Katueté multi-metal ore project in Paraguay

(Gold, Ti-V magnetite, Al, Cu, Co and quartz sand)

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MINERVA
EXPLORATION

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The Itabo Multi-metal Ore Project in Paraguay

Summary

Initially the Itabo project located in northeast Paraguay has been scouted in detail for its gold and native copper potential covering an anomalous area over 50 square kilometers in the laterites and the added potential for an open pit operation in the basalt in the Tabo Fault. The additional commodities are Ti-V magnetite, along with bauxitic clays, discovered over the whole concession. Summary of inferred reserves:

Total area	37.300 hectares
Average thickness laterites	9 meters (7 to 12 meters)
Total volume laterites	>3 billion m3 laterites
Specific weight	1.64 ton/m3
Total reserves	>5.000 million tons laterites
Content of gold	not yet quantitatively defined
Content Ti-V magnetite	>20% Ti-V magnetite
Reserves Ti-V magnetite	>1 billion tons
Reserves Fe (16%)	800 million tons
Reserves Ti02 (3.79%)	190 million tons
Reserves V205 (0.125%)	6 million tons
Average Fe in magnetite	47.5% Fe
Average Ti02 in magnetite	20.6% Ti02
Average V205 in magnetite	0.62% V205
Bauxitic clays (26.12%)	1300 million tons
Aluminum	680 million tons
Quartz sand (32.7%)	1630 million tons

Additional economic minerals may be mined as secondary commodities around the Itabo Fault including **native copper, cobalt and zircon.**

Location of Itabo Project

The Itabo Project is located in NE Paraguay close to the Saltos de Guayrá near the border with Brazil. There is a paved well-maintained road to Katueté, about 5 hours from Asunción. The Project is only 15 minutes from the village Katueté. Various farm roads are crossing the Project. The terrain is basically flat; most of it is cultivated for soya, wheat and corn.

BLOQUE ITABO (modificado 23.10.2021)

Vértice	Coordenadas 21 J		Superficie - has
	Este	Norte	
A	715.000	7.305.000	37.300
B	724.000	7.305.000	
C	724.000	7.312.000	
D	742.000	7.312.000	
E	742.000	7.300.000	
F	729.000	7.300.000	
G	729.000	7.292.000	
H	715.000	7.292.000	

Itabo concession boundary over 37.300 hectares.

The photos illustrate the almost flat topography covered by laterites used for agriculture crops, mainly soya, wheat and corn in the same year.

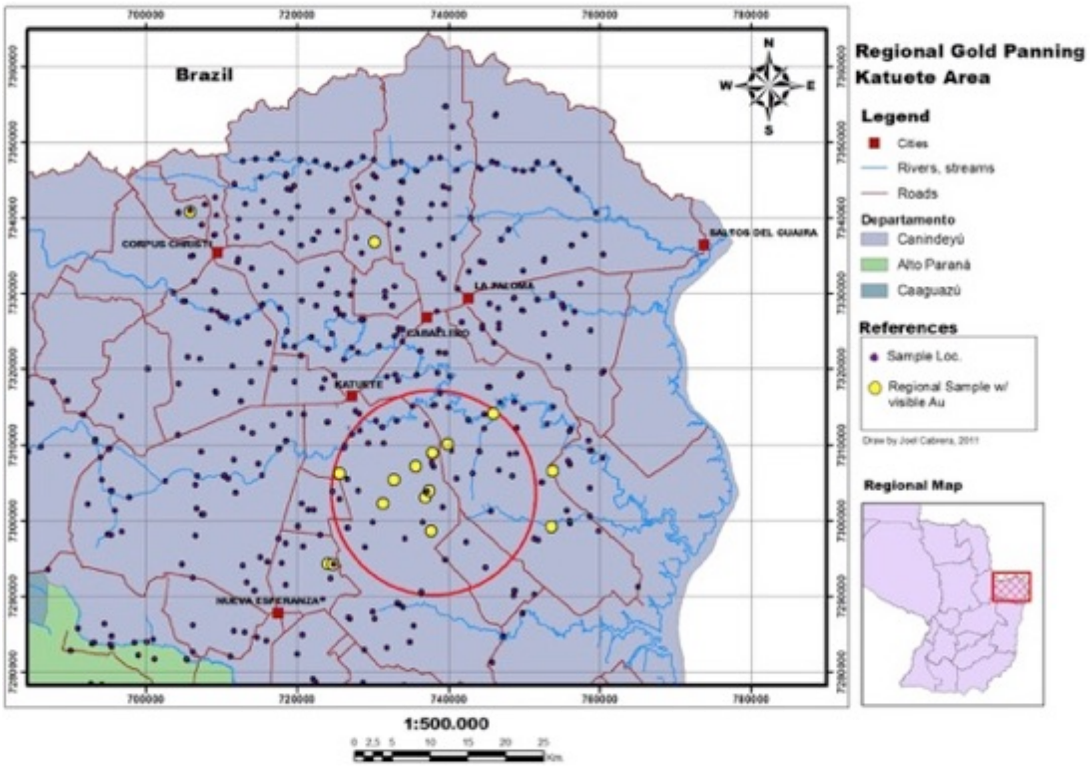
The gold potential

Initially the Itabo project located in northeast Paraguay has been scouted in detail for its gold and native copper potential covering an anomalous area over 50 square kilometers in the laterites and the added potential for an open pit operation in the basalt in the Tabo Fault. The district of Itabo was discovered and developed by our partner Wilmar Bartel, while working as the director of exploration for Rex Diamonds and later for Vane Minerals Limited (2004-2009).

Rex Diamonds of Mali explored for diamonds all of east Paraguay, collecting samples in all big and small rivers and streams for three years. While collecting the heavy sediments to find the pathfinders typical for kimberlites, Bartel also took notes of the streams with gold particles. Even thou Rex Diamonds found more than one area with diamonds, they returned to Mali due to in-house problems of the company. Years later Vane Minerals contracted Wilmar Bartel to explore for gold and copper. Bartel showed them one of the most promising targets for gold in Itabo, where he had seen a few streams with more gold than in others. Vane Minerals did a detailed stream sediment survey over 3000km2 in that district, where they outlined an area with big potential related to a SW-NE structure in a depression of the district.

View of the SW-NE depression or Itabo Fault, where visible gold and native copper was seen in concentrates from streams.

Northern view of SW-NE depression or Itabo Fault. Highest gold value in soil grid was 1.8 ppm Au.

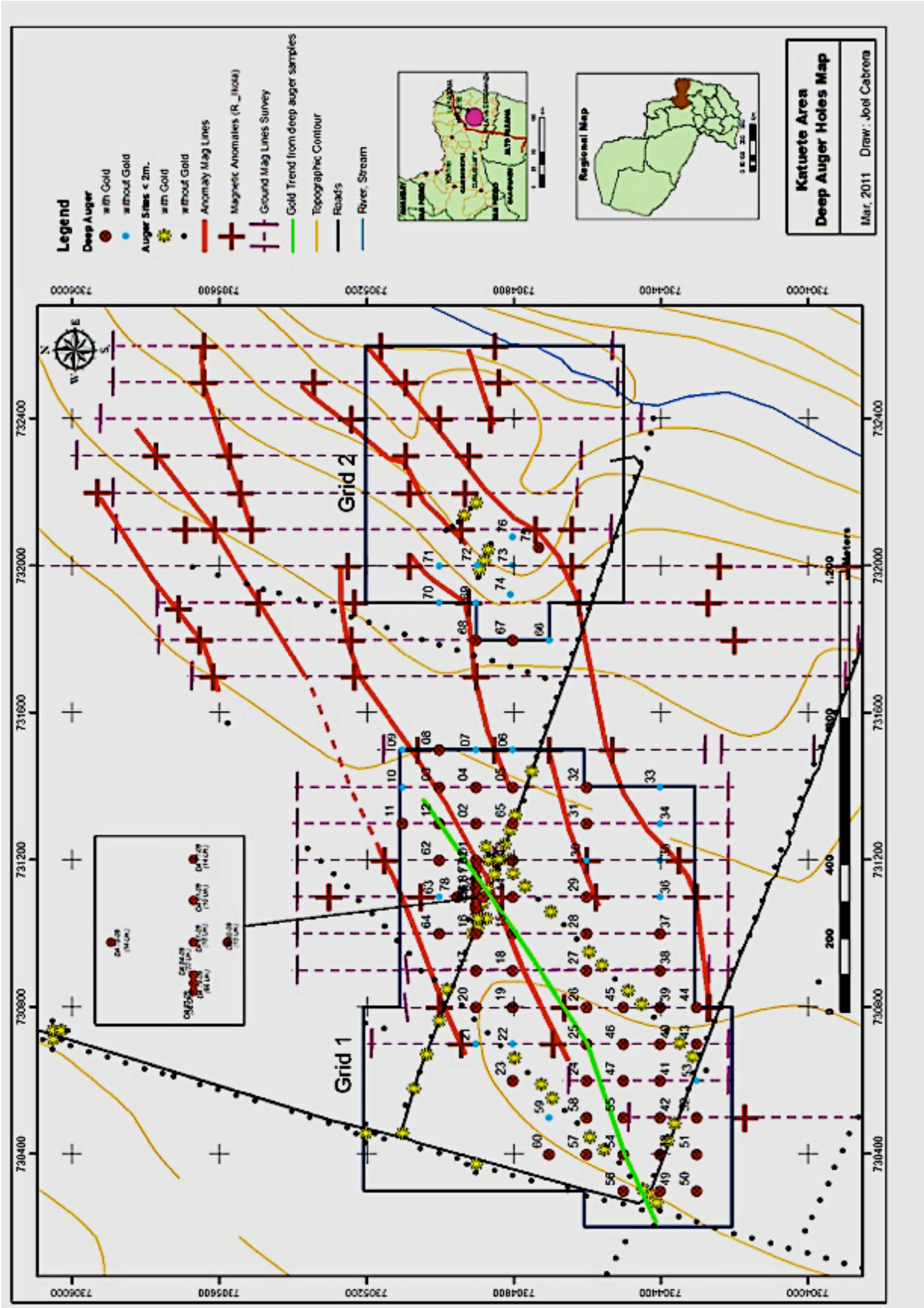


Stream sediment survey over 3.000km2 gold panning for gold. The area with visible gold is outlined in the red circle SE of Katueté.

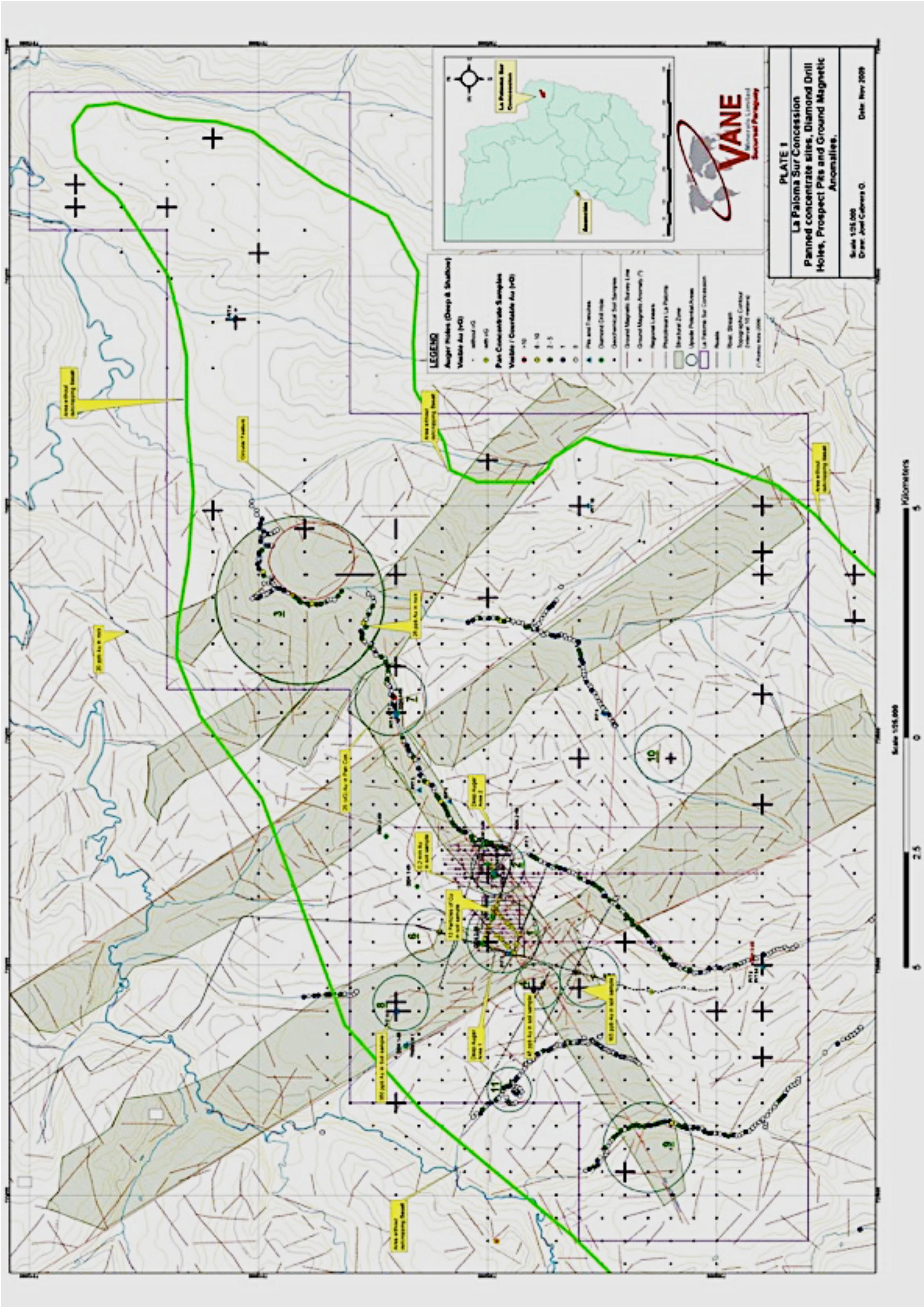
After applying for the concession over the area of interest, Vane minerals proceeded to lay out a soil grid over 25.000 hectares, along with a magnetic survey. At areas of higher priority over areas totalling over 5.000 hectares, Vane did several shallow and deep auger holes and thereafter 7 diamond drill holes. Unfortunately, during the financial crisis of 2009, Vane had run out of funds to continue with the drilling program. Assays of the drill core was only tested over 10% of the core

View of core shack and core which is still located in the village of Katueté, available to be assayed if required. Core has various sections of high grade Ti-V magnetite some visible native copper and cobalt.

