Indústrias Nucleares do Brasil

Converting the Caetité Mill Process to Enhance Uranium Recovery and Expand Production

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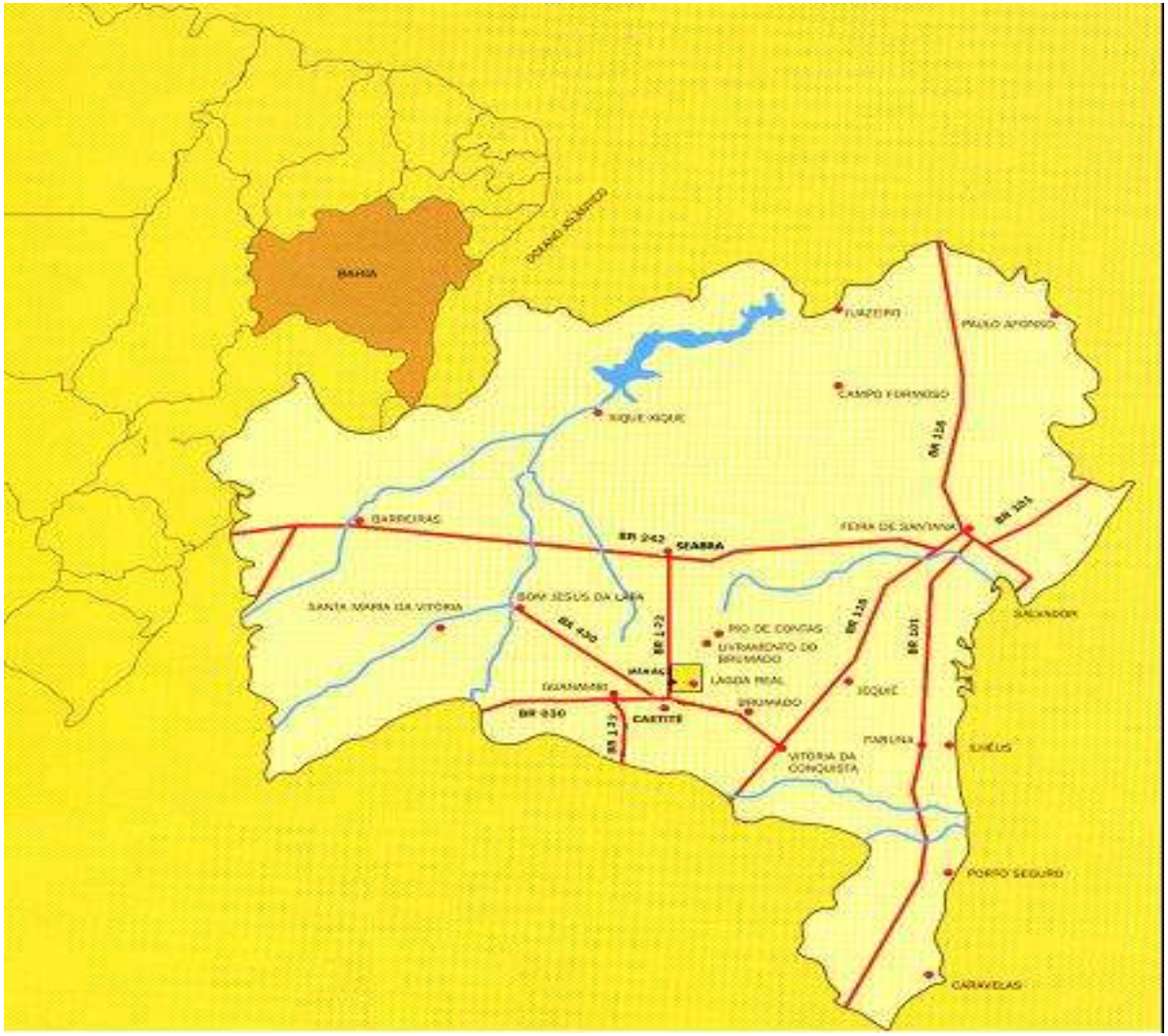
INB INDÚSTRIAS NUCLEARES DO BRASIL

