SERVIÇO GEOLÓGICO DO BRASIL

Revaluation of the Mineral Assets of SGB /CPRM

RIO CAPIM KAOLIN DEPOSIT – PARÁ STATE

Mineral Economics and Exploration Division - DIEMGE

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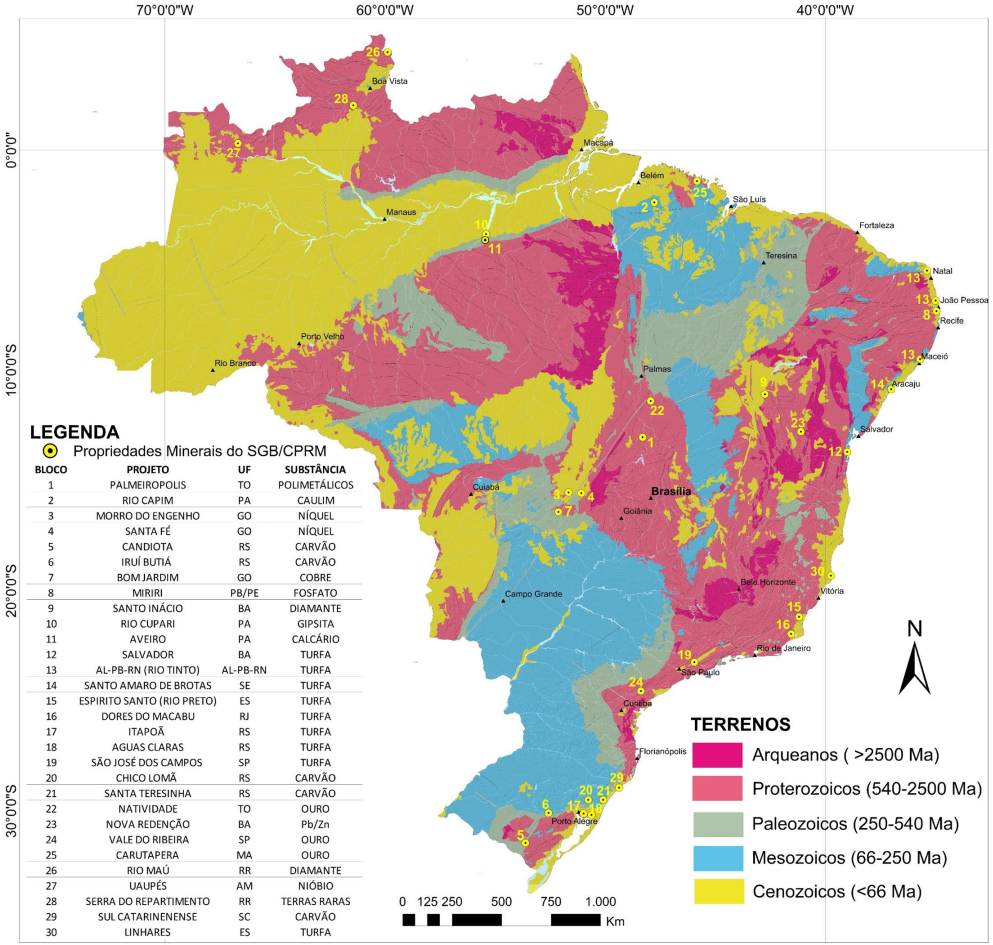
Introduction

