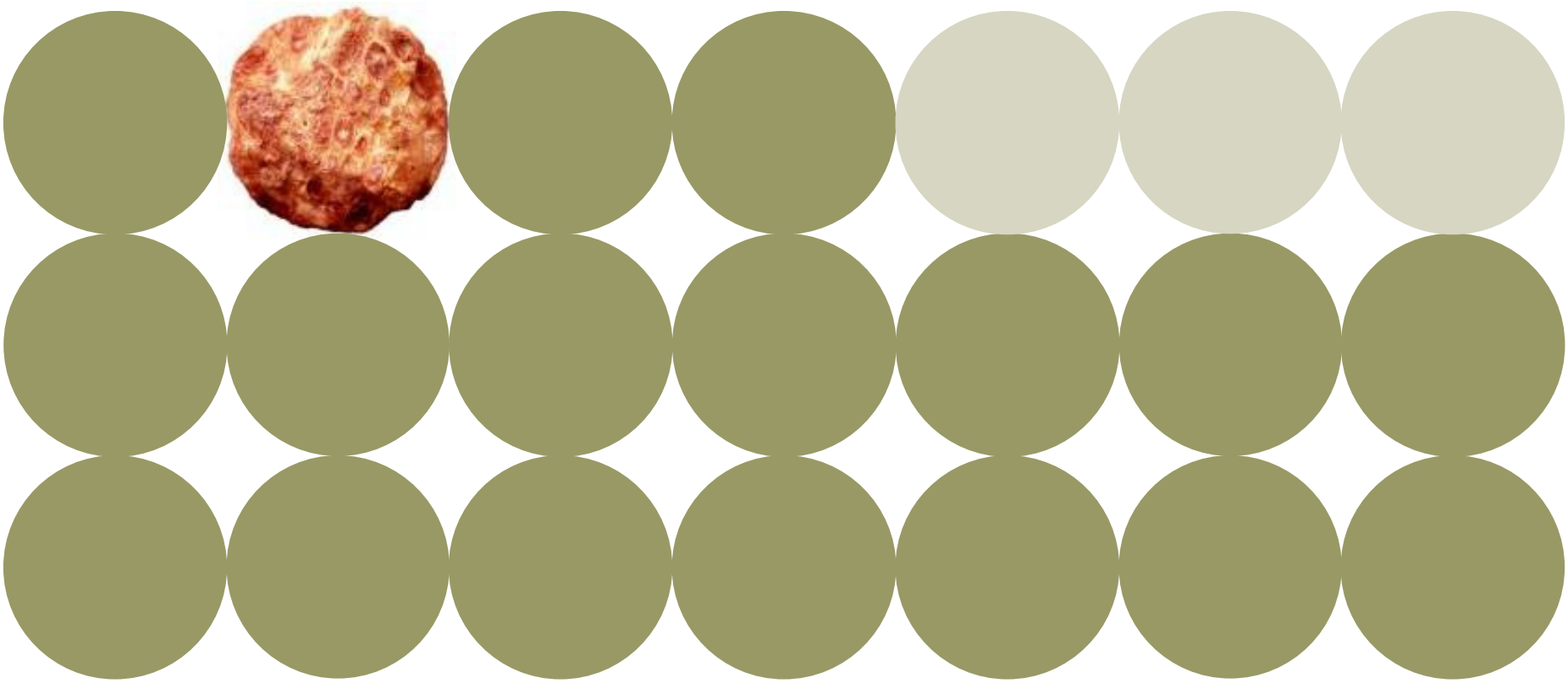
WELCOME TO MINERAÇÃO PARAGOMINAS



José Flávio Alves - General Manager of Operational Support

November 7, 2012

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What is bauxite?

- Rock composed mainly of aluminum oxide and aluminum hydroxide minerals
  - Other materials: iron hydroxides, clay, silt and free silica
- 3 main mineralogy's
  1. **Gibbsite** Al(OH)3
  2. **Boehmite** AlO(OH)
  3. **Diaspore** AlO(OH)