Ministério da Ciência e Tecnologia

BRASIL UM PAÍS DE TODOS GOVERNO FEDERAL

CAETITÉ MINE AND MILL FACILITIES LOCATION



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REGIONAL KNOWN RESOURCES

	U (t)
Cachoeira Mine – open pit (at present)	890
Cachoeira Mine – underground (2011)	2,710
Other regional deposits	65,500
TOTAL	69,100

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CURRENT CAETITÉ MILL FACILITY

- **Building Period: 1998/2000**
- **Initial Production Essays: 2000**
- **Commissioned in november/2001**
- **Ore Crushing Capacity: 600,000 t/y**
- **Ore Treatment Capacity: 200,000 t/y**
- **U concentrate production: 340 t/y U**

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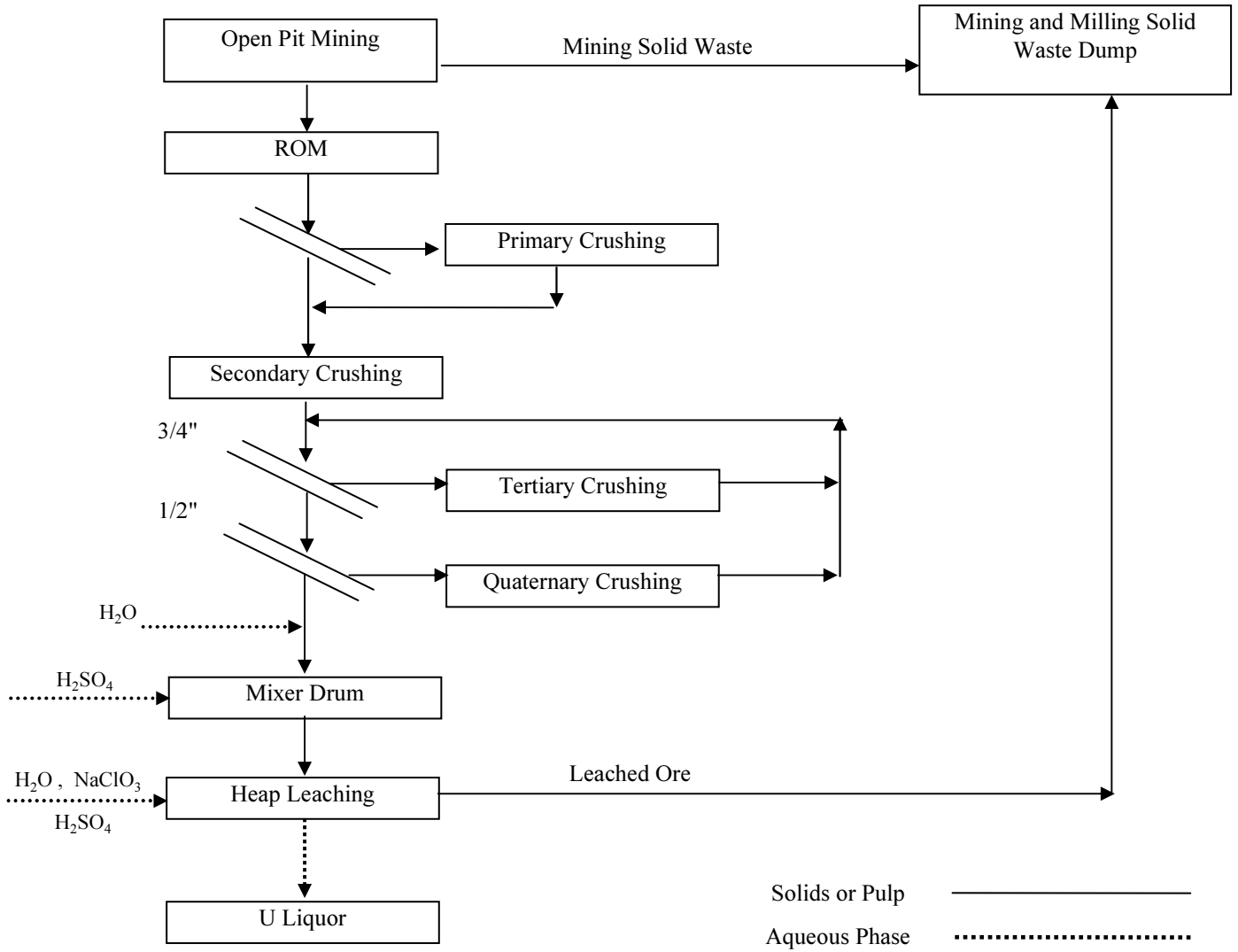
CURRENT CRUSHING AND LEACHING FLOW SHEET



