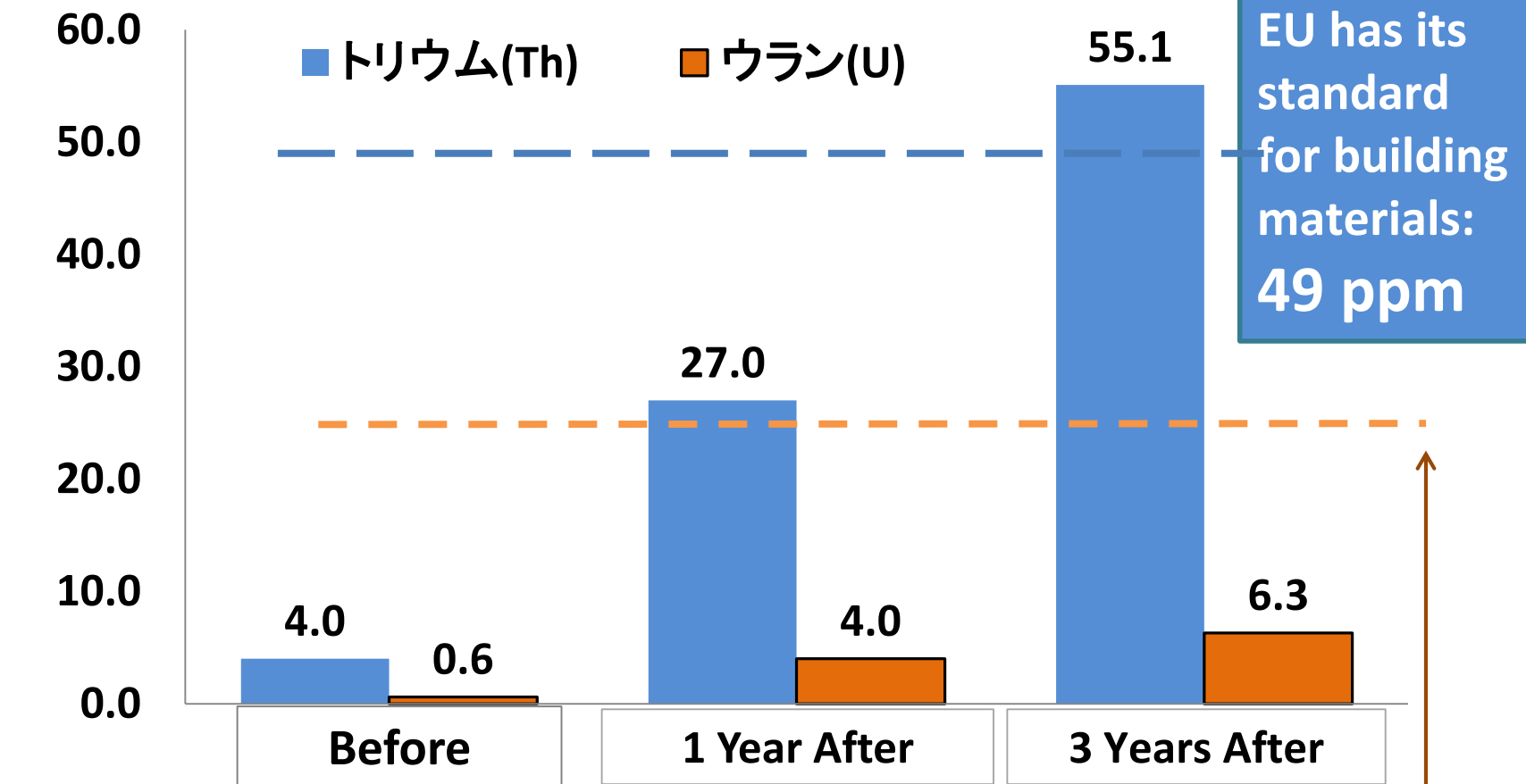
ライナス社製錬工場排水口(左上) 5km下流の河口にある漁村(右下)



# Concentration of Thorium and Uranium in soil in a fishing village on river mouth, 5km from LAMP discharge site: Before, 1 Year and 3 years After Lynas' Operation had Started

工場排水口より約5km下流の河口付近の漁村の泥(土壌)分析結果:含有濃度

mg/kg=ppm



Canadian Safety Standard for soils in residential areas: Uranium: 23ppm

Data for 3 years after operation had started are the average of 3 samples. 15

# Preliminary Results of Soil Sample Analysis Fishing Village, 5km from LAMP discharge site)

表 工場排水口より約5km下流の河口付近の漁村の泥(土壌)分析暫定値

(mg/kg = ppm)	Just before operation started	1 year after operation started	3 year after operation started		
	Soil(mud)	Soil(mud)	Soil(mud) -1	Soil(mud) -2	Soil(mud) -3
亜鉛(Zn)	29.0	151.0	1038.0	1787.0	1965.0
バナジウム (V)	11.0	57.0	481.0	702.0	858.0
銅(Cu)	16.0	54.0	136.0	653.0	439.0
ヒ素(As)	11.0	63.0	386.0	695.0	749.0
セリウム(Ce)	8.5	75.0	228.0	308.0	430.0
ランタン(La)	-	31.0	143.0	190.0	259.0
ビスマス(Bi)	-	6.0	3.8	7.3	11.4
鉛(Pb)	-	106.0	89.0	124.0	112.0
トリウム(Th)	4.0	27.0	46.5	48.0	70.8
ウラン(U)	0.6	4.0	5.3	5.9	7.8