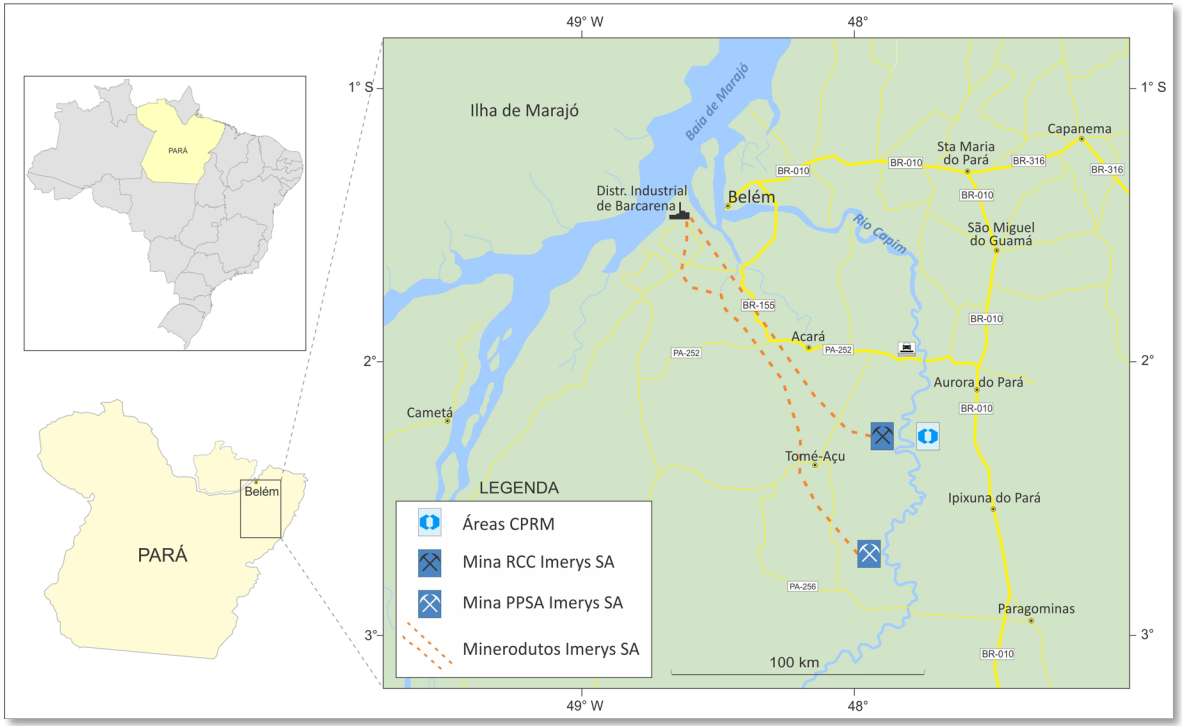
- SGB holds 319 mining processes with the National Mining Agency (ANM);
- The mineral resources in its portfolio include phosphate (1), copper (1), lead (1), zinc (1), gold (1), kaolin (1), nickel laterite (2), gypsum (1), coal (5), peat (8), diamond (2), niobium (1), rare earths (1) and limestone (1);
- 30 projects – 5 already tendered;
- Mineral exploration works conducted between the 70s and 90s;
- Projects with a final mineral exploration report, mostly approved by the ANM;
- Data validation and reassessment of mineral resources in accordance with the most recent techniques available.



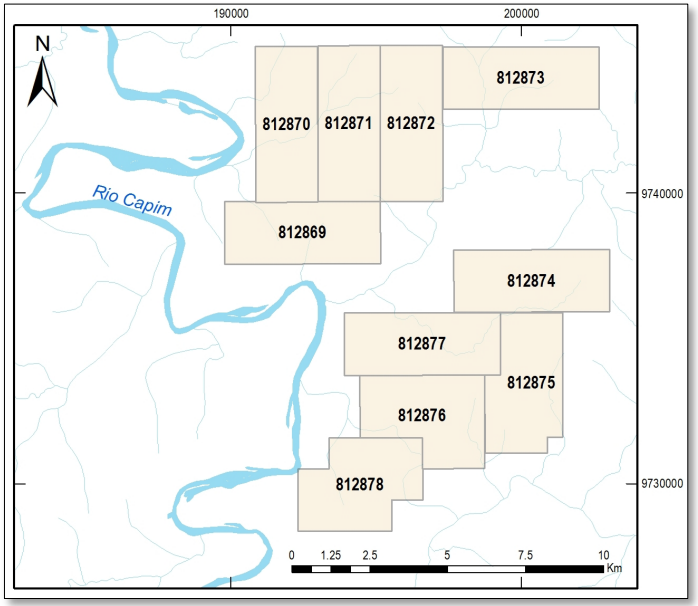
BLOCO	PROJETO	UF	SUBSTÂNCIA
1	PALMEIROPOLIS	TO	POLIMETÁLICOS
2	RIO CAPIM	PA	CAULIM
3	MORRO DO ENGENHO	GO	NÍQUEL
4	SANTA FÉ	GO	NÍQUEL
5	CANDIOTA	RS	CARVÃO
6	IRUÍ BUTIÁ	RS	CARVÃO
7	BOM JARDIM	GO	COBRE
8	MIRIRI	PB/PE	FOSFATO
9	SANTO INÁCIO	BA	DIAMANTE
10	RIO CUPARI	PA	GIPSITA
11	AVEIRO	PA	CALCÁRIO
12	SALVADOR	BA	TURFA
13	AL-PB-RN (RIO TINTO)	AL-PB-RN	TURFA
14	SANTO AMARO DE BROTAS	SE	TURFA
15	ESPIRITO SANTO (RIO PRETO)	ES	TURFA
16	DORES DO MACABU	RJ	TURFA
17	ITAPOÃ	RS	TURFA
18	AGUAS CLARAS	RS	TURFA
19	SÃO JOSÉ DOS CAMPOS	SP	TURFA
20	CHICO LOMÃ	RS	CARVÃO
21	SANTA TERESINHA	RS	CARVÃO
22	NATIVIDADE	TO	OURO
23	NOVA REDENÇÃO	BA	Pb/Zn
24	VALE DO RIBEIRA	SP	OURO
25	CARUTAPERA	MA	OURO
26	RIO MAÚ	RR	DIAMANTE
27	UAUPÉS	AM	NIÓBIO
28	SERRA DO REPARTIMENTO	RR	TERRAS RARAS
29	SUL CATARINENENSE	SC	CARVÃO
30	LINHARES	ES	TURFA

Location

Located approximately 270 km from the capital city of Belém, the Rio Capim Project area covers a total of 10,000 hectares, divided into two groups of five mining rights areas of 1,000 hectares each, distributed along a north-south orientation, referred to as the North Block and the South Block.