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CURRENT CRUSHING SYSTEM

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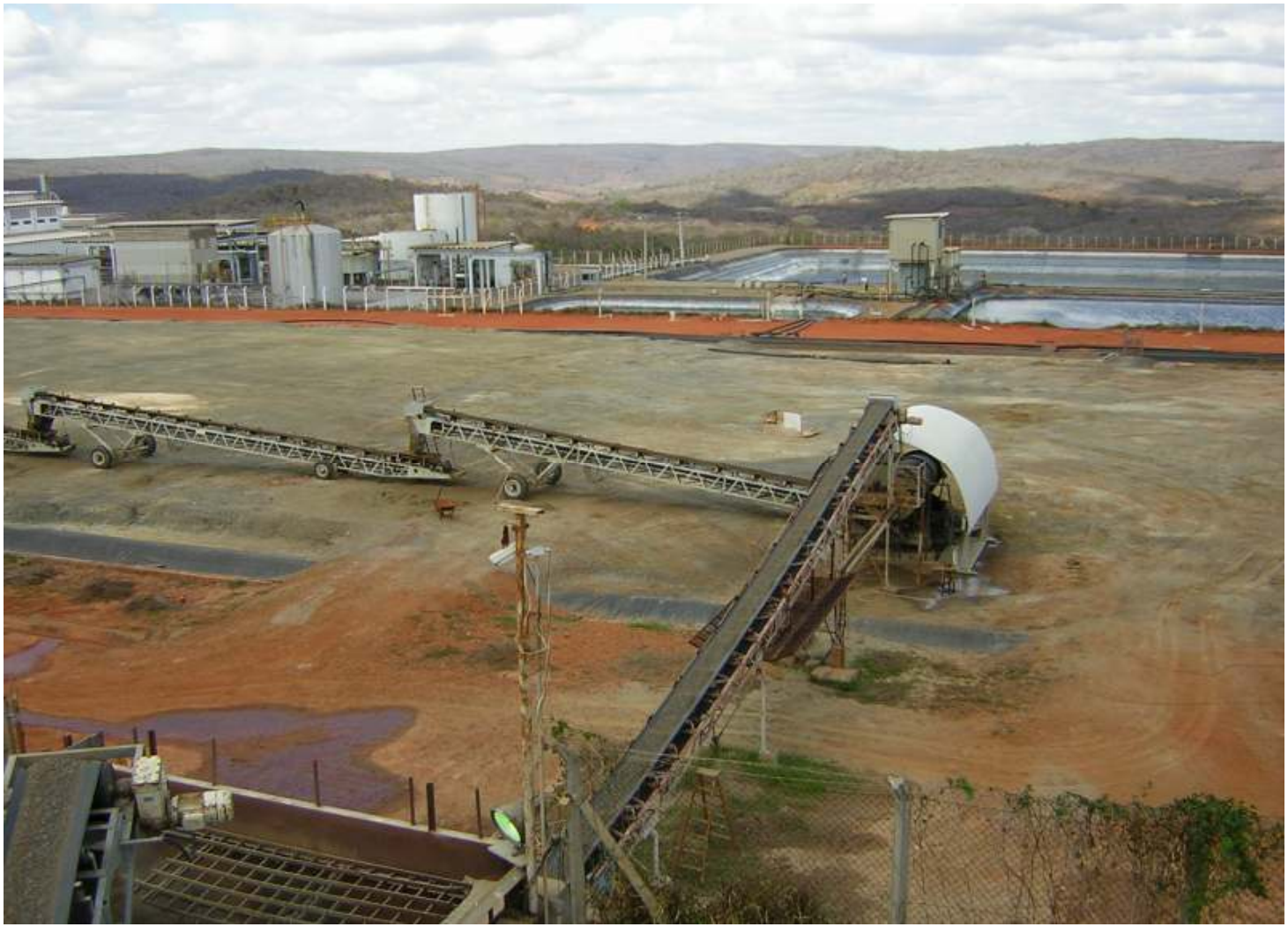
DRUM MIXER AND THE LEACHING PAD



