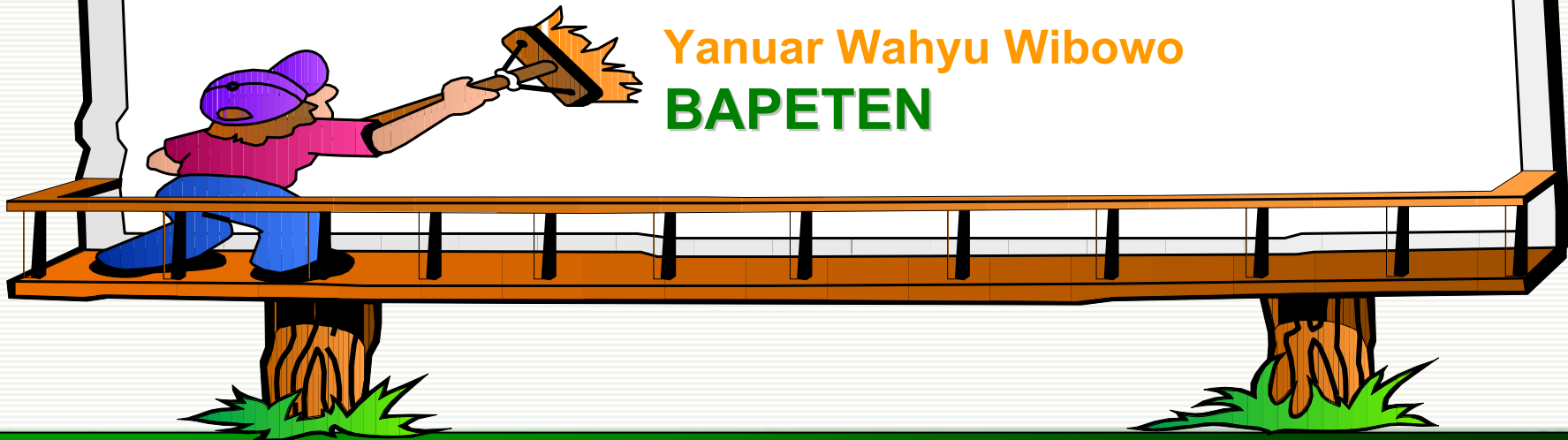




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Yanuar Wahyu Wibowo
BAPETEN





Contents

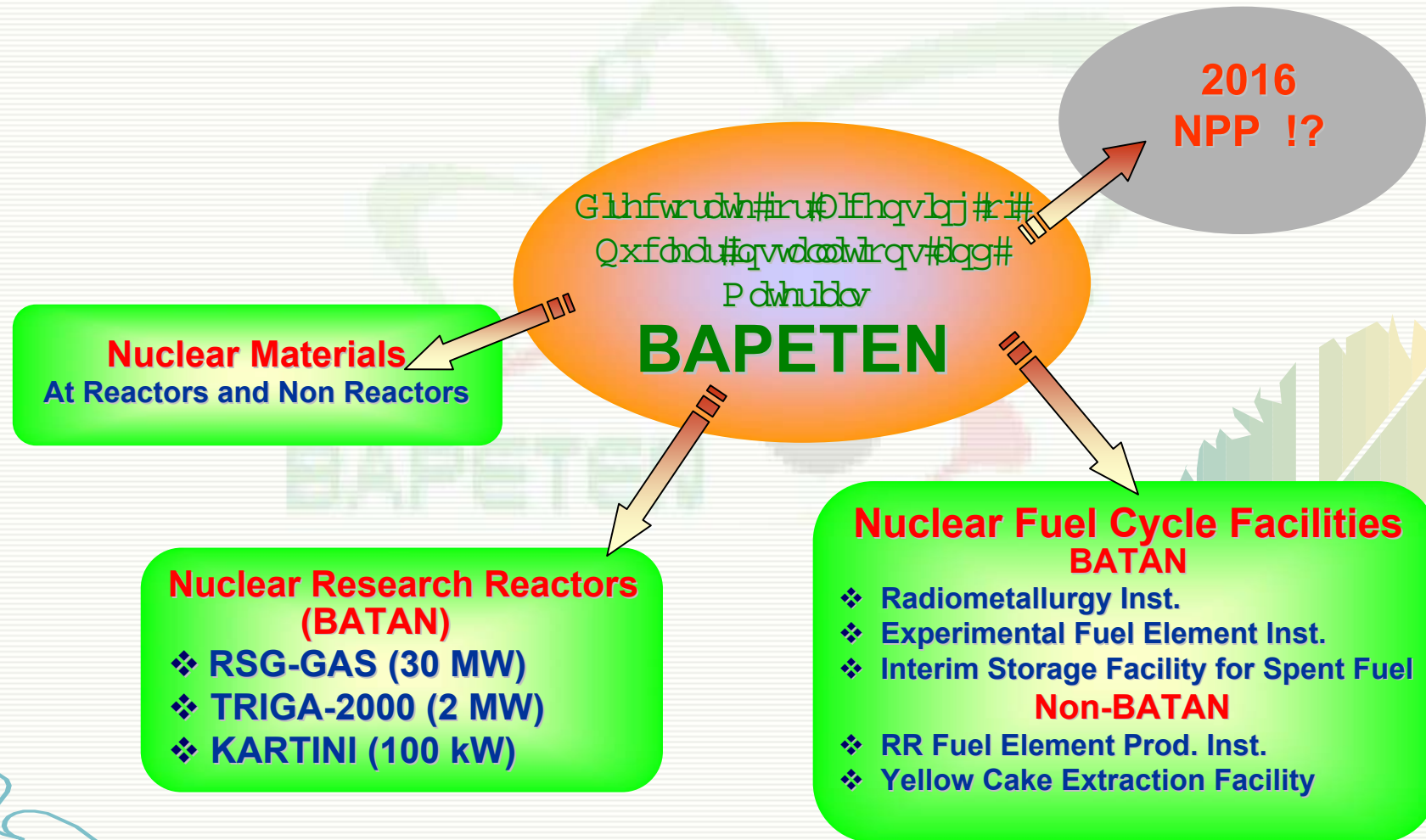
- ❖ Introduction
- ❖ Regulations on Decommissioning
- ❖ Decom. Plan of Yellow Cake Extraction Facility
- ❖ Summary



Introduction

(1)

Objects of Directorate for Licensing of Nuclear Installations and Materials





Introduction

(2)

Research Reactors in Indonesia (Operated by BATAN)

Name of Research Reactors	Reactor Type	Start of Operation	Power	Frequency of Operation	License	
					Type	Year of Expiration
RSG –GAS	MPR	1987	30 MW	~ 60 fpd	Operating	2020
TRIGA 2000	TRIGA	1964 1971 2000	250 kW 1000 kW 2000 kW	~ 9 fpd	Operating	2016
Kartini	TRIGA	1979	100 kW	~ 3 fpd	Operating	2010



Regulations on Decom. (1)

Hierarchy

Act No. 10 / 1997 on “Nuclear Energy”

**Government Regulation No. 43 / 2006 on
“Licensing of Nuclear Reactors”**

Regulations of Chairman of BAPETEN

- **No. 07-P / 2002 on “Decommissioning of Nuclear Fuel Cycle Facilities” (Adopting IAEA WS-G-2.4, 2001)**
- **Draft of Regulation on “Decommissioning of Nuclear Reactors” (in the process of adopting IAEA WS-G-2.1, 1999)**
- **Draft of Regulation on Exclusion, Exemption & Clearance**



Regulations on Decom. (2)

Act No. 10 / 1997 on **Nuclear Energy**

Institutions

- ☞ Separation of nuclear regulatory body (BAPETEN) from nuclear executing body (BATAN)

Regulatory

- ☞ Any utilization of nuclear energy is subject to licensing

Radioactive Waste

- ☞ Final storage of radioactive wastes is the responsibility of executing body



Regulations on Decom. (3)

Government Regulation No. 43 / 2006 on “Licensing of Nuclear Reactors”, article 24.