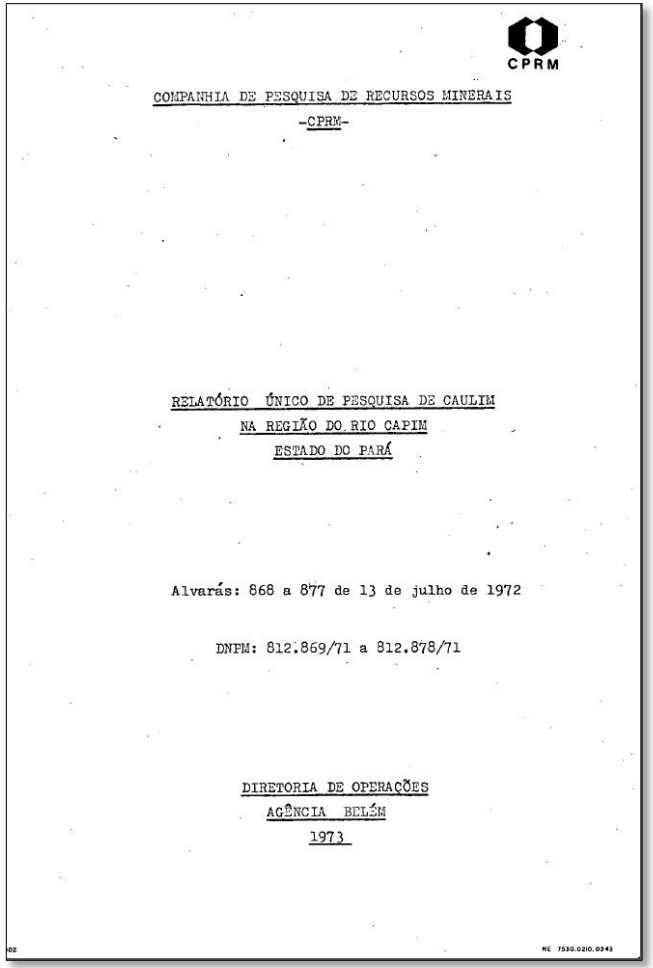


10 mining rights



Rio Capim Project

- Identified by CPRM in 1971 following the discovery of a thick layer of white kaolin along the banks of the Capim River;
- 10 Mineral exploration tenements , corresponding to 10 areas of 1,000 hectares each;
- 1,667.20 meters of excavations completed (including exploration pits, auger drilling, rotary drilling and trenches);
- Kaolin qualitative analysis and specific tests recommended by the paper and coating industry;
- Final exploration report approved in 1974;
- Total reported inferred resource = **566,819,164 metric tons** (Mt)