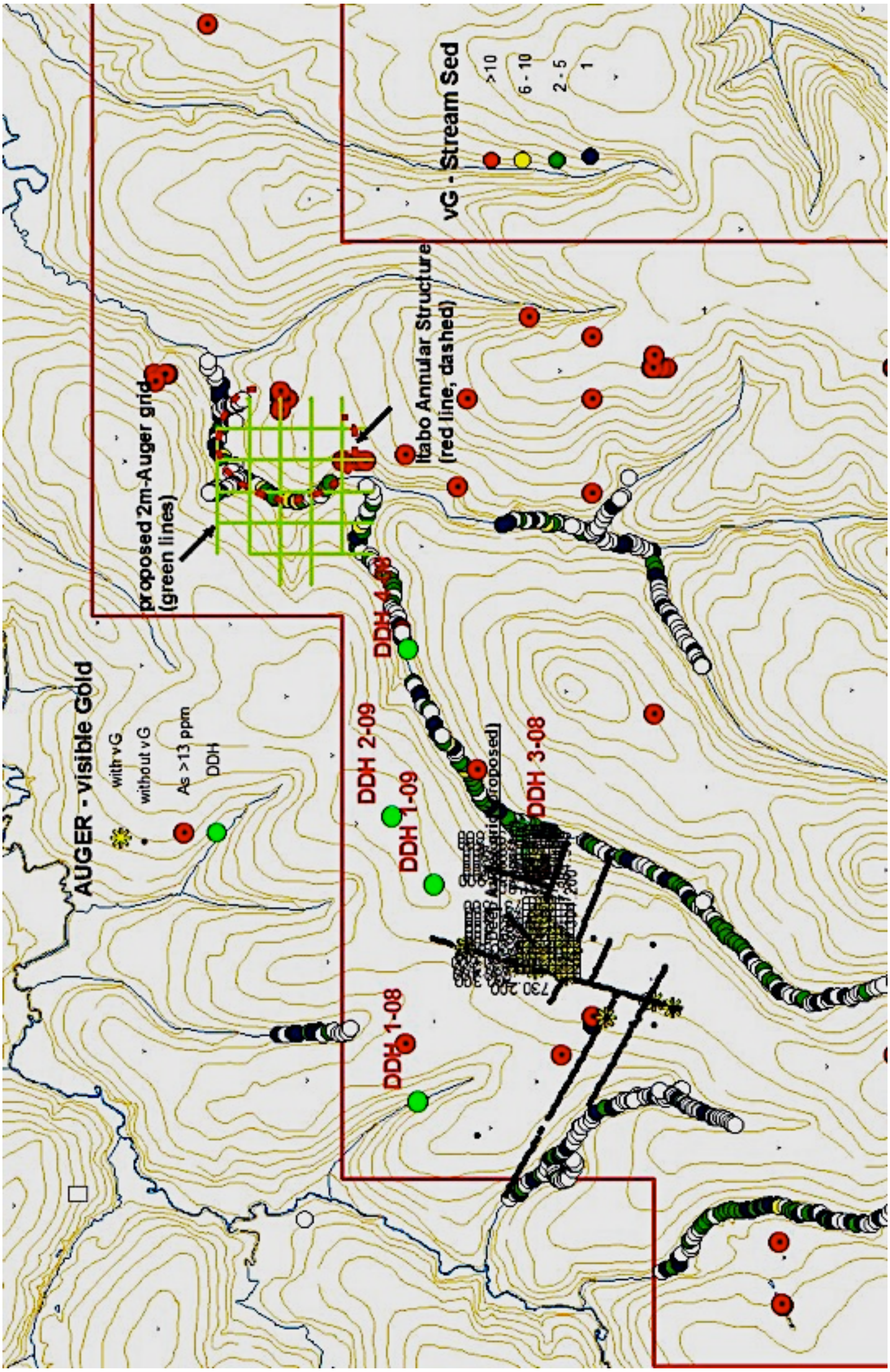
Deep auger and diamond drilling at the Itabo concession in 2007-2009



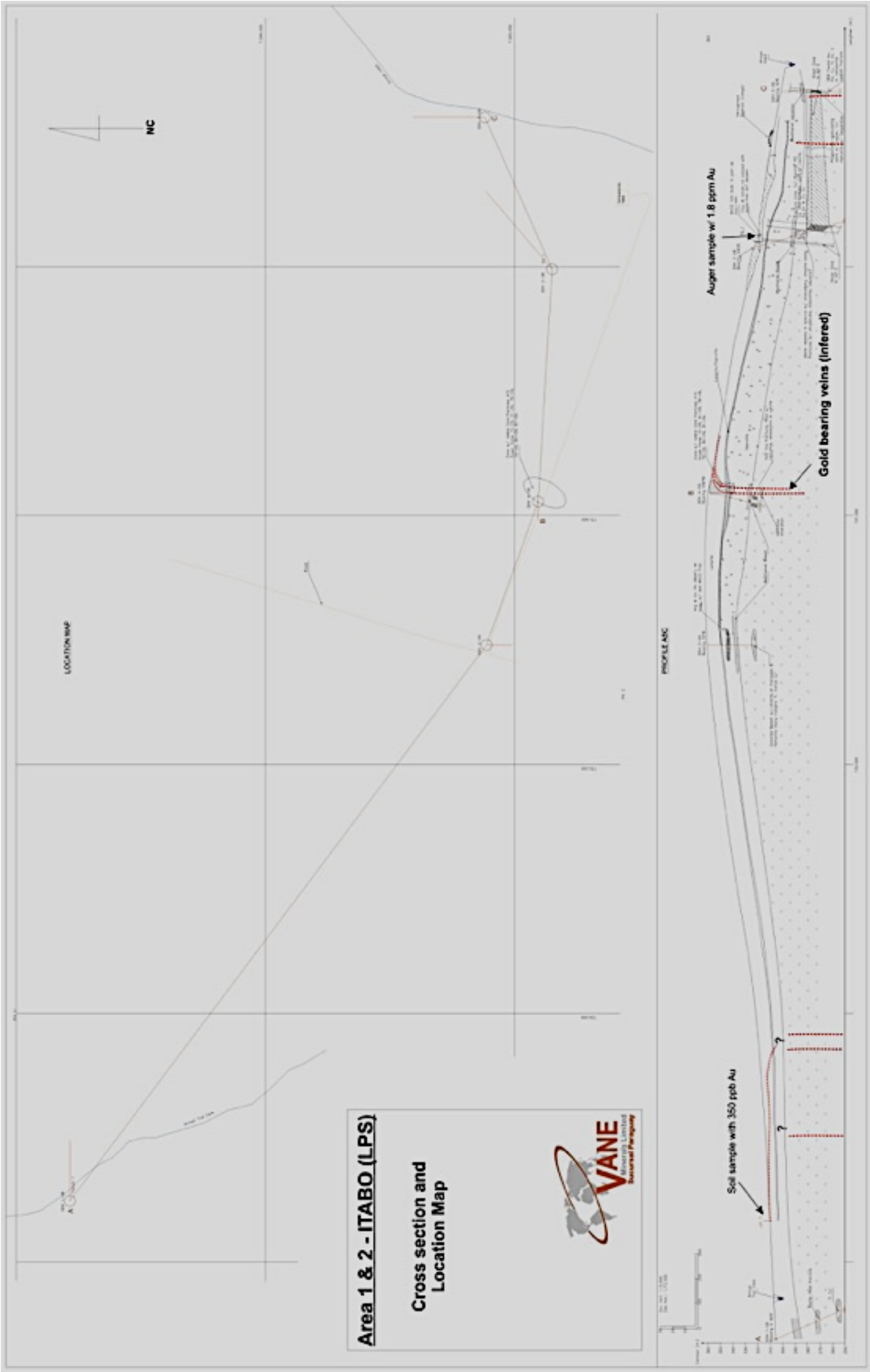
Deep Auger-hole map



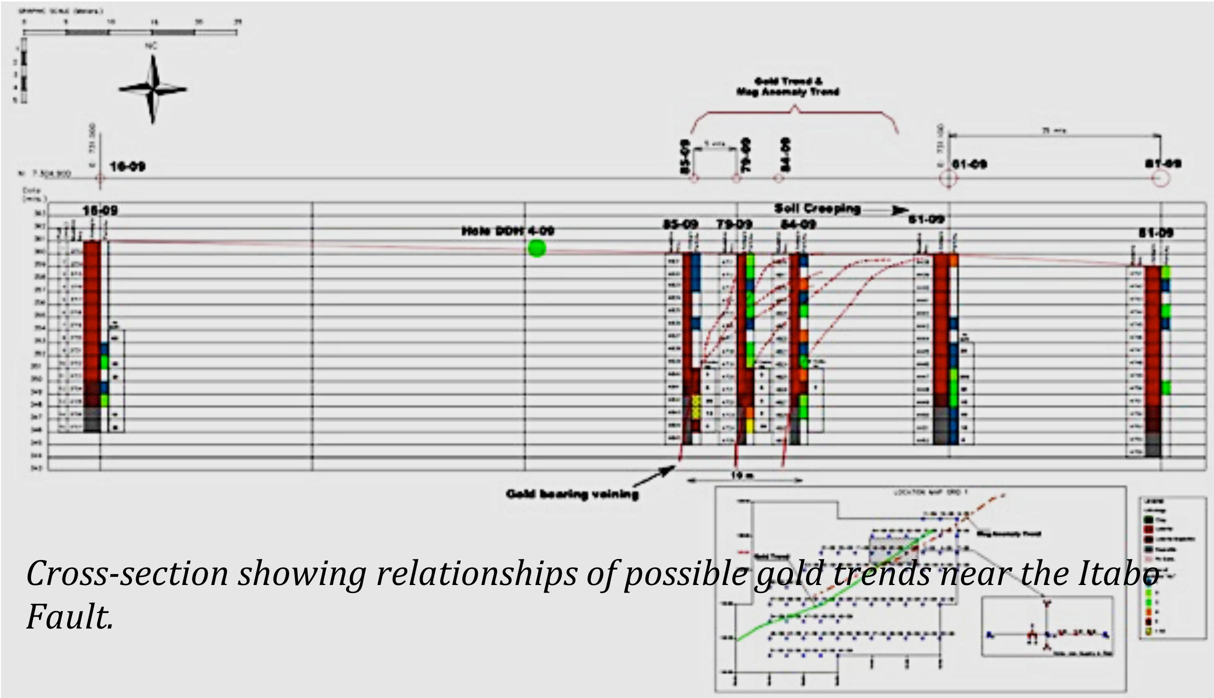
Ground magnetic anomalies, pan concentrates for gold, deep auger holes and diamond drill holes.



Map shows distribution of gold by number of gold particles in pan concentrates.



Cross section profile of areas of interest for gold



Cross-section showing relationships of possible gold trends near the Itabo Fault.

Deep Auger Program for gold

One of principal difficulties found exploring the Itabo Sur Concession is the fact that rock outcrops are scarce. Figure 1 shows a typical landscape of the Concession. The regional soil sampling program, each sample interval 0,25 m to 1,50 m, show values up to 350 ppb Au and it was a first step to locate anomalous areas. But those values are apparently erratic and difficult to reproduce, because of the nugget effect and possibly that the gold had been dissolved/leached by organic acids. Approximately 2500 soil samples have been taken and all have been concentrated by panning, but only a few dozen had visible gold.

After the diamond drill program, a soil-sampling program had been undertaken exclusive for pan concentrates, with sample interval from 0,25 m to 2,00 m. Those had more visible gold in the concentrates and it was a useful method to locate areas of special interest for the deep auger program.
A typical soil profile, based on 12 pits in the concession, shows on top of the saprolite a dark reddish colored lateritic horizon, very homogenous with a thickness ranging between 7 and 12 m. The thickness of the lateritic soil showed the need to find a method to reach the saprolitic horizon in to mineralized sections, where the visible gold from the 2-m soil sample originated.

Fig. 3: The images show different scenes of field crew operating the deep auger. 25% of core was sent for assay and 75% for pan concentrate.

To reach the saprolite horizon and in situ mineralization, Vane Minerals staff has designed a hand auger with a tripod, made basically of galvanized rods (Fig. 3). The tripod had approximately 9 m in height. The hand auger had 1,20 m rods and the bit with 30 cm and could reach a depth down to 15 m.

To deep auge program covered 2 areas (Fig. 2: Area 1 / Area 2) of interest, which had been set up on a grid 100 m apart (see deep auger grid map). Under normal condition the daily production was about 15 m and about 1 hour to the next. To operate the deep augering we required 3 assistants and one for sampling and descriptions.

All finished deep auger holes were sampled at 1-m intervals, where 75 % of the sample material was destined for pan concentrates and the remaining 25 % was bagged for geochemical assays.

Fig. 4: The images are showing the steps to process each sample taken for heavy mineral concentrates.

Results

The results from the concentrates show that some holes have distinctive higher visible gold content lined up in a NE-SW trend, which have been mapped with the stereoscope on air photos, but also noticeable as a gentle topographic break.

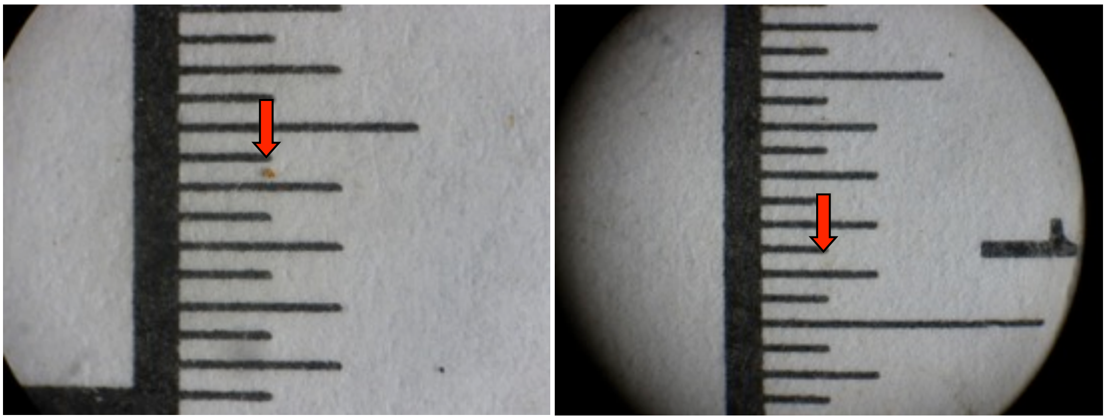


Fig. 5: Gold grains from the deep auger samples (red arrow), some are very fine. The scale divisions are in 0,5 mm.

The results have been processed in maps showing the gold in the laterite horizon, in the saprolite and in the transition zone between lateritic soil and the saprolite. Also cross-sections were prepared with countable (visible) gold grains per meter and also maps with gold grains per 5 m intervals.
Apparently there is a correlation between the presence of visible Gold and the very fine Magnetite, but concentrates with abundant coarse Magnetite were barren of visible gold grains.
In several concentrate samples we observed flakes of a silvery metallic heavy mineral (Fig. 6), which has not been identified until yet.
The map on Area 1 with the results from the pan concentrates outline a NE-SW gold trend, based on deep auger holes with higher content on visible gold. This apparent gold trend has been highlighted in the map with a yellow-dashed line. The strike of this trend shows up as a topographic break plotted with a red-dashed line in the E-W auger line profiles (see annexed Figures 7, 8, 9 & 10). Both, the topographic break and the gold trend, show a similar strike in the NE-photo linears. The photo linears have been interpreted form stereo photo pars.
These facts would mean that the principal strike of the gold mineralization is NE-SW and that gold is related to “softness” in the host rock, like argilization and possible mineral association with calcite, kaolinite, smektites and chlorites.