- ❑ The application for decom. approval shall be submitted **within 3 (three) years** before the operation licence expires.
- ❑ Documents required:
 - ❑ Decommissioning Program,
 - ❑ Quality Assurance Program.



Regulations on Decom. (4)

Government Regulation No. 43 / 2006 on “Licensing of Nuclear Reactors”, article 27.

- Decom. shall be started within 2 (two) years after decom. approval is granted.
- If not, Chairman of BAPETEN has the authority to appoint third party to perform the decom. on the operating organization's expense.



Regulations on Decom. (5)

**Government Regulation No. 43 / 2006 on
“Licensing of Nuclear Reactors”, article 24.**

- ❑ Upon completion of the decommissioning activities, the licensee may apply for release from the regulatory control for unrestricted use.
- ❑ Documents required:
 - ❑ **Decommissioning Report;**
 - ❑ **Radioactive Waste Management Report ; &**
 - ❑ **Radiological Survey Report.**



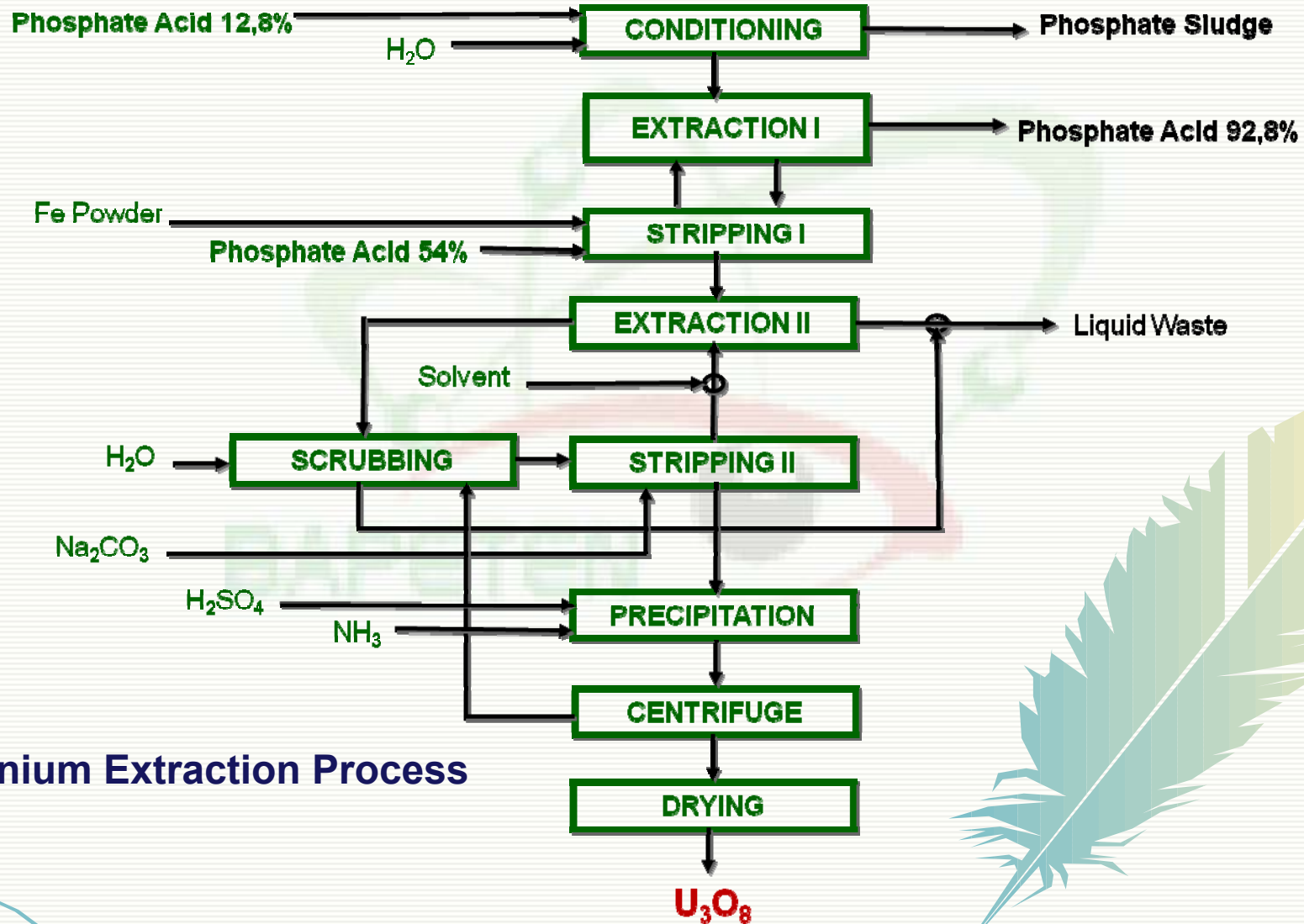
Decom. of Yellow Cake Extr. Fac. (1)