CPRM

COMPANHIA DE PESQUISA DE RECURSOS MINERAIS

-CPRM-

RELATÓRIO ÚNICO DE PESQUISA DE CAULIM

NA REGIÃO DO RIO CAPIM

ESTADO DO PARÁ

Alvarás: 868 a 877 de 13 de julho de 1972

DNPM: 812.869/71 a 812.878/71

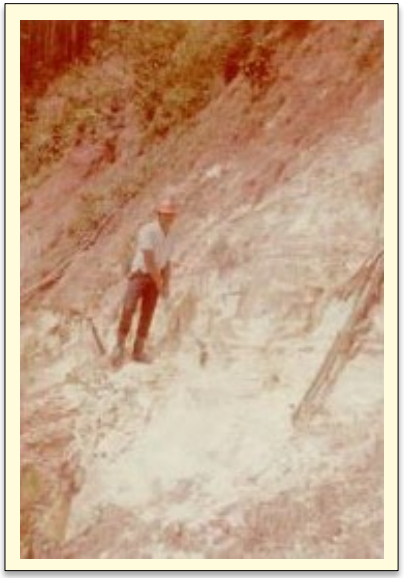
DIRETORIA DE OPERAÇÕES

AGÊNCIA BELÉM

1973

History of the Rio Capim Project

Exploration Trenchs



Kaolin outcrop on the banks of the Capim River

Exploration wells

Geology of the Rio Capim Deposit

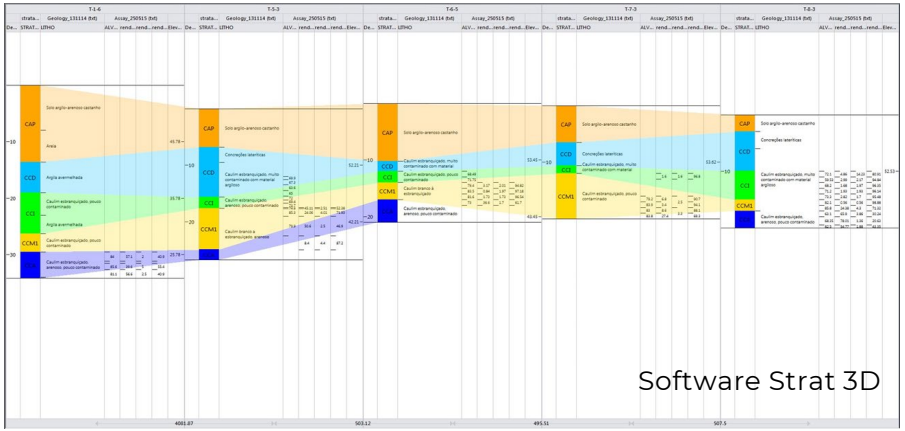
Lithostratigraphic aspects

Ma	Periodo	Litoestrat.	Descrição litológica	Geologia do depósito
5	Plioceno ao recente	Sed. Pós Barreiras	Sedimentos argilo-arenosos, de coloração avermelhada contendo nódulos ferruginosos entre outros produtos lateríticos.	CAP Capping
	Mioceno	SD3		
23		Fm. Barreiras	Arenitos avermelhados finos à médios, argilas variegadas e níveis conglomeráticos.	
	Oligoceno			
34	Eoceno	SD2		
56	Paleoceno			
65		Fm. Ipixuna Unid. A2	Caulim retrabalhado, endurecido, com impregnações de óxidos de Fe e Ti.	CCD Hard Kaolin CCI Intermediate Kaolin
	Cretáceo superior	SD1		
		Fm. Ipixuna Unid. A1	Caulim desferrificado de coloração branca. Em direção à base aumento no conteúdo de quartzo com gradação para argilo-arenito caulinítico.	Minério: CCM Soft Kaolin; CCA Sandy Kaolin
100	Cretáceo inferior	Fm. Itapecuru	Arenitos quartzosos, siltitos e argilitos de coloração vermelho-chocolate.	