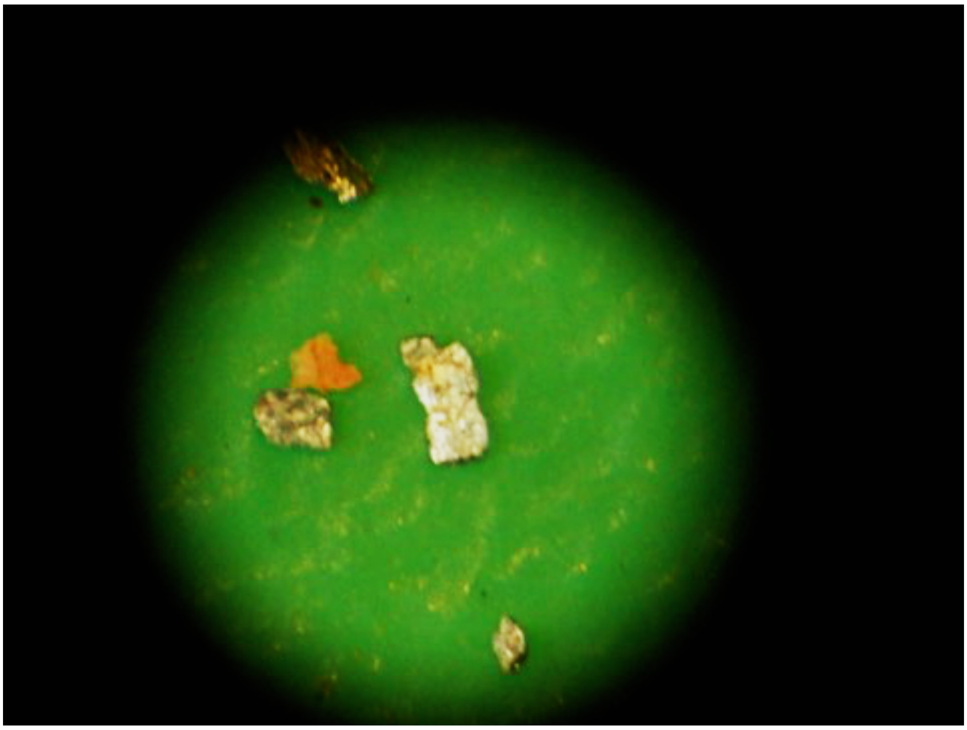


Fig. 6: silvery metallic heavy mineral grains had been found in several deep auger samples, which had also been seen in soil and stream sediments concentrates. Notice that the upper grain shows a light yellowish shine.

DA 1-09 to DA 65-09 are in Area 1 located and DA 66-09 to DA 76-09 from Area 2 and the holes DA 77-09 to DA 82-09 are offset holes on DA 61-09 (see Fig. 7). The best 3 DA holes on the regular 100 m grid (with more countable visible gold) are DA 15-09: 19 vG, DA 61-09: 18 vG and DA 54-09: 13 vG.
Initially it had been planned to do 25-m offset holes on those anomalous ones, but only six offset holes had been finished at this stage and which are all on DA 61-09.

All six offset holes have visible gold, but DA 79-09 has markedly higher content of visible gold: **66** countable grains, including the **1-m interval 13 to 14 m with 28** countable/visible particles.

DA 79-09 is located 25 m West of DA 61-09, showing a profile of red laterite (clayey) down to 11m. 11 m to 12 m is a transitional interval to saprolite, red and grey colored. From 12 m to total depth (14,60 m), the profile shows varicolored, argilized saprolite.

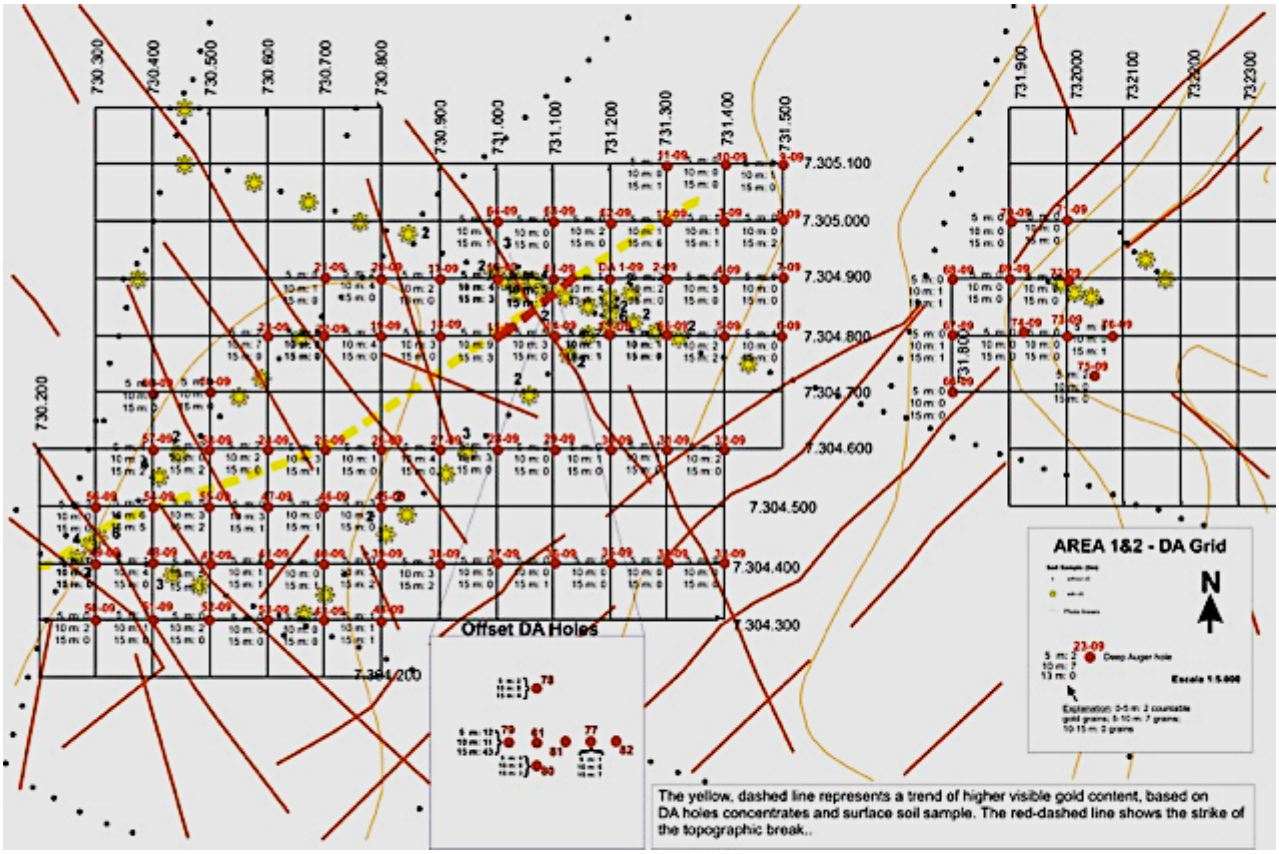
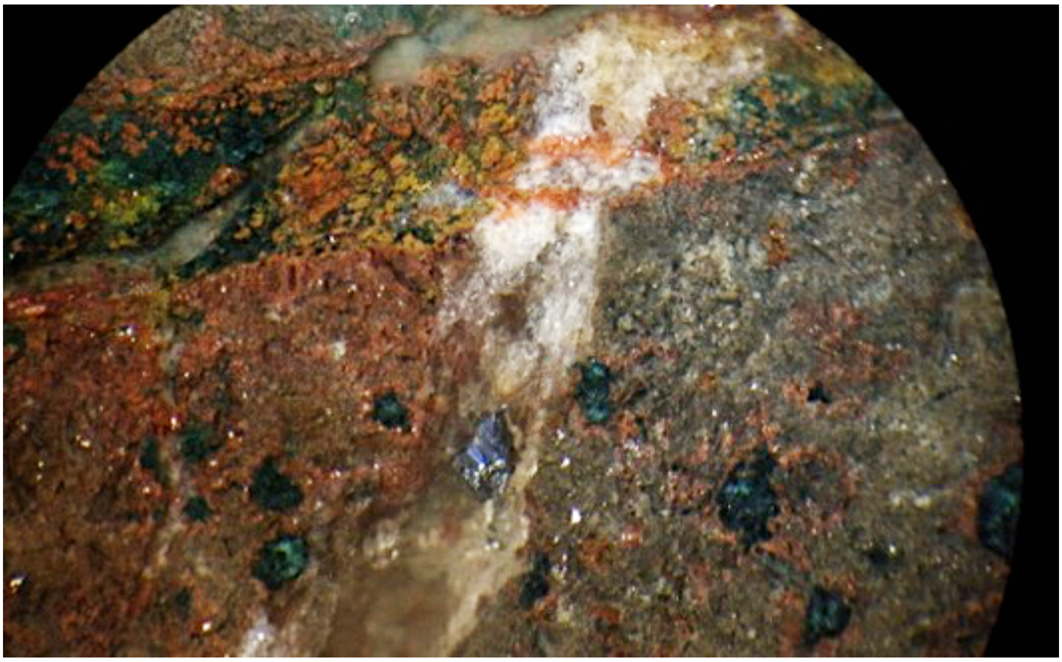


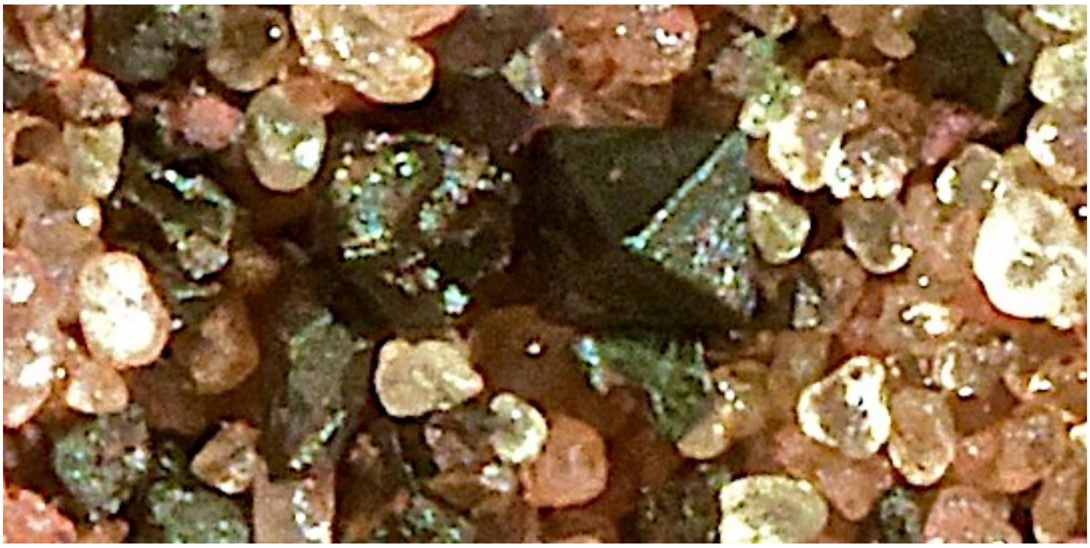
Fig. 7: Deep auger grid of Area 1 and Area 2, showing the visible gold "grades" from the sample concentrates in 5-m intervals. This outlined sector has an important argillic alteration.



The argilized saprolite in hole DA 79-09 shows high smektite content, distinctive to all other DA holes. Also has relative high MnO^2 and white kaolin content, while the "high grade" interval (13-14 m) shows violet and bluish green coloring.

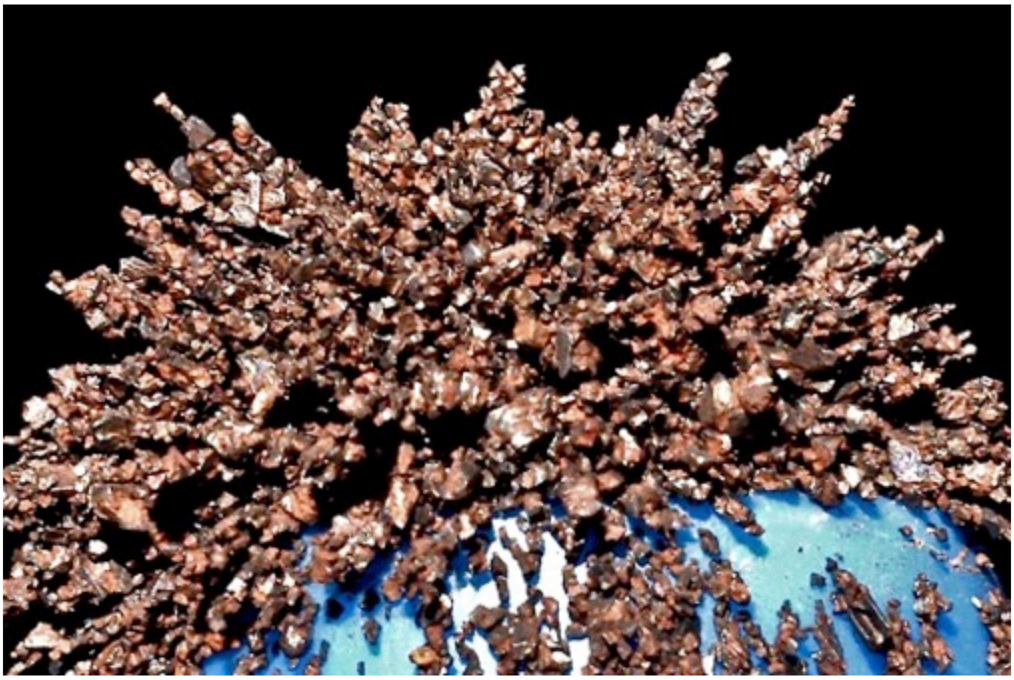
The Titanium-Vanadium Magnetite discovery

We took a concentrate sample panning sediments from the stream.



Looking through the hand lens it became apparent that the sands contained well-formed octahedral magnetite crystals.

After drying the concentrate, we noticed that 99% of the black sands were magnetic, which became evident with the respective microscopic analysis.



View shows high magnetic property of the black sands at Itabo.
All black sands were picked up with a hand held magnet.

After inspecting the black sands on top of the road, it became immediately clear that the particles were octahedral and that all the black sands turn out to be magnetite and not ilmenite.
We also tested the laterites and noted that 100% of all the pulverized laterite is 100% magnetic, implying that these laterites are saturated with magnetite, a quite unique scenario.
Assays from the laboratory showed that all samples of the magnetite collected on top of the road and all samples in the laterites in the Itabo concession had a high grade of Ti02 and Vanadium down to the saprolite.

View of black sands in microscope show the octahedral Ti-V magnetite crystals.

This discovery turned the Itabo Project with the gold and the Ti-V magnetite into a world class mining deposit, easy to prove its reserves and may go into production in less than four years, where the mining costs are less than $5/m3 and $5/ton in the concentration process with manifold profits. In view that one may have several simultaneous exploitation facilities, considering the low costs of energy, stable politics and the lowest tax regime in the continent, it is most practical to convert the commodities of Itabo into potential final products: Au, Fe, Ti02, V205, FeV, FeSi, Si, Al plus the Cu, Co & Zr in certain sectors.

General Geology at ITABO

The overall geology in eastern Paraguay with the border of Brazil and to the south with Argentina are early Cretaceous Parana basalt flows from the rift, which started to separate South America from Africa about 130 million years ago. These basalts are covering Permian eolian sandstones. The flows in Brazil may be over 1000 meters thick, while in Paraguay one encounters the initial flows up to two hundred meters thick. The Permian deposits are about 270m above sea level west of Itabo and the basalt at Itabo border around 400m above sea level.