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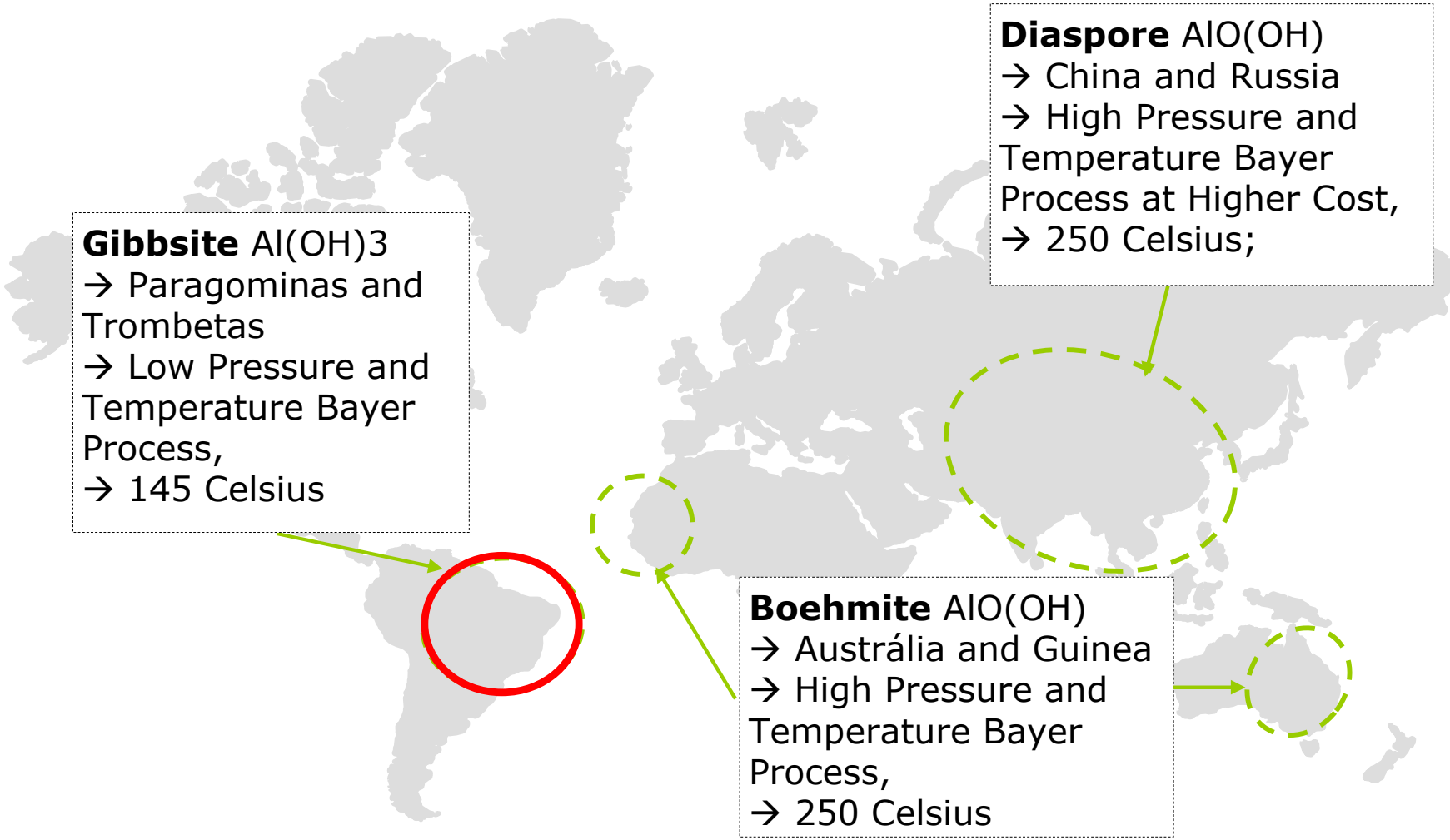
Bauxite - where do we find the different mineralogy's?



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Bauxite mining in Paragominas

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1972

1980 -1990

2002

2007

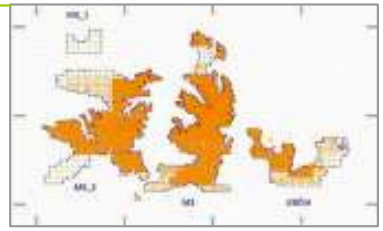
2008

2011

2012

Beginning of geological research

More exploration and new studies



Beginning of the Paragominas Bauxite Project

Start-up operation

Beneficiation plant - Expansion

Hydro acquires Paragominas Mining

Consecutive production records

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Bauxite mining in Paragominas

- Exploration, geological survey
- Deforestation and Use of Wood
- Top Soil Removal & Reuse, Overburden Removal: Yellow Clay, Nodular Bauxite & Ferruginous Laterite
- Bauxite Ripping
- Bauxite Excavation & Transportation
- Recovery of Terrain and Reforestation
- Infrastructure: Access Roads, Drainage, Dust Control, Safety & Environment