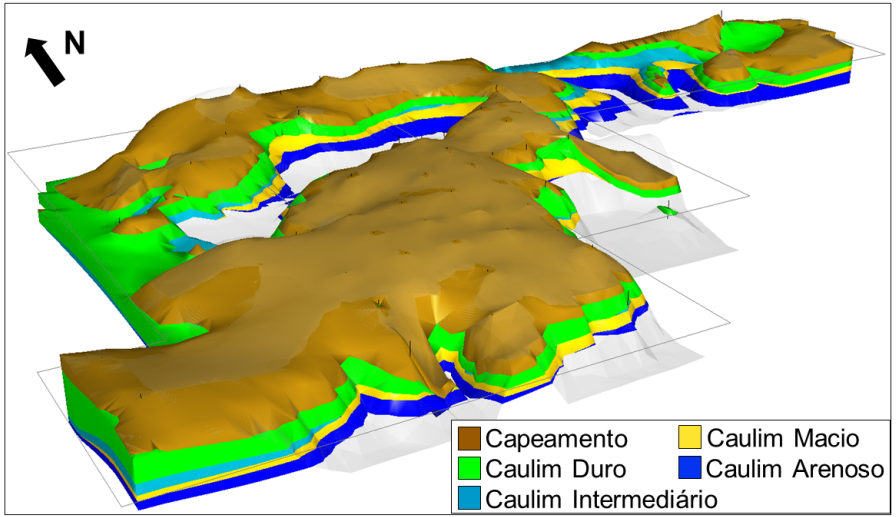
Foto cedida por Imerys Capim S/A

3D Geological Modeling

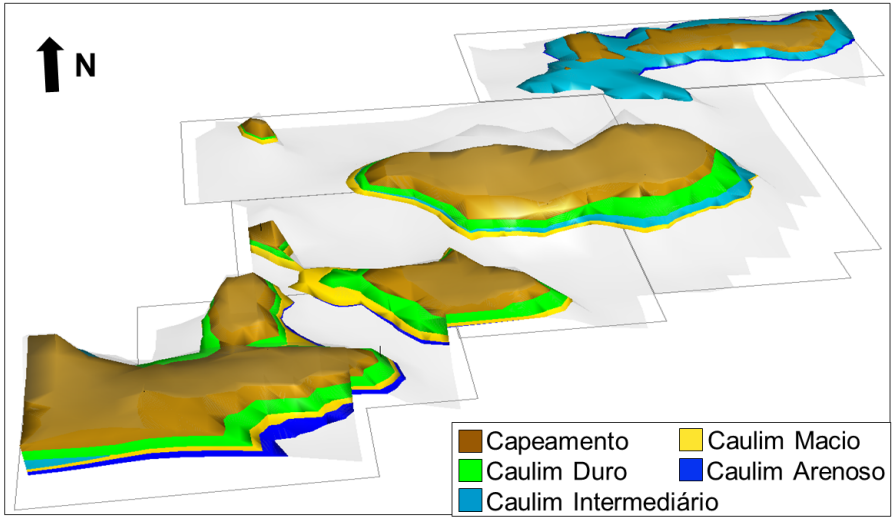
- Layer Correlation Geological Modeling;
- Main Ore Types : Soft Kaolin Layer (CCM) and Sandy Kaolin Layer (CCA);
- Main data sources: Geological descriptions of the intervals, Whiteness Index, Yield, and Particle Weight Analysis.



North Block

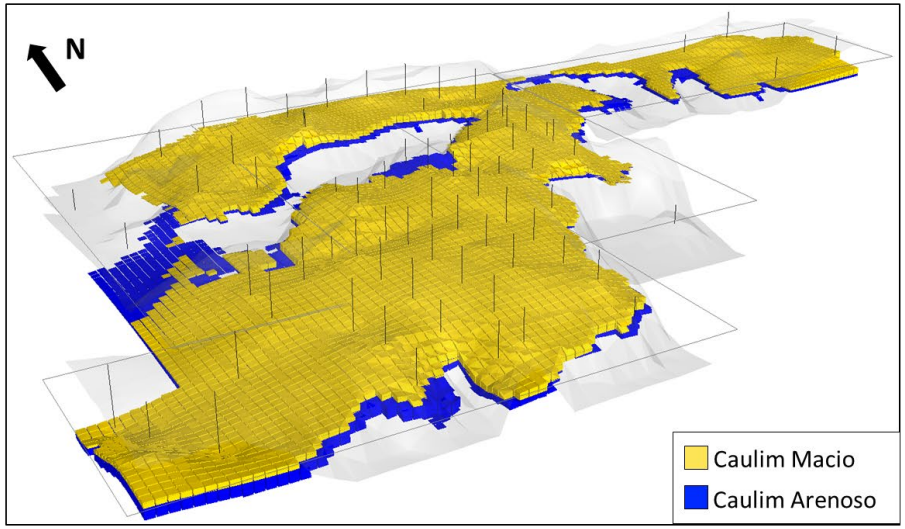


South Block



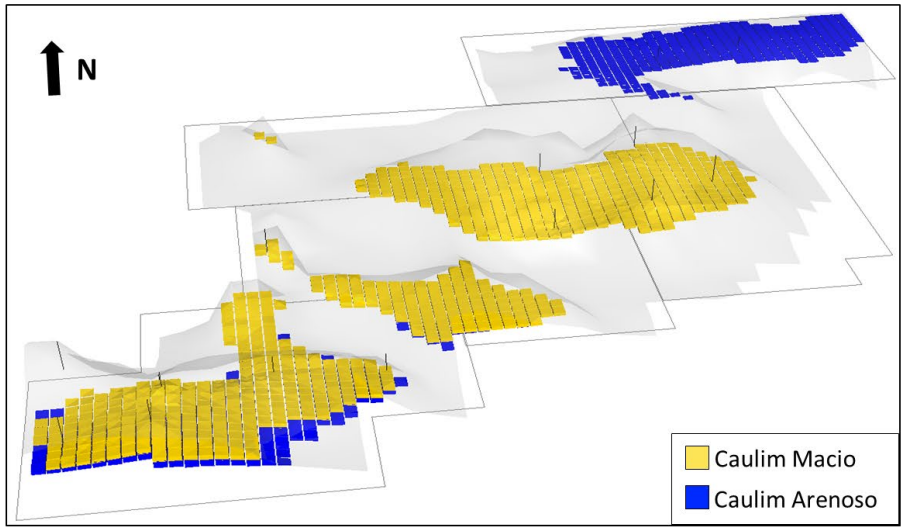
Block Models

North Block



Axes	Block size	Sub-block size	UTM origin	Number of blocks	Rotation
X	170	85	188.896	76	0
Y	170	85	9.736.772	45	0
Z	0,5	0.01	-200	822	0