View of the basalts to the right and Permian sandstones below to the left.

The basalt outcrops are only seen near the edge of the drop off about 30km to the west of Itabo. Different fracturing of the basalts show they are somewhat different to each other. Each flow is often just a few to tens of meters thick. In Itabo the basalt outcrops are only seen near the creek about 10m below the flat agriculture surfaces. The Ti-V magnetite contents will vary in each basalt flow, but the contained value of the Ti-V magnetite will always be economic in relation to the low cost to mine the ore in the laterites.

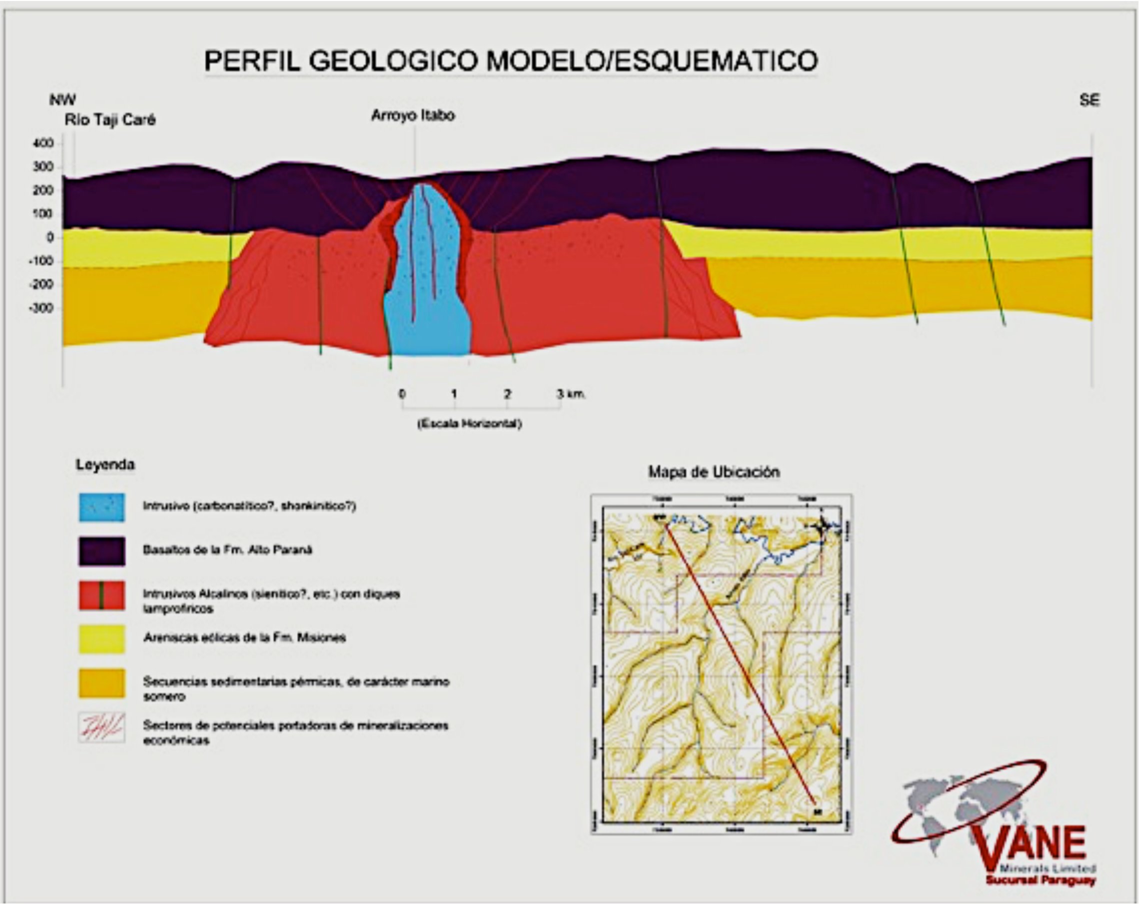
Views showing different types of basalt flows.

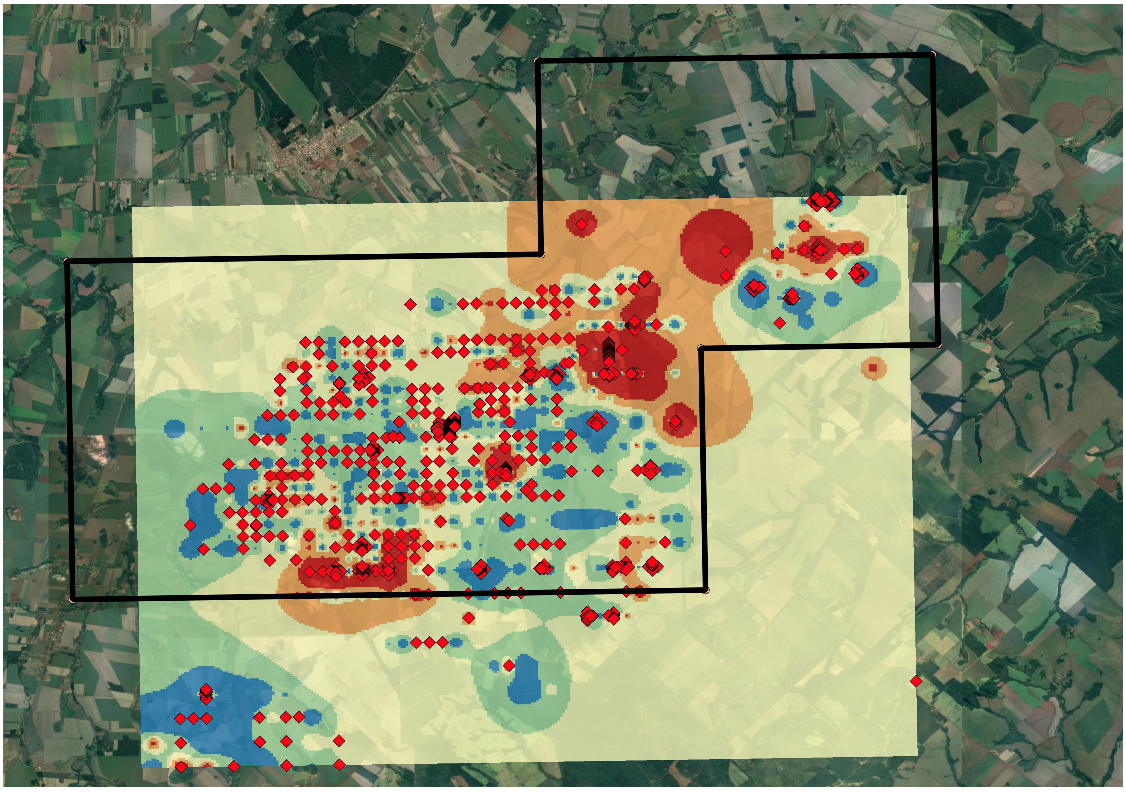
Views showing different types of basalt flows; the Ti-v content is quite consistent for the different flows.

The ITABO Fault

The district has been initially scouted for the high gold and copper anomalies located close to a depression in the center of the ITABO concession. This depression has a SW-NE direction highlighted with a small creek. This sector appears to be locally mineralized with gold, copper and cobalt which might be a suture where the first basalt flows emanated 130 million years ago. The more distant basalt flows have little or no economic potential for the above-mentioned economic elements. The exploration work done for gold and copper has been described in previous pages of this report.
Local alteration and mineralization is evident in the core by the presence of argilized saprolite, smektite, chlorite, k-feldspaar, specularite , among others. In the drill-core one could observed under the microscope gold, native copper, malachite, stibenite, arsenopyrite and pyrite.

Map showing inferred Itabo Fault and related structures where the high gold anomalies were located. It also shows the initial sample locations for the Ti-V magnetite.


PERFIL GEOLOGICO MODELO/ESQUEMATICO
NW
Rio Taji Caré
Arroyo Itabo
SE
400
300
200
100
0
-100
-200
-300
0
1
2
3 km.
(Escala Horizontal)
Leyenda
Intrusivo (carbonatítico?, shonkinítico?)
Basaltos de la Fm. Alto Paraná
Intrusivos Alcalinos (sienítico?, etc.) con diques lamprofíricos
Areniscas eólicas de la Fm. Misiones
Secuencias sedimentarias pérmicas, de carácter marino somero
Sectores de potenciales portadoras de mineralizaciones económicas
Mapa de Ubicación
VANE
Minerals Limited
Sucursal Paraguay



Views of the depression in the Itabo concession reflecting the SW-NE structure interpreted as the Itabo Fault which has mineralized the zone with gold, native copper and cobalt.

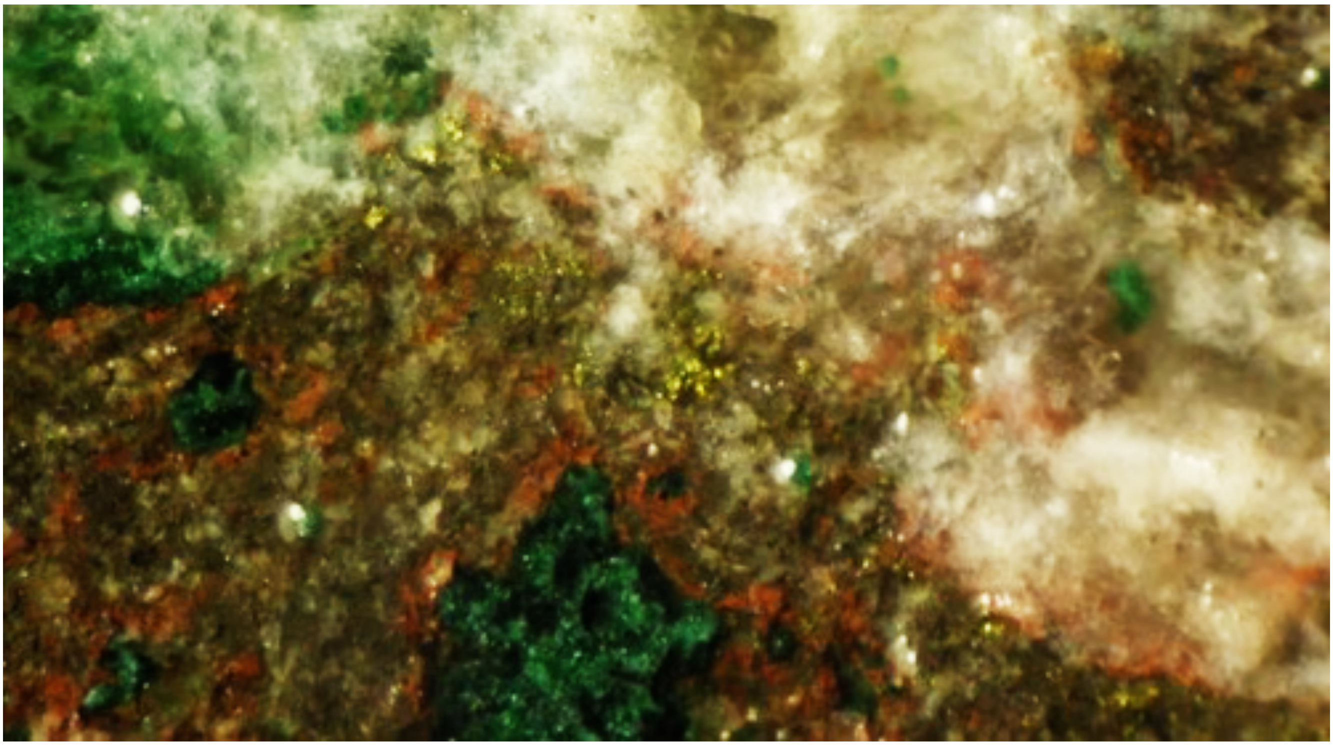
View of local deposit of ferricrate.

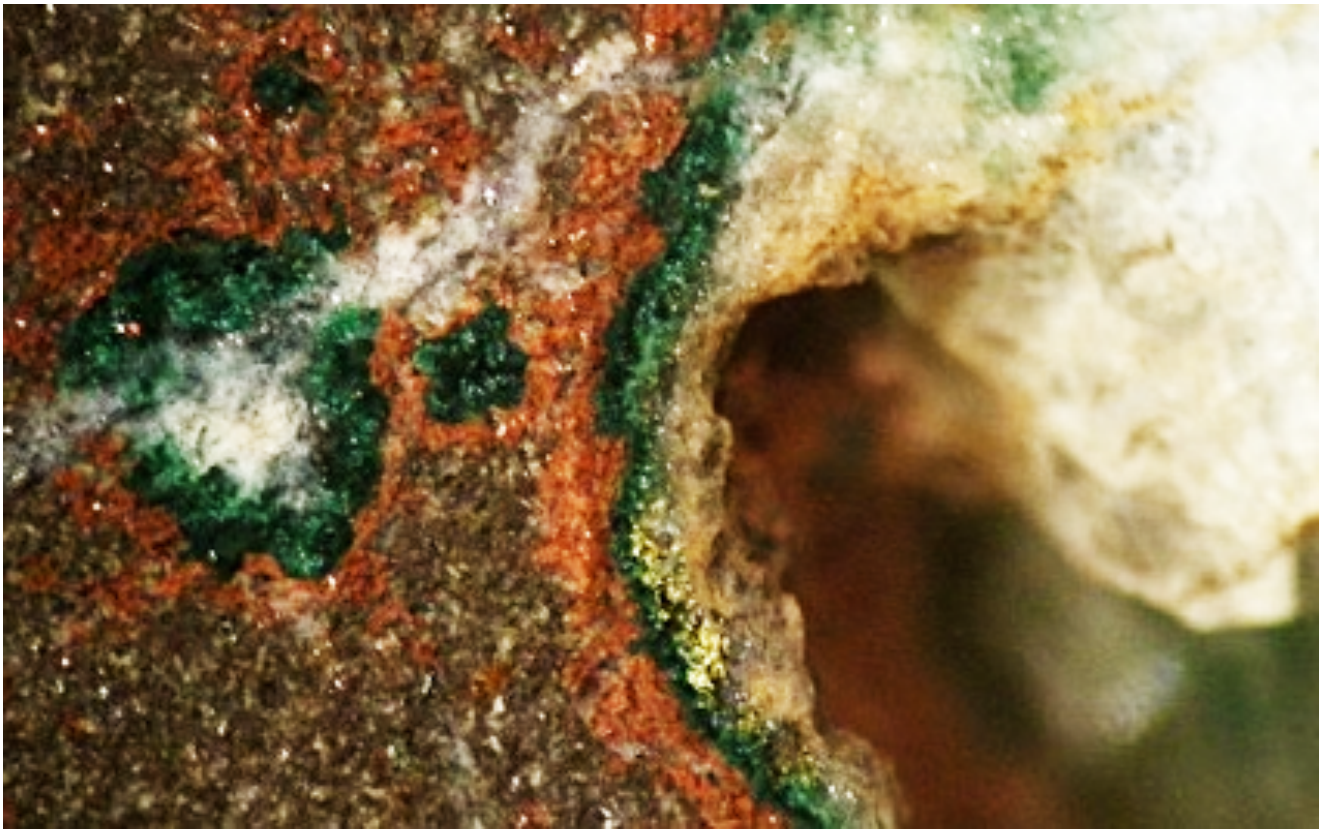
Economic minerals in the laterites

The laterites are quite uniform over the whole concession with a thickness between 7 to 10 meters. The overall concession over the 37.300 hectares has the economic grades to be mined for the Ti-V magnetite; for practical purposes some areas might not be mined and and the district surrounding the ITABO Fault would have the additional commodities for Au, Cu, Co and Zr.