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HEAP FORMATION IN THE LEACHING PAD AND THE CHEMICAL PLANT

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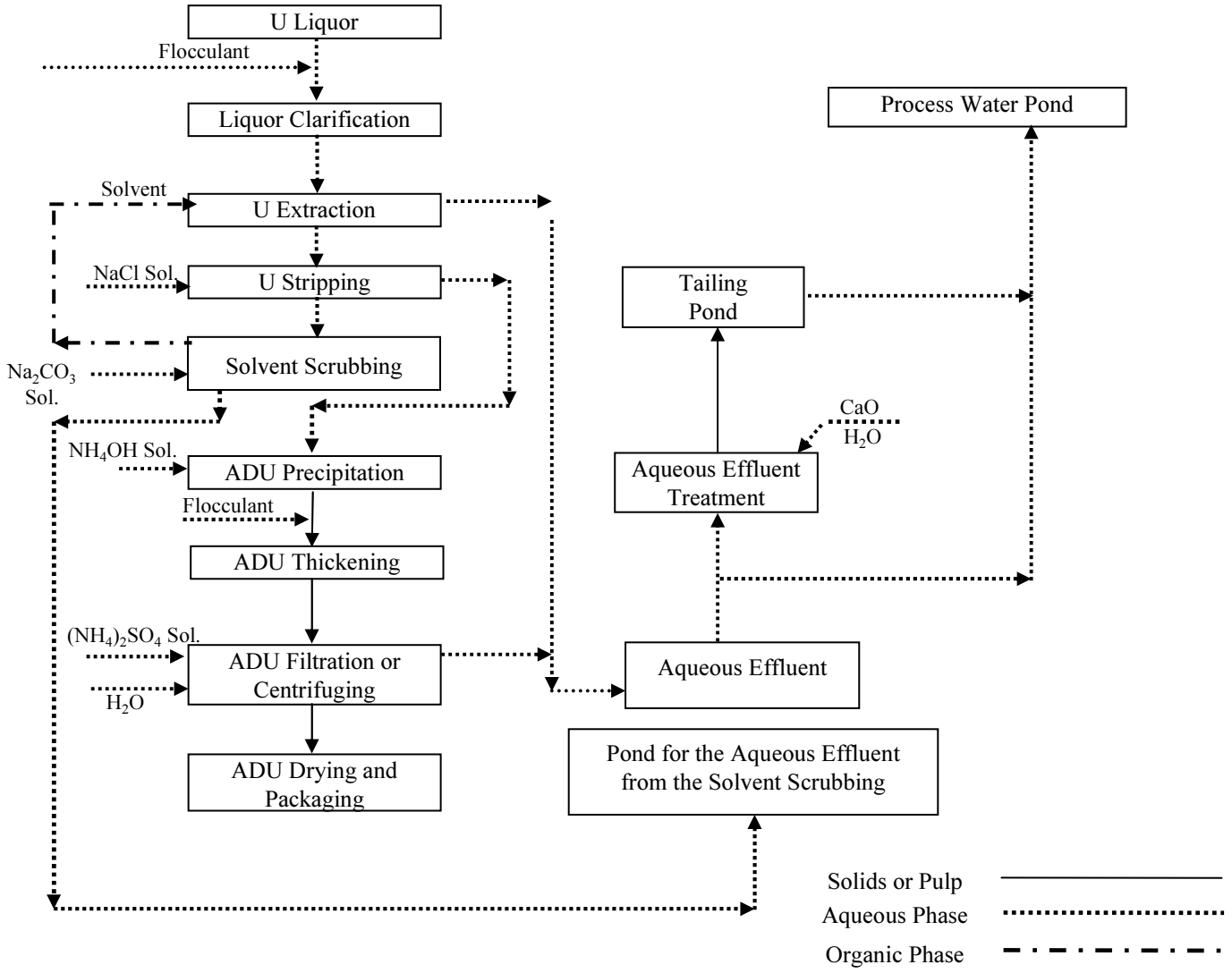
CURRENT LIQUOR PROCESS FLOW SHEET



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NEW INTENDED CAETITÉ MILL CAPACITY