South Block



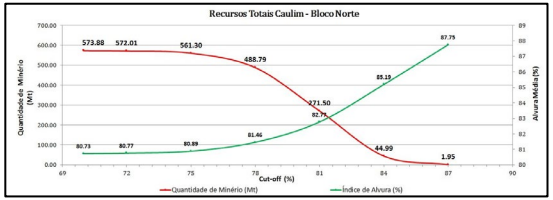
Axes	Block Size	Sub-block size	UTM origin	Number of blocks	Rotation
X	250	125	190.831	47	0
Y	250	125	9.727.849	42	0
Z	0.5	0.01	-200	804	0

Resource Estimation

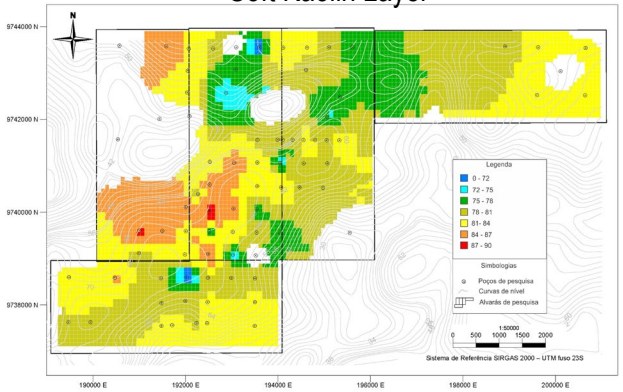
North Block

Medium whiteness

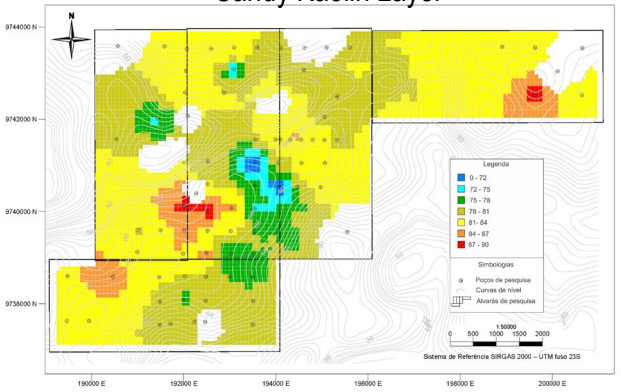
North Block= 80,94%



Soft Kaolin Layer



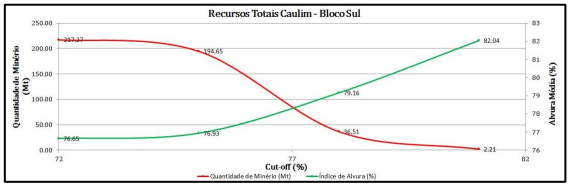
Sandy Kaolin Layer



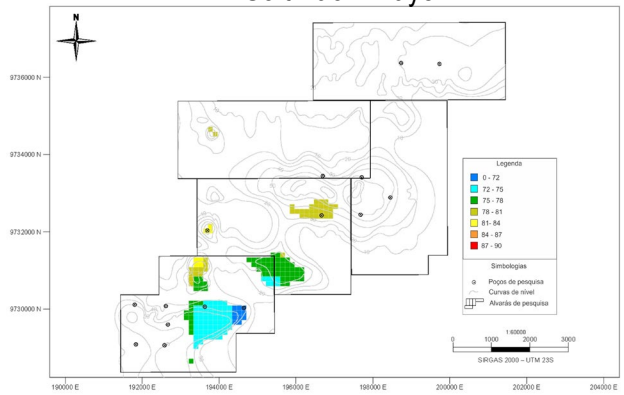
South Block

Medium whiteness

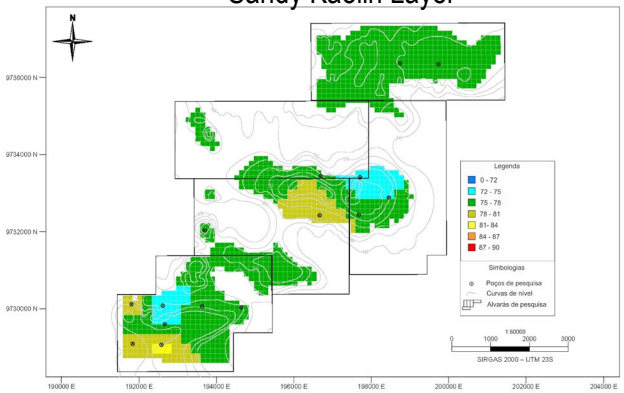
South Block= 76,62%