Description of the Facility

- Operator: Petrokimia Gresik Company
- Constructed in 1988
- Production capacity: 60 tons/year
- To extract uranium from the by-product of Phosphate Acid Production Installation
- Operation started : April 1989
- Operation stopped: August 1989, due to no market
- Yellow cake produced: 8.8 tons



Decom. of Yellow Cake Extr. Fac. (2)



Uranium Extraction Process



Decom. of Yellow Cake Extr. Fac. (3)

Result of Characterization Survey

Zone	Average Ext. Dose Rate ($\mu\text{Sv/h}$)	Estimated Int. Dose ($\mu\text{Sv/y}$)	Radioactive Material	Chemical Material
I	0.12	15.9	-	37.5 m ³ lime
II	0.18	43.4	1.8 m ³ radioactive slag	76 m ³ solvent 12 m ³ gunk 0.4 m ³ Fe powder
III	0.65	66.3	5.3 m ³ radioactive slag 21.93 m ³ yellow cake	10.5 m ³ solvent
IV	5.73	347.0	1.6 tons (10 drums) yellow cake 6.56 m ³ yellow cake	10 m ³ gunk + solvent 35.7 m ³ gunk



Decom. of Yellow Cake Extr. Fac. (4)

Decommissioning Schedule

Activities	\hdu#1	\hdu#5	\hdu#6	\hdu#7	\hdu#8
Sdfndj lqj # #Udqvs ru#i 43#guxp v#h#or z #f dnh	█				
G lvp dqwdqj #r #r qh #L	██████████				
G lvp dqwdqj #) #Ghf rqw#r #] r qh #L		██████████			
G lvp dqwdqj #) #Ghf rqw#r #] r qh #L			██████████		
G lvp dqwdqj #) #Ghf rqw#r #] r qh #Y				██████████	
Sdfndj lqj # #Udqvs ru#i Udgl rdf w y h #z dwh			██		
Ihd #Udgl r r j l f d #xuyh					█



Decom. of Yellow Cake Extr. Fac. (5)

Cost Estimate

No.	Items	Cost	
		Billion Rupiahs	Million US\$
1	Salaries	3.03	0.33
2	Waste Transportation & Treatment	12.79	1.41
3	Tools & Materials Procurement	2.50	0.27
4	Contingency (20 %)	3.66	0.40
5	Tax (15%)	3.30	0.36
	Total	25.28	2.79



SUMMARY

- Currently there is no regulation which requires the operator (BATAN) to prepare the decommissioning plan during operation phase. However, BATAN is now preparing the decommissioning programmes for the 3 research reactors.
- Decommissioning is very costly. Hence, the planning of decommissioning should start as early as possible.



Thank you
Maraming Salamat
Terima Kasih