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Bauxite mining in Paragominas

- Mines: Two Mines in One Plateau called M3 with 9,9 Mtpy capacity
- Expansion: A Third Mine could be opened in Plateau M5 with 4,85 Mtpy capacity
- Mine Planing: Short, Medium & Long Term (LOMP)
- Mining Concept: Conventional (Smaller Equipment's and Manpower Intensive - Lower Productivity and Higher Cost) & Continuous Mining (Higher Productivity and Lower Cost)
- Actual Mining Fleet: 186 Equipment's & 972 FTE's (Operation & Maintenance)
- New Technologies: Surface Miner (bauxite excavation); BWE & XPS (overburden); LDCB (bauxite transportation); Bigger Trucks (bauxite short distance transportation)

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Mine process

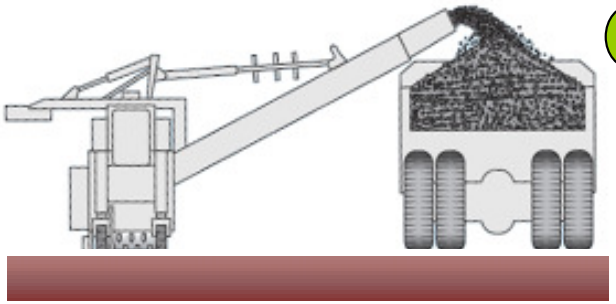
- ***Vegetation removal***
- ***Removal and stocking of the timber***
- ***Top soil removal***
- ***Stripping***
- ***Grading the box***
- ***Ripping or excavation using the surface miner***
- ***Loading***
- ***Transport***
- ***Regularizing the land for planting***
- ***Reforestation***

1 Vegetation removal

2 Stripping

3 Conventional mining method
Ripping – Loading - Transport

4 Mining method using the surface miner
Bauxite excavation/loading - transport



5 Prepare for rehabilitation

6 Reforestation area

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Equipments and training

Hydraulic Excavator 18m³

Compactor roll

Motor grader

Auxiliary truck - Dolly

Hydraulic Excavator 4,5m³

Off road truck

D11 Bulldozer

Righway truck

Surface Miner

Tire Dozer

Water truck

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From conventional to continuous mining?

- **Traditional technology**
- Smaller equipment
- More manpower intensive
- Lower productivity
- Higher cost
- Actual mining fleet:
  - 186 trucks, excavators etc,
  - 972 FTE's (Operation & Maintenance)

- **New Technologies**
- Surface Miner (bauxite excavation)
- BWE & XPS (overburden)
- LDCB (bauxite transportation)
- Bigger Trucks (short distance transportation)
- Higher productivity

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Surface mining

The Surface Mining SM 2500 has replaced the operations performed by bulldozers, hydraulic excavators and graders

Beyond this, it has almost the double of the hydraulic excavator productivity and can work with bigger trucks (60m³ a 80m³) reducing the mining costs. The ore control process is better, since the terrain shape left by the surface miner is more regular.

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Bauxite physical beneficiation

- Concept: remove clay from the ore (30 to 40%) & grinding the final product to pipeline transportation (100% below 0,3 mm);
- Economics: improve the available alumina from 38-40% to 47-48% and reduce reactive sílica from 9-10% to 4,5-5%;
- Grinding (coarse fraction): SAG mill, terciary crusher & ball mill;

- Classification (fines, ultrafines & clay): hydrociclones 26" and 10";
- Thickeners (water recirculation & solids concentration): product & tailings;

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Bauxite physical beneficiation

- Actual installations: two beneficiation plants (each with capacity of 4,85 mtpy);

- Relevant points
  - Water
  - Electric energy
- Tailings disposal system, located at valley
  - Structure: four dikes to disposal tailings, one dike to preserve natural water, one dike to return clean used water to natural drainage and channel for safety in case of long run heavy rainfall
  - The dikes are being raised every year and will be depleted in 2015

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Pipeline

- Concept: Transport slurry to refineries with 50% solids, transport capacity 14,85 Mtpy

- Pump Stations
  - PS1 at M3 with 6 pumps
  - PS2 at Tomé-Açú with 6 pumps (being Installed and start-up scheduled to 2013/2014)

- Tanks and valves at Barcarena: receive the slurry and adjust solids content to delivery to Alunorte's dewatering filters

