

Uranium and Thorium Production in Brazil - Present and Near Future Status -

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THORIUM RESERVES IN BRAZIL

This theme will be the subject of the next presentation by the Geologist Getulio Miyasaki, from the Brazilian Nuclear Energy Commission.

THORIUM PRODUCTION IN BRAZIL

Nowadays there are no records about currently thorium compounds production in Brazil.

In the same way, there are no informations about plans for thorium minerals exploitation to produce its compounds in the near future in the Brazilian country.

BRAZILIAN URANIUM MINERAL RESERVES

NAME / LOCATION(RESERVES CATEGORIES (t U ₃ O ₈)		TOTAL
	RAR	EAR	
	U ₃ O ₈ <40 US\$/lb	U ₃ O ₈ <40 US\$/lb	
CIPC – POÇOS DE CALDAS	500	4.000	4.500
CAETITÉ / LAGOA REAL	94.000	6.770	100.770
SANTA QUITÉRIA / ITATAIA	83.000	59.500	142.500
OTHERS ^(a)	-	61.600	61.600
TOTAL	177.500	131.870	309.370

(a) Related to the following áreas:

Rio Cristalino (PA); Amarinópolis and Rio Preto/Campo Belo (GO); Poços de Caldas and Gandarela (MG); Figueira (PR) and Espinharas (PB)

A 10,000 M DRILLING WORK IS CURRENTLY ON COURSE AT CAETITÉ / LAGOA REAL REGION IN AN EFFORT TO ENHANCE THE LOCAL RESERVE AND BETTER UNDERSTAND THE GEOLOGY OF THE REGIONAL DEPOSITS

CURRENT URANIUM CONCENTRATE PRODUCTION

CAETITÉ MILL FACILITY

- **Building Period: 1998/2000**
- **Initial Production Essays: 2000**
- **Commissioned in november/2001**



UNIT OPERATION	NOMINAL
Ore Crushing Capacity (t/y)	200,000
Ore Treatment Capacity (t/y)	200,000
U Concentrate Production (t/y U ₃ O ₈)	400

ORE AGGLOMERATOR AND HEAP BUILDING



HEAP BUILDING IN THE LEACHING PAD AND THE CHEMICAL PLANT



CURRENT U PURIFICATION PROCESS



- Solvent extraction with tertiary ammine
- Stripping with NaCl solution
- Precipitation as ADU
- Solid / liquid separation and precipitate washing in a decanter & vacuum belt filter system
- Washed precipitate drying



NEAR FUTURE URANIUM CONCENTRATE PRODUCTION

CAETITÉ MILLING EXPANSION

The expansion of Lagoa Real, Caetité Unit is on course. The nominal capacity will be doubled to **800 t U_3O_8 /year** and includes the replacement of heap leaching by conventional agitated leaching and also changes in the process root. The overall investment is estimated at 90×10^6 US\$ and the operation scheduled for 2015.

CHANGES IN THE U PURIFICATION & PRECIPITATION

CURRENTE PROCESS	TO BE CHANGED TO:
Solvent extraction with tertiary amine	Same
Stripping with NaCl	Stripping with sulfuric acid
Precipitation with ammonia	Precipitation with H_2O_2

MILL LIQUID EFFLUENT TREATMENT

The mill liquid effluent is treated with milk of lime up to pH 10. The precipitate slurry is pumped into a HDPE membrane lined pond that has a bottom drainage system. The solid phase is retained in this pond while the liquid one is fed back into the leaching production process.

This area will also be modified to meet the raffinate flow rate increase and to improve its efficiency.

SANTA QUITÉRIA / ITATAIA PROJECT



CONSORTIUM
INB-GALVANI

Proposal:

Exploration of phosphate and uranium ore to produce:

- MAP;
- DCP;
- U_3O_8 .

Investment cost US\$ 350 x 10⁶

Production Capacity:

- 240,000 t/y of P_2O_5
- 1,500 t/y of U_3O_8

SANTA QUITÉRIA / ITATAIA PROJECT

	Recoverable	Geological
⇒ Total Ore Reserves:	$80 \cdot 10^6 \text{ t}$	$520 \cdot 10^6 \text{ t}$
⇒ Main Content:	11% in P_2O_5 0,1% in U_3O_8	1,92 % in P_2O_5 0,02% in U_3O_8
⇒ Phosphate Reserve:	$9 \cdot 10^6 \text{ t P}_2\text{O}_5$	$10 \cdot 10^6 \text{ t P}_2\text{O}_5$
⇒ Uranium Reserve:	$83 \cdot 10^3 \text{ t U}_3\text{O}_8$	$90 \cdot 10^3 \text{ t U}_3\text{O}_8$
⇒ Marble Reserve	$> 300 \cdot 10^6 \text{ m}^3$	

SANTA QUITÉRIA / ITATAIA PROJECT

The Santa Quitéria Project is applying for local / construction licenses, now under the new guidelines imposed by Brazil's federal environment regulatory authority, IBAMA.

Pilot tests have been carried out for phosphate and uranium production.

Project design is in progress. The construction is expected to end by 2015 with an initial capacity of 1,100 t U_3O_8 /year with a ramp up to produce 1,500 t/year.

CONCLUSIONS

Thorium Compounds Production:

- No current production activities.
- No known plans for a near future production.

Uranium Concentrate Production:

- Current Production: 400 t U_3O_8 /year
- Production plans for 2015: 2,300 t U_3O_8 /year

Thank You

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