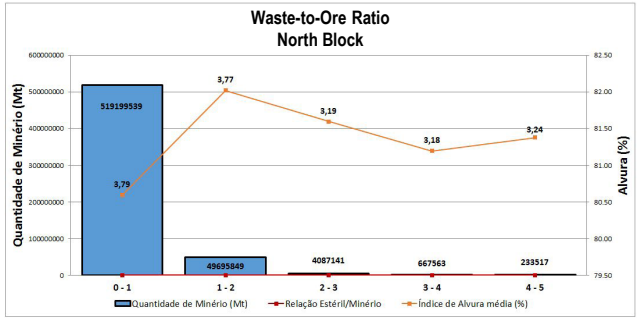
Soft Kaolin Layer

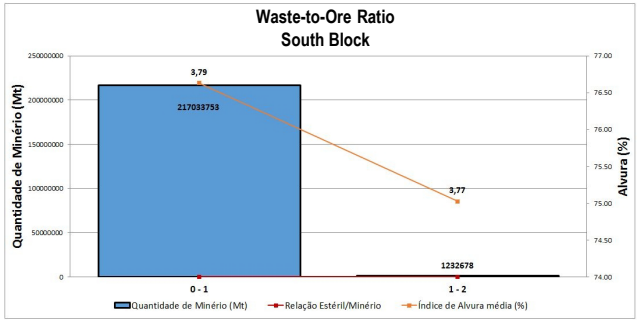


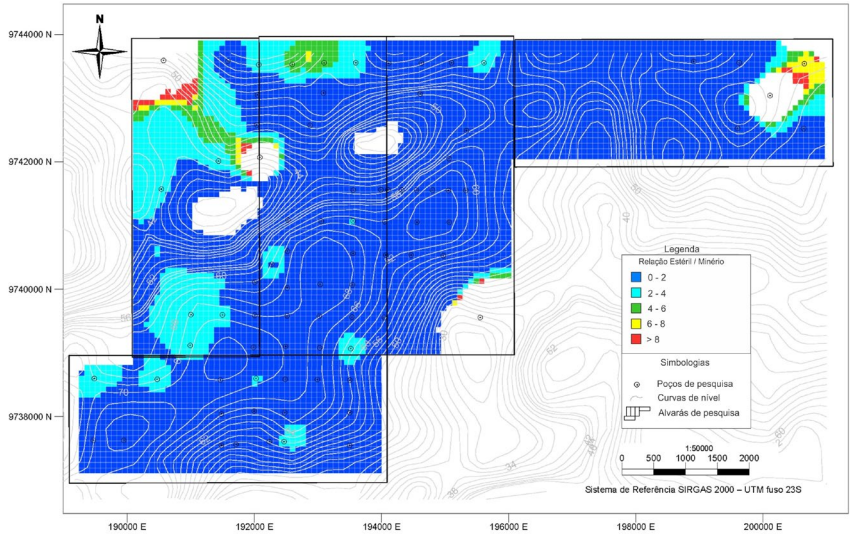
Sandy Kaolin Layer

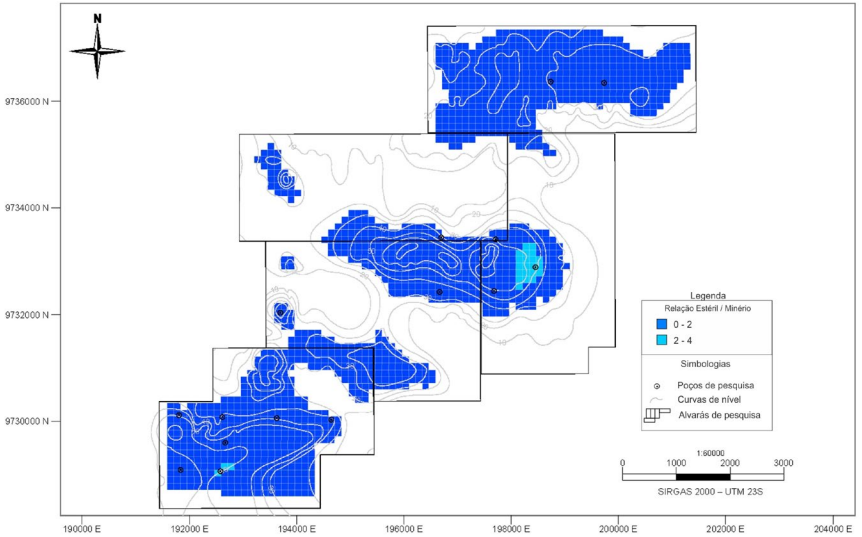


Waste-to-Ore Ratio









Resource Board

The resources reported in the economic evaluation have been entirely classified as Inferred Resources due to the inability to reach the minimum requirements stipulated by international codes for resource classification.
No significant social or environmental restrictions that could hinder the mineral exploitation of the deposit were identified.