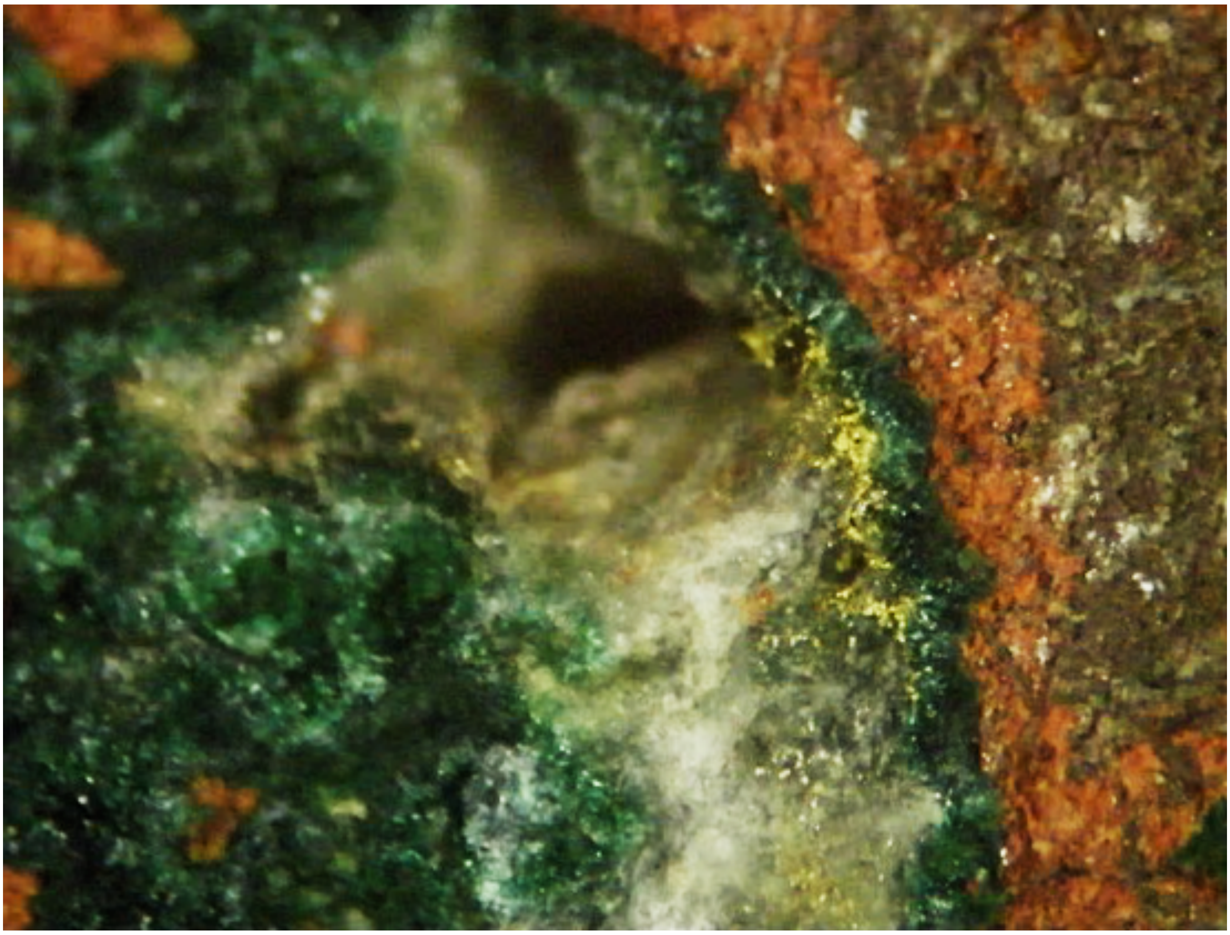
Gold

Initially the Itabo project was scouted in detail for its gold and native copper potential by Vane Minerals for several years until they dropped the project after the 2009 economic recession. Several targets have been identified around the Itabo Fault covering an area over 5.000 hectares. Panning in small streams, shallow and deep auger pits and drill holes had favourable results to continue the exploration program. Possibly there is not enough gold in the laterites to justify a placer operation just for the gold, but it would certainly justify to separate the non magnetic heavy fraction and isolate the gold, native copper, zircon and possibly cobalt.
It is very difficult to assay coarse gold. A normal sediment sample is crushed to -200 mesh and sieved. Native gold particles will not crush, but flatten out and will get lost in the sieve. The highest soil sample assayed 1.8gr Au near drill hole #2.
That is why Vane Minerals with Wilmar Bartel panned every sample and counted the gold particles in a pan. In several occasions in samples from the deep auger holes, 5kg were panned and up to 25 particles of gold recovered. These 25 particles weight about 4mg, which adds to 0.8gr Au/ton, where one may expect laterites near the mineralized zones with an average of 0.2gr Au/ton as a “free” sub product of the whole operation.

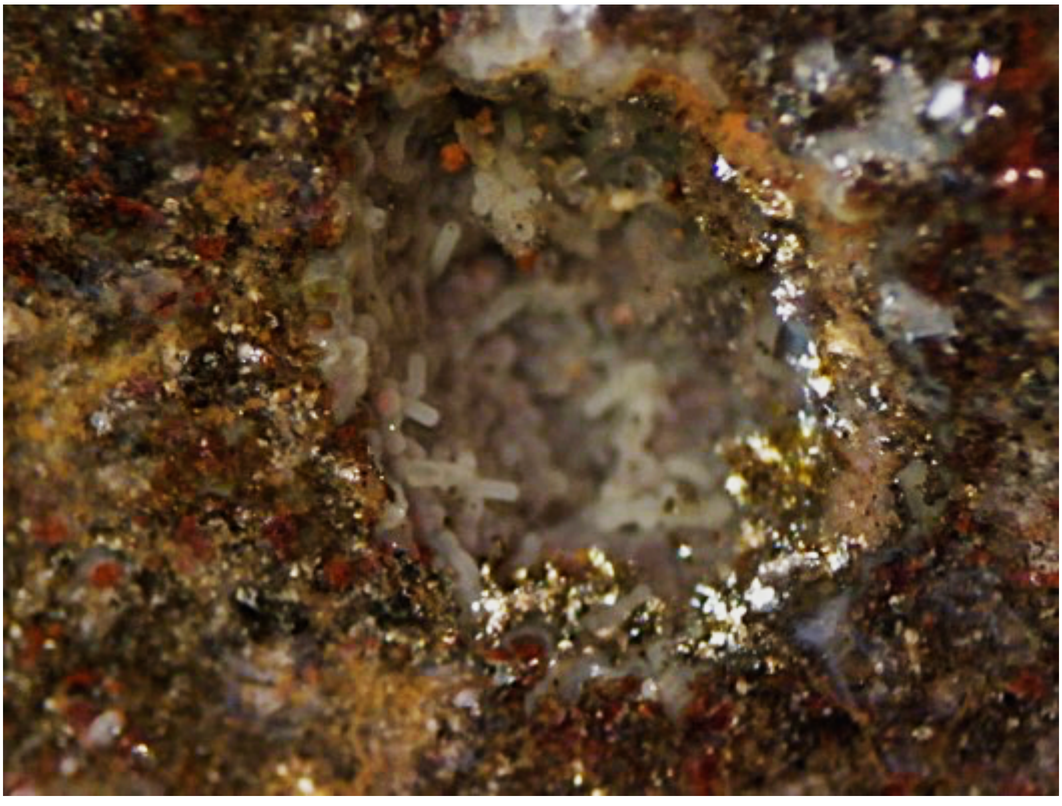


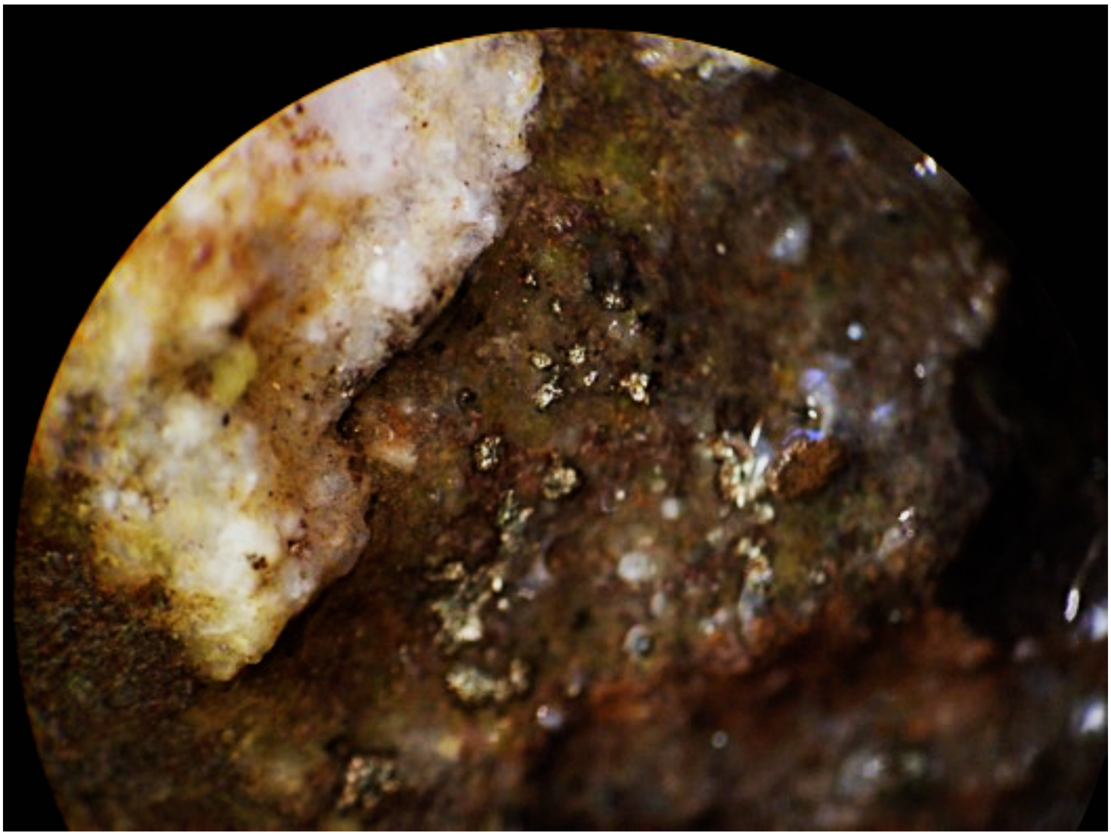


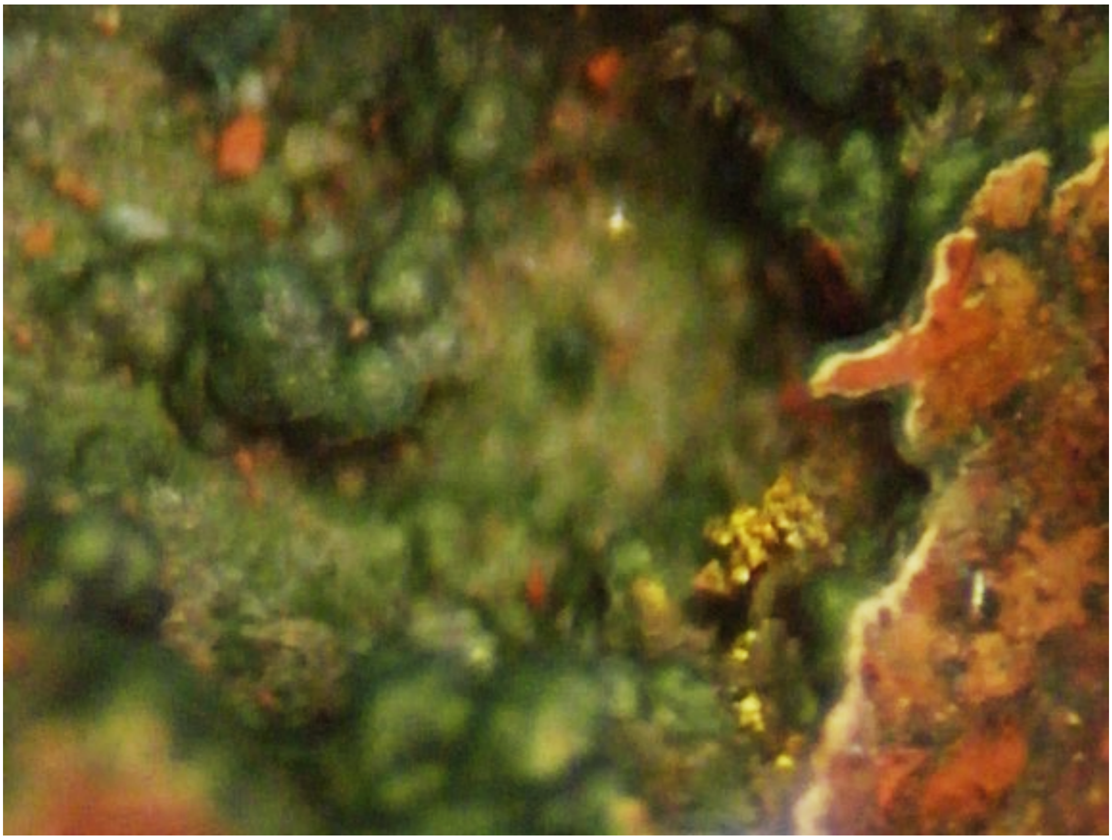
Microscopic view of the gold particles located next to the quartz and the native copper.



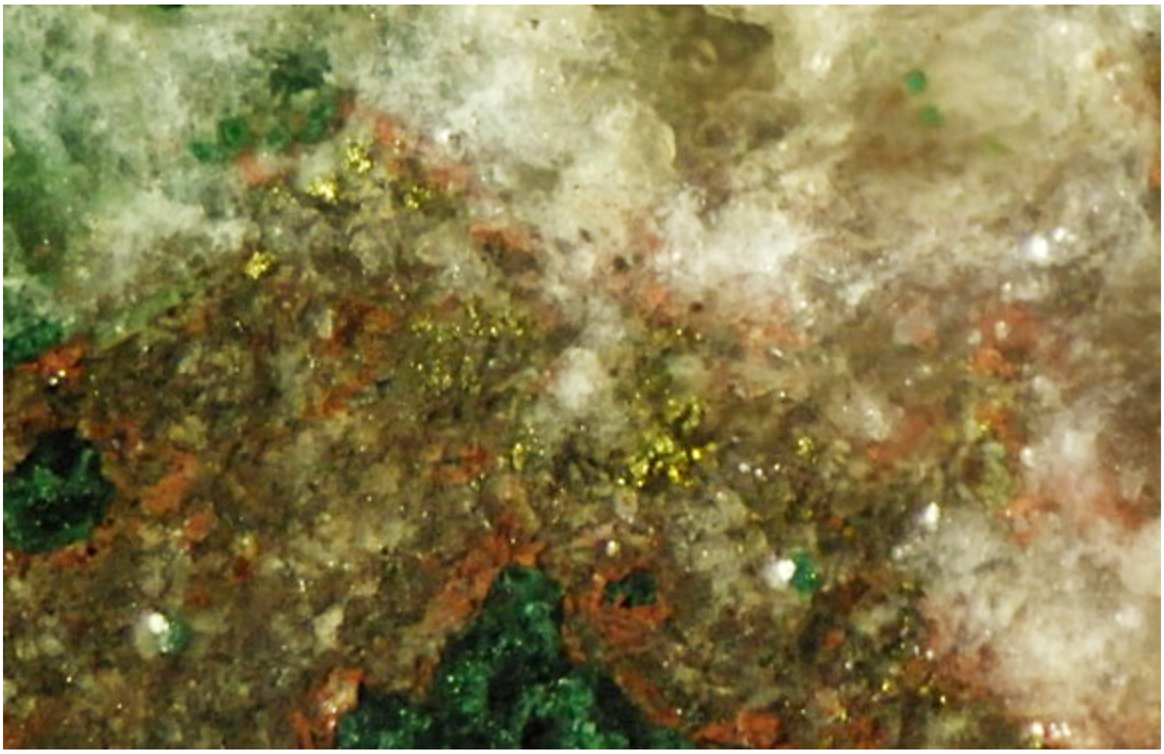
Quartz & chloride flooded vugs with gold at the edges.