- **Ore Crushing Capacity:**
  - **Remains 600,000 t ore/y**
- **Tank Agitated Leaching Capacity:**
  - **335,000 t ore/y (2011, current design)**
  - **500,000 t ore/y (2014, with expansion)**
- **U concentrate production:**
  - **500 t/y U (2011)**
  - **680 t/y U (2012, PLS treatment expansion)**
  - **1,100 t/y U (2014, leaching expansion)**

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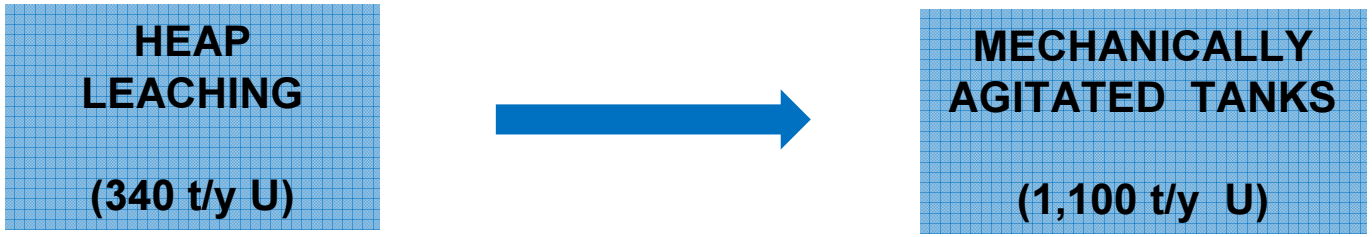
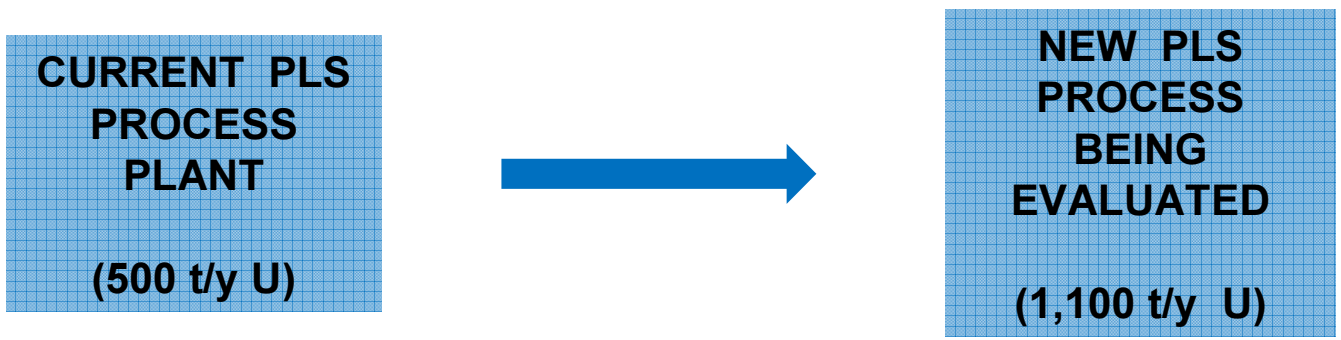
CAETITÉ MILL MAIN CHANGES TO EXPAND PRODUCTION