Resource Board - Rio Capim Project - Ore Type											
Block	Ore Type	Classification	Volume	Density	Gross Tonnage	Average Raw Whiteness Index(%)	Average ore thickness (m)	Waste-to-Ore Ratio average	Yield -325#	Q (Mt) Mining Recovery	SR Processing
Norte	Soft Kaolin	Inferred	214027874.8	1.55	331743206	80.81	11.84	1.024	66.16	219482518	3.41
	Sandy Kaolin	Inferred	147646587.1	1.64	242140403	81.12	4.49	1.19	63.92	154772012	3.48
Subtotal	Soft + Sandy	Inferred	361674461.84	1.59	573883609	80.94	8.74	1.10	65.21	374254530	3.44
Sul	Soft Kaolin	Inferred	4995768.159	1.55	7743441	76.60	2.27	0.69	66.49	5148785	1.55
	Sandy Kaolin	Inferred	128367677.2	1.64	210522991	76.62	7.23	0.527	66.66	140342303	1.29
Subtotal	Soft+Sandy	Inferred	133363445.33	1.64	218266431	76.62	7.05	0.53	66.66	145491088	1.30
Total Inferred Resource			**495037907.17**	**1.60**	**792 150 040**	**79.73**	**8.27**	**0.94**	**65.61**	**519 745 619**	**2.84**

Source: Economic Evaluation of the Rio Capim Project - Saga Consultoria, Sep 2020

Certification and Valuation

The resources were classified as Inferred, and according to international codes, there is no qualification for Probable or Proven Reserves. Therefore, the material utilized in the mining plan is referred to as the Mineral Inventory.

The mineral inventory is the result of the combination of blocks whose cumulative benefit function value is greater than zero and with a brightness index equal to or greater than 84.0%, considering the economic parameters to be described.

Mineral Inventory

MATERIAL TYPE	VOLUME (m^3)	MASS (t)	WHITENESS (%)	SR
NORTH BLOCK				
Waste	-	**58 343 486**	-	-
Ore	**23 132 741**	**36 735 014**	**85.01**	**1.78**
Sandy Kaolin	9 769 615	15 613 489	84.81	1.77
Soft Kaolin	13 363 126	21 121 525	85.16	1.78
SOUTH BLOCK				
-	-	-	-	-
TOTAL	**23 132 741**	**95 078 500**	**85.01**	**1.78**

Source: Economic Evaluation of the Rio Capim Project - Saga Consultoria, Sep 2020

Mine Sequencing

The sequencing study was conducted considering the established product parameters and aiming to achieve lower waste-to-ore ratios (WOR) at the start of mining operation, which maximizes the project's financial results.
The parameters considered were:

1. Method: Strip mining;
2. ROM (Run of Mine) Production: 1.36 Mt;
3. Mining recovery: 100%;
4. Plant recovery: 55.15%;
5. 20 years of mining operations.

OVERALL RESULT (1st to 20th year)

MATERIAL TYPE	VOLUME (m^3)	MASS (t)	WHITENESS (%)	SR
Waste		**43 797 491**	-	-
Ore	**17 424 336**	**27 584 616**	**85.11**	**1.54**
Sandy Kaolin	6 409 962	10 194 634	84.97	1.41
Soft Kaolin	11 014 374	17 389 982	85.20	1.62
TOTAL	**17 424 336**	**71 382 107**	**85.11**	**1.54**

Source: Economic Evaluation of the Rio Capim Project - Saga Consultoria, Sep 2020

Hypothetical Direct Selling Scenario

The following data and parameters were adopted for the preparation of the project's cash flow:

1. Annual Production of Final Products: 750,000 tones/year of final products;
2. Number of Production Years: 20;
3. Annual Waste-to-Ore Ratio: variable, with an average of 1.59 t/t;
4. Annual Mine Movement: variable, as a result of sequential mine planning;
5. Product Recoveries at the Plant: 55.15%.

ECONOMIC INDICATORS RESULTING FROM CASH FLOW

Discount Rate	**% per year**	***8***
Net Present Value (NPV) after taxes (year-2)	**R$ million**	***760.88***
Internal Rate of Return (IRR)	**%**	***12.5***
Payback Period	**years**	***6.4***

Source: Economic Evaluation of the Rio Capim Project - Saga Consultoria, Sep 2020

Business Model (Auction)

Signing Bonus: R$ 500,000.00 (five hundred thousand reais), to be paid as a prerequisite for the execution of the Promise of Assignment of Mineral Rights Contract;

Opportunity Prize I: R$ 2.5 million, to be paid as a prerequisite for the execution of the private instrument of mineral rights assignment;

Opportunity Prize II: R$ 7 million, to be paid within ten business days from the publication by the Brazilian government of the first mining concession;

Royalty on the gross monthly revenue of the mined minerals, with a minimum percentage of 1% (one percent), to be paid quarterly and periodically adjusted according to the terms and conditions of the Promise of Assignment of Mineral Rights Contract;

SERVIÇO GEOLÓGICO DO BRASIL

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