Microscope image of gold particles at the border or inside the quartz



Examples of native gold deposited at edges of vugs along with quartz and chloride seen with microscope in cut core of drill hole No.4

Ti-V magnetite

It came as a big surprise that the abundant black sands on the roads were magnetite, easy to recognize by the octahedral crystals. To confirm this, we sent two samples for microscope analysis at the Politécnica University in Quito, where they concluded that almost all the sands were magnetite with traces of Goethite, Limonite, very little Ilmenite, Franklinite and, of course, Quartz.

The overall average content of the Ti-V magnetite is around 20%; grades do not vary from the surface down to the basalt. Therefor one would mine all the laterites with no stripping ratio.

Reserves are over 5 billion tons of laterite with and estimated content of 20% Ti-V magnetite totalling 1 billion tons, with values in the magnetite averaging 47.5% Fe, 20.6% Ti02 and 0.621% V.

Inferred reserves of iron total 830 million tons; pig iron produced from this magnetite is considered of high quality.

Titanium

The Ti02 content in the magnetite averages 20% and represent about 190 million tons in the project. To compare with the Ti-V magnetite mined in Bushveld-South Africa, where it assays in most places around 12% and only in Villa Nora Body 18.6%; in Kurihundi-India it assays 20 to 22.59%, in Kashkanarsky-Russia the concentrate holds only 3.6% and in Gusevogorsky-Russia 2.5%.

The Ti02 may be separated as slag after the magnetite has been melted in a furnace. The quality of the Ti02 is much better if its sourced from magnetite than from ilmenite.

Considering the low cost of energy, it would be of interest to produce titanium metal by electrolytic methods. Titanium metal current price is around $50.000/ton Ti compared to $3000/ton Ti02 and to $200/ton Ti-V magnetite. Once again it is clear that the final product is where the profits are and the best opportunities to do so are in Paraguay.

Vanadium

The V205 content in the magnetite averages 0.62%. Resources with more than 0.3% V205 are considered of economic interest by itself. Even in a hard rock mine, 0.62% V205 is a very attractive resource by itself, but in Itabo it is mined at very low cost along with the iron and titanium and other sub-products.

85% of the Vanadium is obtained world wide from the Ti-V magnetite. In Bushveld-South Africa, the Ti-V magnetite assays in some areas 0.4% while in others around 1.6%. In Gusevogorsky-Russia the concentrate holds 0.59% and in Kachanarsky-Russia 0.60%. In Kurihundi-India it assays 0.85% to 1.15% V205.

The inferred reserves of V205 at Itabo are over 6 million tons.

World production is 80.000tn/year.

Vanadium oxide flakes sell around $15/kg; 95% pure vanadium cost $20/lb and 99.9% pure is worth about $3 million/ton.

Ferro-vanadium steel prices range between $25.000/ton & $100.000/ton, another example that finish raw material should be processed in Paraguay.

The average content of V205 in the magnetite is 0.62% and in the overall Itabo laterite is 0.125% or 1.25kg/ton.

Iron

Pig iron would be an initial product in the smelter to obtain the slag, which contains the Ti02 and the V205. Pig iron produced from magnetite and with very low phosphorus content is well sought after in the industry. Currently, average iron ingots sell in Paraguay for $900/ton.

The reserves in Itabó are 800 million tons, certainly enough to justify a smelter in its vicinity, where required infrastructure and power is available.

The iron may be converted into FeV, among the most expensive steel on the market. Nearby there is the required quality of highly pure quartz over 3cm diameter to produce silicon steel. Silicon steel is undoubtedly the most important soft magnetic material in use today. Applications vary in quantities from the few ounces used in small relays or pulse transformers used in generators, motors, and transformers. Paraguay requires huge amount of transformers.

Aluminum

The bauxitic clay is easily separated by washing the laterites. Testing the black sands, 99.9% of the particles are picked up with a magnet.

The bauxitic clays and quartz sands will be settled out in ponds, which represent about 80% of the laterites, with about 26% of bauxitic clays.

Economics to obtain the bauxitic clays as a by-product certainly warrants to install an aluminum factory in the same location RTZ had planed to build one eight years ago.

The aluminium may aldo be processed from bauxitic clays, which is the product of the lateritic leaching process that took place in the basalts. Bauxitic clays have been found in Brazil and Colombia where Rio Tinto is currently exploring similar clays at "Morales-Cajibió¨ for a few years.

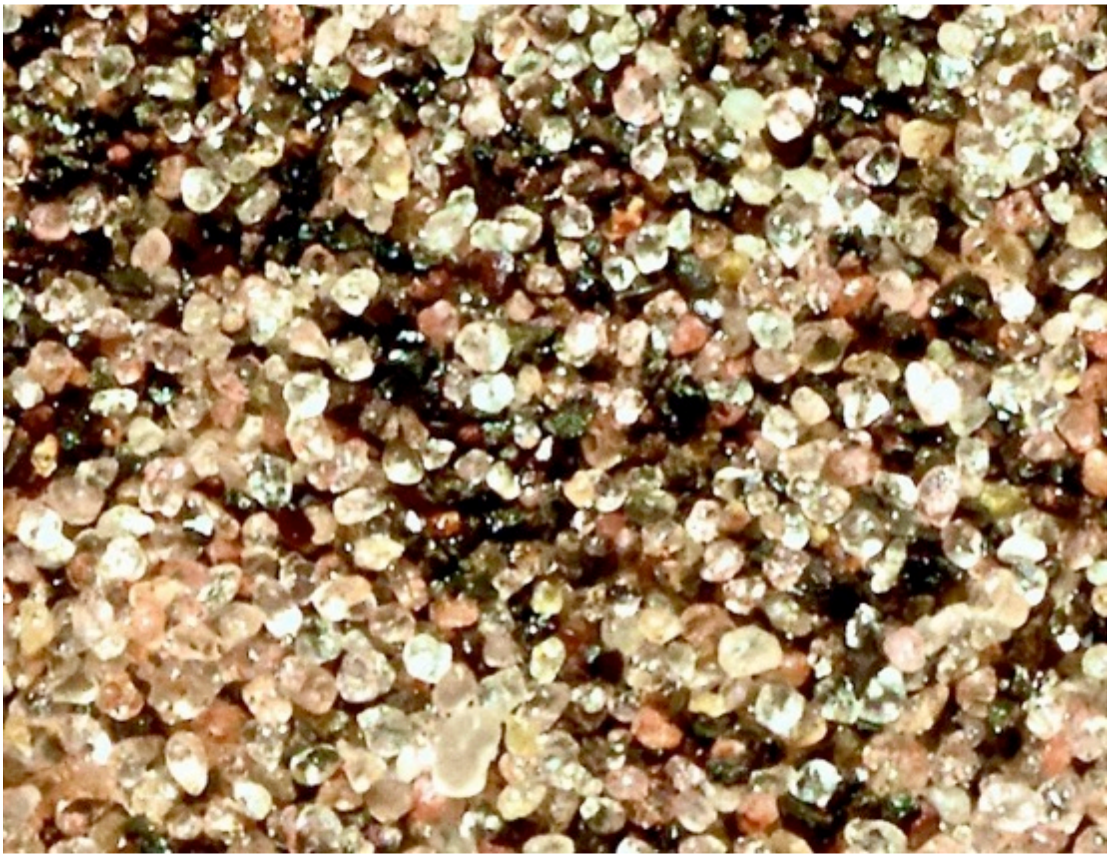
Samples collected from the bauxitic clays in Itabó have been washed with water and the total alumina grades have been upgraded to values >45% Al2O3 and the total silica has been reduced to values <20%, generating similar products to those of the "Los Pijiguaos" aluminum mine in Venezuela. While washing the magnetite in the laterites , these bauxitic clays could be exploited as a byproduct to obtain the required cliachite for aluminum.

About 4 years ago, due to low energy costs, RTZ wanted to build an aluminum processing plant in Paraguay, importing the bauxite from

Brazil with a $4000 million investment. RTZ wanted to pay $35/megawatt, while the government wanted $45/megawatt. In view that RTZ had large transportation costs for the raw material, this project could be reinstated, considering that the bauxitic clays would be a cheap by-product located just north of where RTZ wanted to install the processing plant; the plant could be built on site next to the power line. With a **single operation**, mining one hectare or 100.000 tons a day of laterites would amount to 19.800 tons of clay containing about 10.000 tons of aluminum, enough to justify the plant. With 5 operations, the company could have a feed of 50.000 tons Al/day.
Total inferred reserves of aluminum are 680.000.000 tons

Quartz

The reminder of the washed laterites is an average of 32.7% quartz sand. The crystal clear and well-rounded quartz grains over 10 mesh in size might very well apply for **fracking** in the oil industry, which is required, for example, in Brazil.
Total reserves of quartz is 1´630.000.000 tons quartz sand

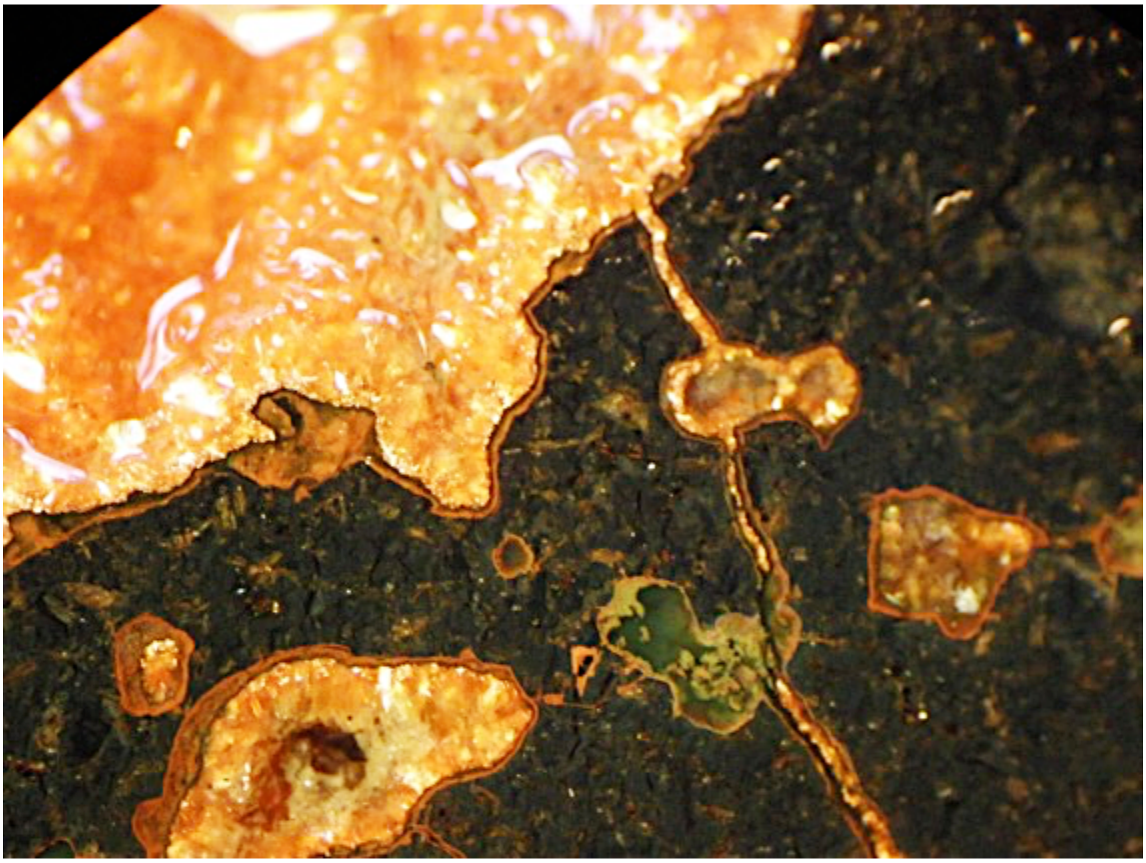


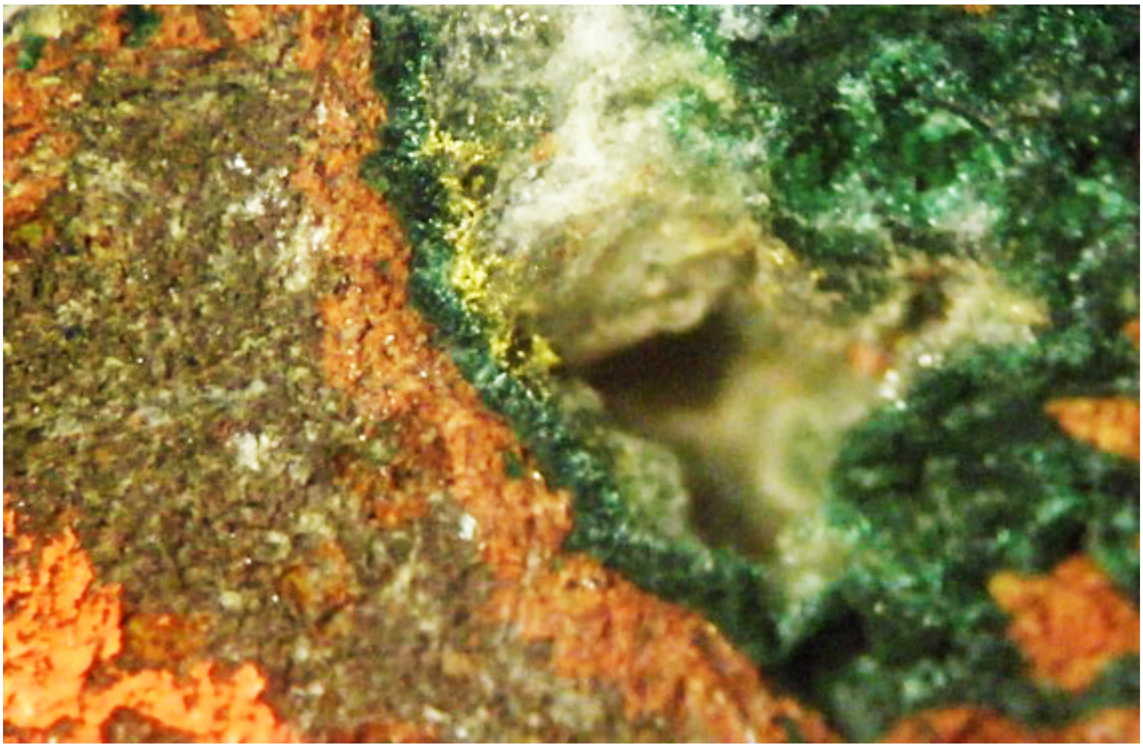
View of the well-rouned crystalline quartz sand optimal for fracking sand in the oil industry.