(ppb = 10<sup>-6</sup> g/L)

# Tentative Result of Analysis of Water Samples At the Lynas Wastewater Discharge Site

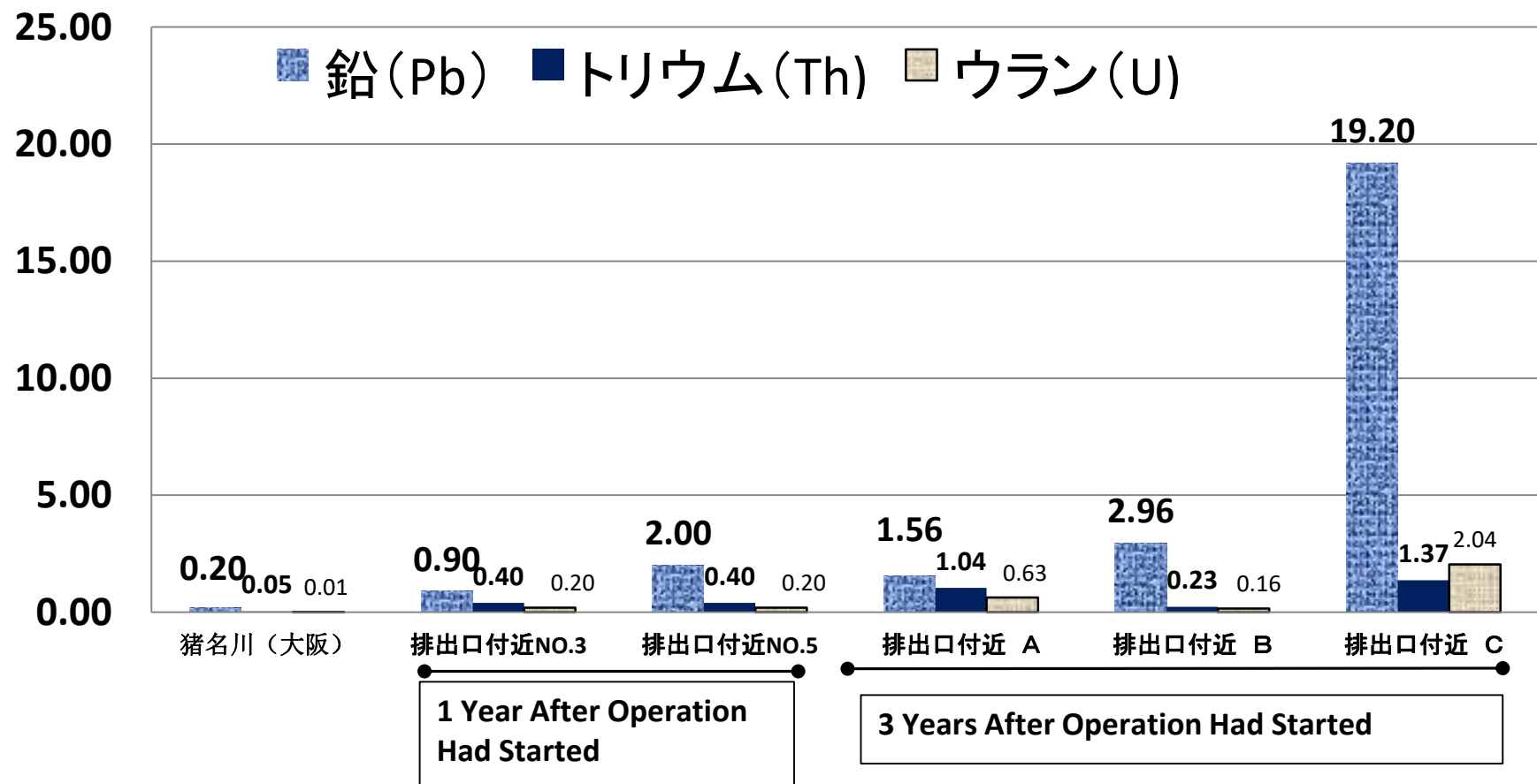


図 工場排水排出口付近の水サンプルの鉛, トリウム, ウラン含有濃度 (操業開始1年後と3年後)



# Conclusions

- Lynas waste facility is **not adequate**.
- **It is highly possible that the Lynas Refinery is discharging toxic matters such as Thorium, Uranium at higher level than safety standard.**
- The Malaysian government should **revoke** its operation license.
- **Japanese government (METI), and Japan Oil, Gas, and Metal National Corporation (JOGMEC) are responsible for lending loan to such a polluting project.**
- **Japanese public financial institutions involved in projects overseas (such as JICA, JBIC) have their own “Environmental and Social Guidelines.”**
- **JOGMEC should introduce the same.**

- **Urban Mining** should be promoted more.
- **Short-term “Economism”** should give way to the **health of children and the next generations** in terms of **long-term risks** of radioactive contamination.

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**Thank you very much for  
your kind attention !**