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Competent and enthusiastic local employees

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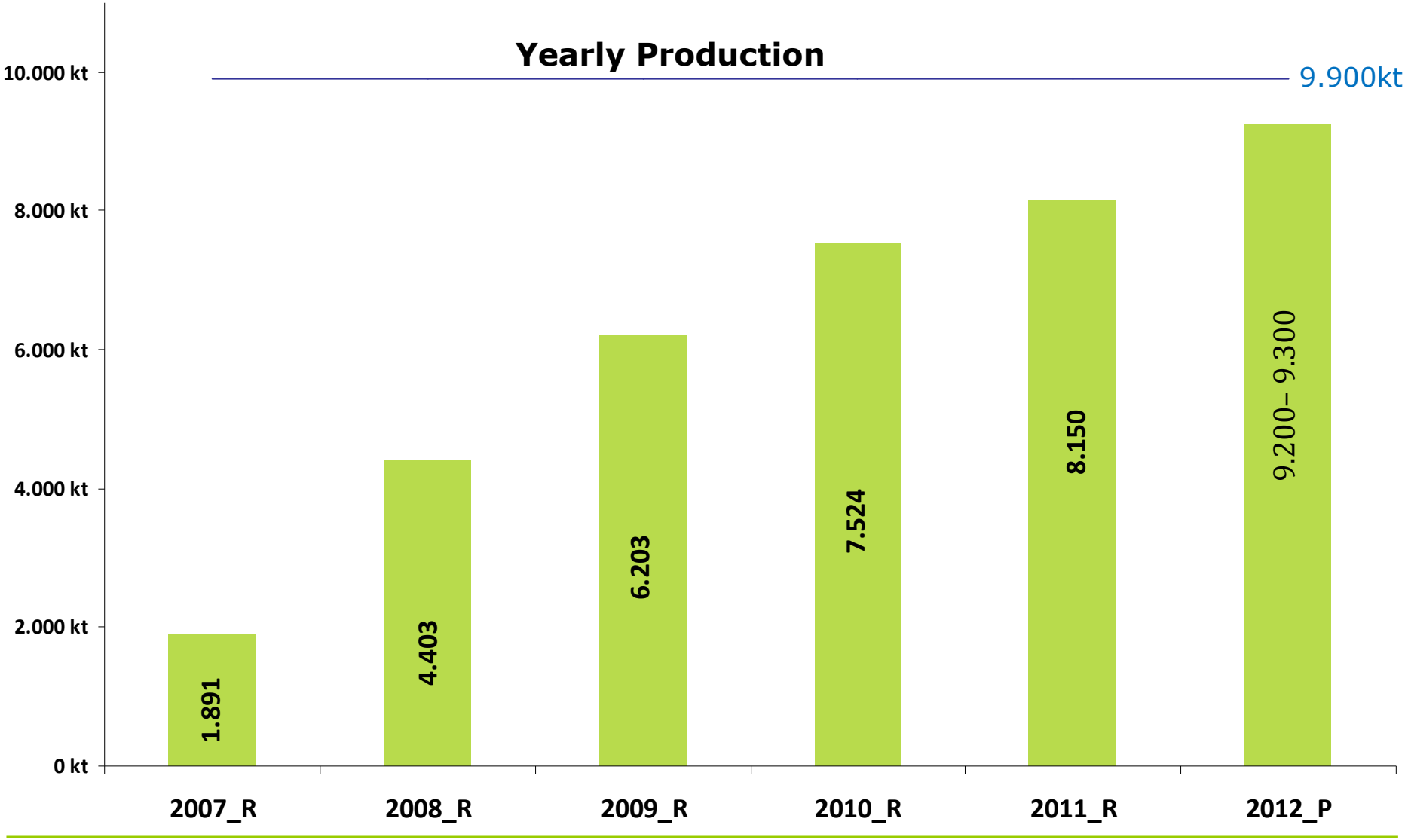
We are improving but need to stabilize



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Steps to leverage the business value

- Economy of scale: pursue gains
- Product: improve the quality
- Reduce costs: mining, beneficiation, pipeline and dewatering
- Project MAIS
- People: attract, retain and continuous training
- HSE: improve the management
- Housekeeping: Hydro Way
- BABS – Bauxite and Alumina Business System
- Certifications: ISO 9 000 and 14 000, OHSAS 8 000
- Maintenance: high level system and skilled people
- Procurement and warehouse; to improve efficiency and reliability

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