Native Copper

The other commodity Vane Minerals was following up in Itabo was the potential for copper, which is known to occur in the basalts up to 0.2% Cu. In many areas near the Itabo Fault native copper was seen while panning the laterites over an area of 5.000 hectares. It has also been see in the core of the diamond drill holes. Assays of the core, as well as in the laterites are around 150ppm-300ppm; but the problem with native copper is the same as gold, where the metal will flatten out and be thrown away with the coarse fraction in the sieve, while only the -200 mesh fraction is assayed. The sample Ti-14 was a 1 to 3 concentrate of the laterite, which assayed 1340ppm Cu.

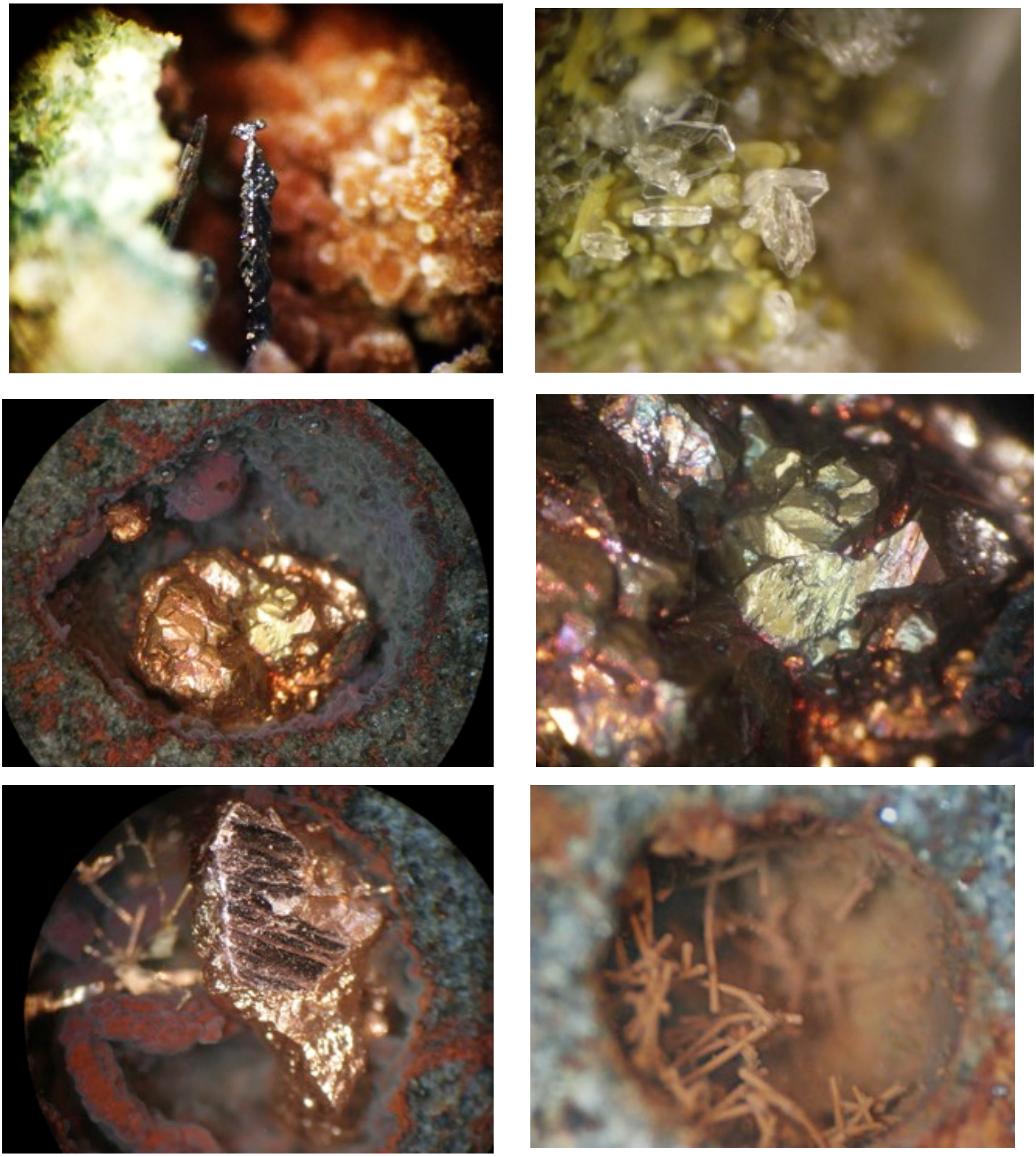
View of native copper in core sample.





Views of native copper in or around vugs in the core of Drill hole No.4 into the basalt.

Other minerals found in the core of Drill hole No.4



Examples of other minerals located in the vugs in the core of Drill hole No.4, possibly stibenite, barite, pyrite and others.

Cobalt

The cobalt has been noted by Vane in their scouting for the gold and copper with consistant high anomalies in certain areas over anomalies totalling over 5.000 hectares. Values between 300ppm to 600ppm have been obtained in the vicinity of the Itabo Fault. Due to acid digestion problems, we have not been able to reproduce these cobalt values with AlsChemex. We also do not know in what form the cobalt is found. Most often cobalt is found in nature as an arsenate, but arsenic values are too low, hence, if cobalt is present it would be a different mineral. In 2018 we considered to review this mining district for the gold and copper potential. Reviewing the assay results for cobalt, it was noteworthy that the anomalous are for gold and copper was also anomalous for the higher values of cobalt around one pound Co, currently a commodity of great value.

View of the highest cobalt values, which line up with the SW-NE Itabo Fault.

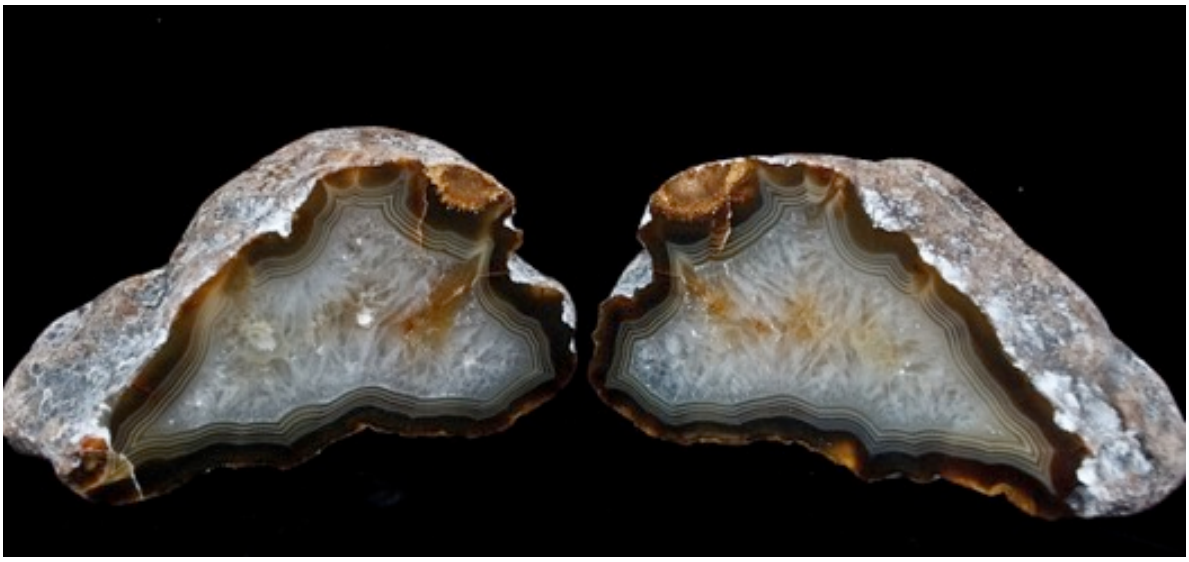
Zircon

As with all heavy non magnetic concentrates, zircon will be present.

There is an average of one pound of zircon per ton; in view that is a easily to separate mineral in the non magnetic heavy fraction along with the gold and copper, it would add the total output.

Agate

The laterites do not contain any hard rock particles, except in the depression by the river. In this sector one encounters agates, which would be separated in a de-rocker. These agates have an ornamental value greatly appreciated in Asia. It may be sold in bulk for $5000/ton.



In certain areas close to the Itabo Fault, agates are found which are commercially mined in Brazil, Uruguay and Argentina for the gem industry.

Sample collection at Itabó

In general, the magnetite samples were collected with a hand-held magnet and the laterite samples about 50cm deep using a posthole digger. The XRF unit also gave relative good results for Fe, Ti and V, particularly taking an average of several readings.

Soil and magnetite sampling at Itabo. Values indicated by XRF-unit are similar to laboratory assay results.

Laterites only outcrop along road cuts. View of outcrop several meters thick. XRF unit show similar values from top to bottom.

	A	B	C	D	E	F
1	Sample	%Fe	%Ti02	%V205	%Al203	%Si02
2						
3	Magnetite					
4	Ti-05	(28.40)	(10.49)	(0.471)	(6.18)	
5	Ti-09	(32.70)	XXX	(0.316)		
6	Ti-11	(15.20)	XXX	(0.240)		
7	Ti-12	31.25	13.85	0.373	15.05	17.55
8	Ti-14	34.84	12.60	0.446	10.35	17.80
9	Ti-17	35.25	14.45	0.437	12.80	14.65
10	Ti-19	33.16	17.25	0.499	12.65	15.65
11	Average	33.62	14.53	0.445	11.46	16.41
12						
13	Magnetite recalculated pure					
14	Ti-12	46.64	20.67	0.557	22.46	26.19
15	Ti-14	48.40	17.75	0.628	14.58	25.07
16	Ti-17	48.96	20.07	0.607	17.78	20.33
17	Ti-19	46.10	23.96	0.693	17.57	21.72
18	Average	47.52	20.61	0.621	18.10	23.32
19						
20	Laterite					
21	Ti-04	14.95	2.75	0.123	(9.35)	
22	Ti-06	18.95	3.74	0.157	(8.18)	
23	Ti-13	16.36	4.07	0.127	25.5	32.8
24	Ti-15	16.15	4.69	0.129	25.0	32.4
25	Ti-16	13.16	3.52	0.084	28.1	34.7
26	Ti-18	15.04	3.73	0.121	27.4	32.0
27	Ti-20	17.72	4.05	0.137	24.6	31.8
28	Average	16.04	3.79	0.125	26.12	32.7
29						
30						
31	Ferricrate					
32	Ti-07	41.80	(0.15)	0.203	4.88	
33	Ti-21	47.21	1.18	0.332	7.69	10.20
34						

Reserves at the Itabo Multimetal Project

The overall area of 37.300 hectares is covered by laterites which were derived from the underlying basalt, rich in Ti-V magnetite, with values in the magnetite averaging 47.5% Fe, 20.6% Ti02 and 0.621% V. The total inferred reserves are 5’000.000.000 tons of laterite with initial estimates around 1.000’000.000 tons Ti-V magnetite, which contain 800.000.000 tons Fe, 190’000.000 tons of Ti02, 6’000.000 tons of V205; one may also consider the aluminum with 680’000.000 tons and the quartz sand with 1.630’000.000 tons.

Typical view of the laterite fields at Itabo. Dark red color of laterites are indicative of the high Ti-V magnetite content which averages over 20%.

Mining laterites

Mining a laterite is comparable to separate the same desired product from the pulp or milled primary rock, with the difference that the laterite has already a higher concentration of the commodity, because all soluble minerals around it have been washed away over millions of years. By mining a laterite, in this type of operation one has already saved the initial expense in a hard rock operation, which excludes to mine, crush and mill the primary ore.

One may compare the laterite mining at Itabo with the beach sand operation for ilmenite at the Moma Mine in Mozambique (page 69), which is the largest placer operation for illmenite in the world.

Mining the Ti-V magnetite in the laterites is a similar process to mine the gold in an alluvial, but in this case all the rocks have already been removed. To obtain the gold, the final stage is separating it from the concentrated black sands. But these recovered black sands in this project consist mainly of the Ti-V magnetite. Hence, the obtained Ti-V magnetite is already in place for the gold extraction.

To summarize, comparing the extraction of the gold, the magnetite and the other secondary heavy mineral commodities in laterites with the traditional gold extraction in alluvial placers, the operation does not require a de-rocker nor sophisticated equipment to separate the black sands and gold from the source. The gold located in the laterites in the Itabo structure probably will prove to be an economic mining operation by itself.

The contents of the Ti-V magnetite in Itabo is at least 20%, which would yield over 0.30 tons ore per cubic meter of laterite.

While consulting in 2003 for two years for DuPont to locate titanium ore in Peru, Alexander Hirtz visited their plant in Gainsville, Florida. The black sands are their main Ti02 source worlwide, where they have a very large floating plant on an artificial lake. Their operation consists in separating all economical commodities, mainly pseudo-leucocine, magnetite, rutile, zircon, garnets, staurolite and quartz sand. The gross sale of all these commodities were **$20/yard** and this operation was the most profitable one of the DuPont enterprises.
If the commodities at Itabou are processed in Paraguay, one may obtain several hundred dollars worth per cubic yard of laterite.

RMS-ROSS
CORPORATION

Tuesday, January 29, 2019

Capitan Bado Titanium Vanadium Magnetite Alluvial Ore Project

RMS Review and Extraction Process Summary

Attn: Mr. Alexander Hirtz

RMS-Ross Corporation is a privately-owned boutique firm that specializes in the engineering, design, manufacturing and distribution of an extensive range of heavy duty, quality mining machinery and systems which are exported and used worldwide. RMS-Ross' systems have been used in mining operations in over 60 countries around the world, including North American, Central America, South East Asia, South America, and both Western, Central and East Africa. The company has been in business since 1926 and is a 4th Generation Family Owned Corporation.

RMS-Ross is known for its innovative yet simple ways to maximize efficiency and enhance recovery of target values, designed around detailed mineralogical test work, with robust systems that are designed for ease of operation and long mine life, in harsh environments.
RMS-Ross works with mining companies to design, build and install completely integrated mineral processing systems and solutions.

We have been asked to provide specification for and quote on equipment to process and separate the range of rich, concentrated value streams that are a potential for separation and refining from the world class Itabo Titanium Vanadium Magnetite deposit in the area of Itabo, Paraguay. RMS is, and will be involved in assisting in the mineralogical and metallurgical evaluation, separation, recovery and processing analysis of samples taken from this property.

The Itabo property is being developed by the Paraguayan company Valkiria Explorations S.A. over an area of 37,300 hectares, with an average pay zone that goes from surface to bedrock interface with average depth of 8 Meters. This ore zone holds a total of approximately 3 billion cubic meters of lateritic clay soils containing over 1 billion Tons of recoverable Ti Vanadium Magnetite and over 6 Million tons of V2O5 and 190 Million tons of TiO2.