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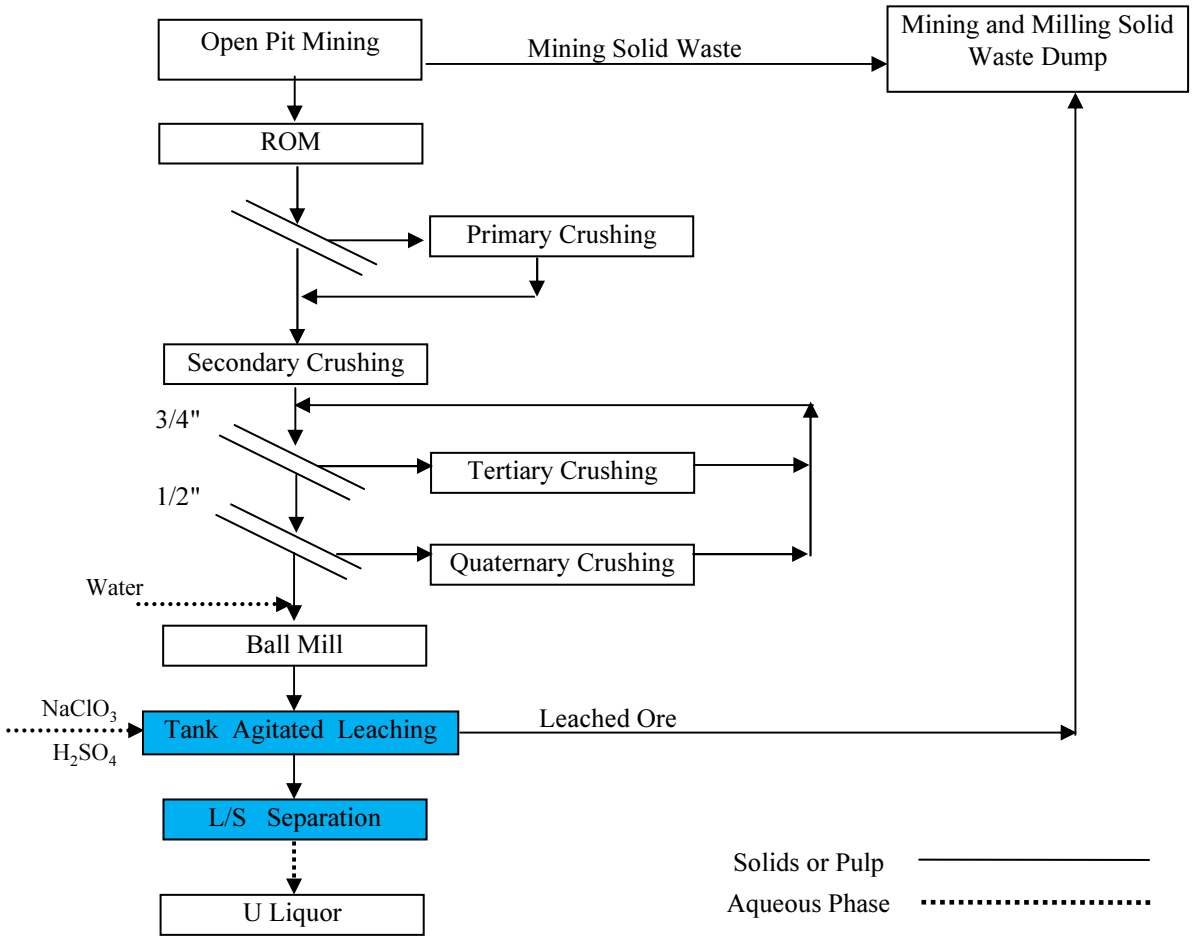
CRUSHING AND NEW LEACHING FLOW SHEET



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NEW TANK AGITATED LEACHING DESIGN

WILL USE THE FOLLOWING MAIN EQUIPMENTS TO BE REMOVED FROM THE DISCONTINUED INB-CALDAS URANIUM MILL:

- **1 ROD MILL THAT WILL BE CONVERTED TO BALL MILL (52 t/h).**
- **14 MECHANICALLY AGITATED TANKS (25 m^3 each) THAT WILL BE DISPOSED IN TWO LINES OF 7 TANKS IN SERIES.**
- **2 VACUUM BELT FILTER (60 m^2, one for each leaching line).**

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LEACHING AND FILTERING CONDITIONS

- GRINDING SIZE: ≤ 590 µ
- SLURRY DENSITY: 65 SOLIDS WT%.
- LEACHING TIME: 4 HOURS
- TEMPERATURE: 60 ºC
- ORP: ~ 500 mV

AFTER FILTRATION THE LEACHED ORE WILL BE WASHED THREE TIMES IN COUNTERCURRENT OVER THE FILTER BELT.

THE WASHED RESIDUE CONTAINING ABOUT 10% OF MOISTURE IS REMOVED BY TRUCK TO THE MINING AND MILLING SOLID WASTE DUMP.

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PLS TREATMENT PLANT

- **Current Plant Capacity (untill 2012):**
  500 t/y U (amine extraction, NaCl stripping, ADU precipitation)

- **Processes being evaluated in pilot plants:**
  - PLS pre-neutralization and clarification followed by uranium precipitation as uranium peroxide;
  - Uranium extraction, sulphuric acid stripping and uranium peroxide precipitation after excess acid recovery from the pregnant stripping solution.

ONCE DEFINED THE NEW PROCESS WILL BE SET UP BY 2012 TO PRODUCE UP TO 1,100 t/y U.

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THANKS