While the values of these metals are already massive in scale, the other by-products also appear to be of significant potential. The sand tailings waste, when scrubbed, cleaned away from the silts and dewatered as a clean sand, happens to be a very hard rounded crystalline quartz composition – which in size ranges from a 20 to 100 mesh size, is very valuable as frac sand. Being as the deposit lies near the heart of the Parana Basin Oil/Gas Shale deposit which virtually circles theItabo, encompassing large areas of Paraguay, Bolivia, Brazil, Argentina and Uruguay. As these zones, (which are estimated to contain over 300 Trillion Cubic Feet of gas), progress into ever expanding production, there will be a huge requirement for this high value frac sand within trucking range of this Itabo deposit.

Prospective Shale Gas and Shale Oil Resources in Bolivia, Chile, Paraguay, and Uruguay.

The other "tailing" product is the fine lateritic clays and silts, which are required to be scrubbed to individual particles, in order to recover all the other cleaned valuable target elements.
Curiously, the silts, once scrubbed free of the other coarser products, are saleable as a high-grade aluminum bauxite (aluminum oxide / hydroxide) fine ore concentrate, which is the world's leading feed source for making aluminum.
This product will be separated in a magnetite slurry, and then concentrated and precipitated as a thick dewatered silt material in the project slimes dam, requiring drying in the scrubbing and separating of the other products, this fine silt fraction also becomes a high value product, leaving little remaining that does not carry a significant value.
As far as a sale of the aluminum feed material, Argentina and Brazil have multiple aluminum smelters, until one is built as a second stage, near this project.

Aluminum Smelters in Proximity to Itabo Deposit

As you can see on the map below, there is a major river barge route travels the Rio Parana and Rio Tiete Rivers, and reach the ocean at Sao Paulo, the locations of the Aluminio, Brazil Aluminum Smelter.

Most dry cargo barges in InterBarge's fleet are capable of transporting approximately 1,500 to 2,000 tons (1,350 to 1,800 metric tons) of cargo. InterBarge's barge convoys normally carry 20 barges. As a comparative, inland barges are the most efficient, safe and clean way to transport commodities. By way of reference, one 15-barge convoy equals 216 rail cars or 1,050 trucks.

Barges can move one ton of cargo 616 miles per gallon of fuel. A rail car would move the same ton of cargo 478 miles, and a truck only 150 miles. The river barging system is a very economical way to ship bulk separated ore products or finished products to get them to market. It may be as well that large volumes of frac sand can be shipped near to well sites by the river barge system as well.

On average, each well requires 3200 tonnes of frac sand. For aggregate consumption conceptual numbers, the US consumed 42 Million Tons of frac sand in 2014 alone.

Separation Protocol

Regarding the separation of this product into its separate saleable, and/or smeltable product streams, the process has already been largely determined in a readily modular, scalable design, as it is clear that this project will be desired to rapidly scale with multiple recovery plants and the scaling of each of these plants and the project develops.

To go through the circuit design, step by step, the material is excavated from the ground and placed in a large hopper/feeder where it will remove any of the oversize material that will be found closer to bedrock. This material is then split out (see in the larger plant concept drawing), to several conveyors and fed in equal amounts to the high pressure, low volume shearing force HydroClean ore scrubber. This system was designed to take aggregates that can not meet spec due to remaining clays etc., after trommels and scrubbers have been used, and make those projects and materials clean and in spec as saleable products. It consumes several times less process water than other scrubbing methods, with far superior results. This is key for the disintegration of the deeper laterite clays, so that we can separate clean products.
The HydroClean scrubbed material is then screened to size for further processing, and the fine slurry that encompasses virtually all the head ore target values are pumped to the RMS modular, scalable, portable Circular Jig Plants for the concentration of the more dense target value magnetic fraction consisting of the Ti V Magnetite.

The concentrated magnetite is then pumped to the cascading wet drum magnetic separators with demagnetizing coils between the stages, to randomize and remove the magnetic susceptibility that keeps the particles flocculated together, keeping other values interred. A series of lab magnetic gauss level susceptibility tests will be conducted to see what the range of magnetic particles are in the magnetic concentrate, to see if the vanadium content may possibly be able to be upgraded even further, just through magnetic separation, perhaps making two or three higher value products through magnetic separation.

Once the magnetics are cleanly removed, they will be cleansed one more time to remove any other particles and then will be high grade and ready for the furnace. As mentioned in the summary work by Mr. Alex Hirtz, the firing process of this product creates a 97% Fe Pig iron, which is extremely high grade and higher value. The vanadium and titanium are then recovered from the pig iron slag, where they have been greatly concentrated.

After the removal of the magnetic particles, the remaining material will process through the secondary jigs. This will determine if any other values than the iron can be targeted in the non- magnetic heavy mineral fraction. This will also be determined in the lab, prior to the completion of the circuit build. We presume that either there will be additional target values, or any escaped magnetite will be recovered here and then fed back to the magnetic separators for recovery, in a heavy mineral closed loop.

The lighter fractions will then process to the large dewatering sand screws, and this coarser product consists of the frac sand. This will be dewatered and conveyed to a stack. If it is needed, this will be dried and then screened to the desired size range to be best for frac sand pumping applications.

The reddish fine silt/broken up clay that now dewaters from this product will be pumped to the Compaction Clarifier. A large study was done to find the most robust, simple to maintain and operate clarifier, and this unit is the one we have determined without a doubt to be the best application. This will efficiently drop all the fines out of solution, so that the process water can be re-circulated to the fresh water ponds. The fines that are removed, that feed by gravity to the slimes dam, will be dried and shipped by barge to the aluminum smelter, as a high-grade source material for aluminum smelting.

With this, the circuit is mostly a closed loop, efficient, scalable, clean, separated high value marketable products produced. The remediation of the land is then also simple, with the addition of zeolites, which are found not too far away, to rehabilitate what remains back to superior farming ground.

Please review the General Arrangement Drawings that will soon follow, that will bring much better clarity to what is discussed and described above.

Best Regards,

Scott Plummer, President
RMS-Ross Corporation

GLOBAL SOLUTIONS FOR MINERAL RECOVERY
Gold, silver, tantalum, tin, iron ore, PGMs, Diamonds, lead, titanium minerals, etc

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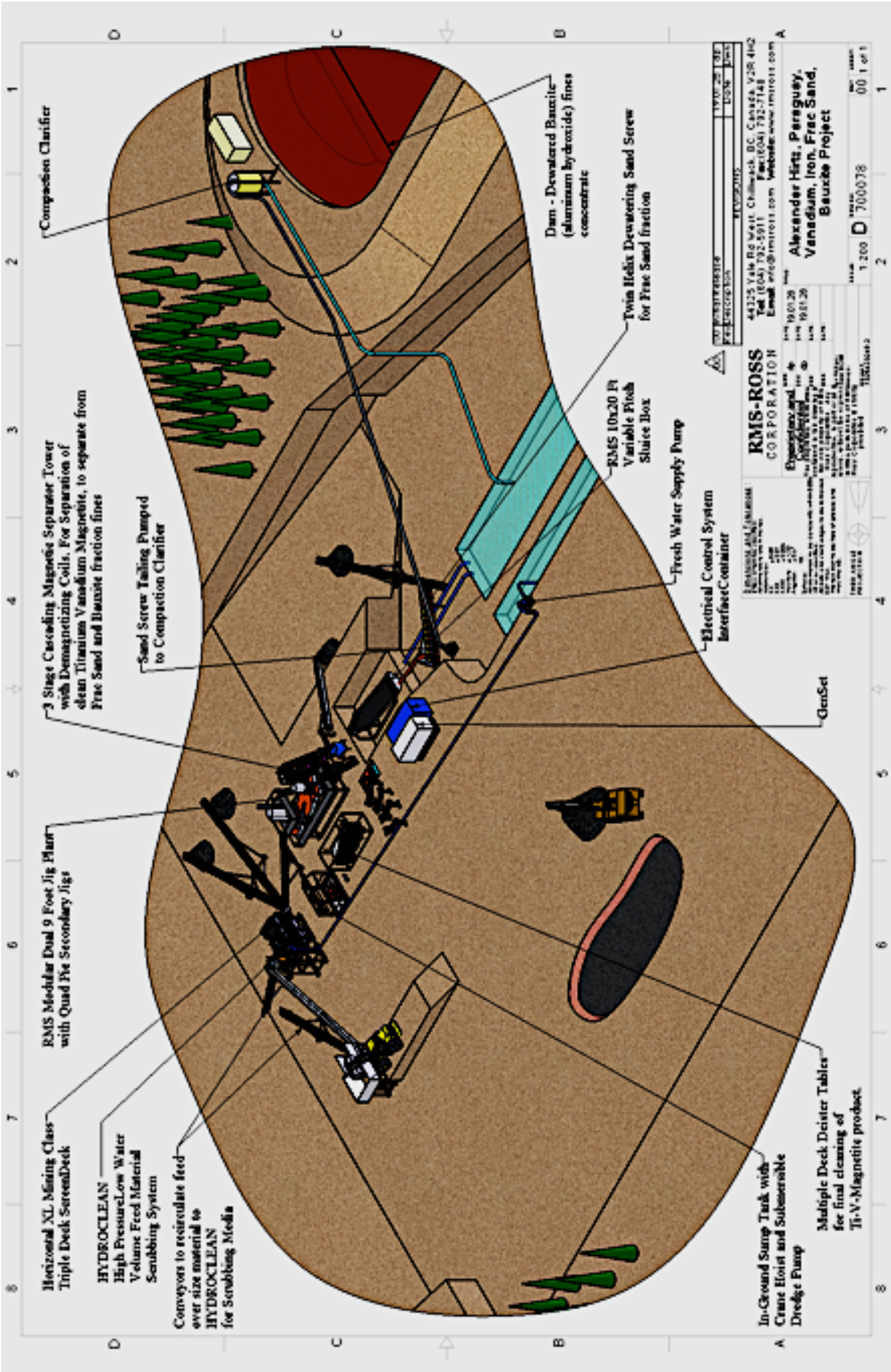
*RMS-Ross Corporation has been requested to design and build a scalable plant capable of processing the Itabo red lateritic ore from an open pit operation targeting gravity and magnetic separation methods for the separation of Titanium Vanadium Magnetite, frac sand and aluminum concentrates.

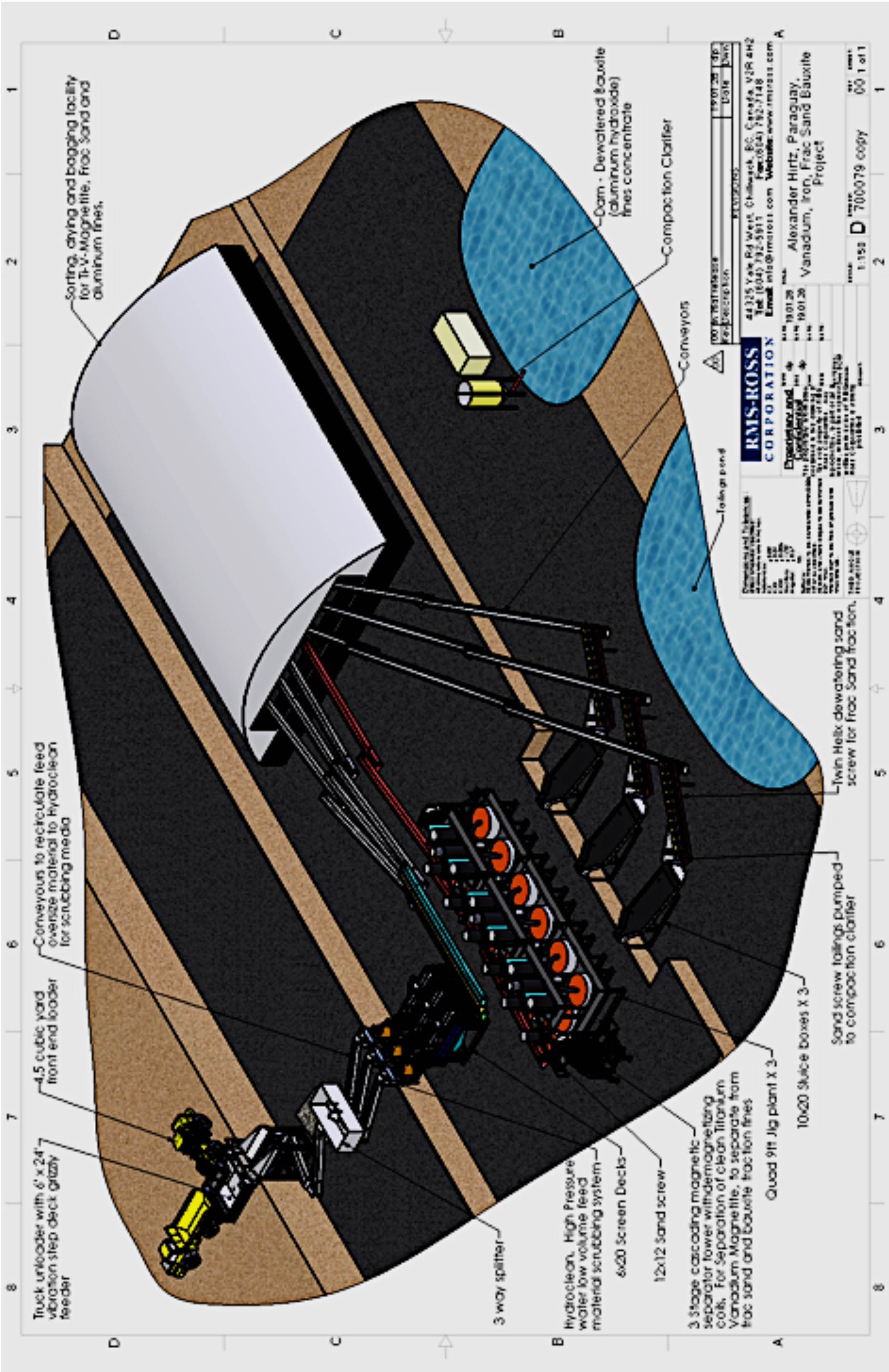
RMS-Ross Corporation specializes in the engineering, design, manufacturing and distribution of an extensive range of quality mining machinery, which is exported and used worldwide.

RMS-Ross systems have been used in mining operations in over 60 countries around the world, including both Western, Central and East Africa; North and South America, Russia and Asia. RMS-Ross is known for its innovative solutions that simplify required processes and enhance equipment that is designed around mineralogical test work, scaling from lab test work to full production systems, maximizing efficiency, effectiveness and recovery.

RMS designs and builds mining equipment that is well known as being some of the most robust and reliable in the mining industry.

Plant design to mine the laterites at Itabo





Scalable plant capable of processing the Itabo red lateritic ore from an open pit operation targeting gravity and magnetic separation methods for the separation of Titanium-Vanadium Magnetite, frac sand and aluminum concentrates.

The Kenmare Ilmenite operation

Example of an ilmenite mining and concentration operation.

The Kenmare ilmenite facility in Mozambique produces over one million tons ilmenite per year, the largest ilmenite producer in the world. They have a reserve of 9 billion tonnes spread over 9 areas with a 100 year mine life. Grades range between 2.8% to 4.2% ilmenite and around 5% in total (rutile & zircon). They have a very high mining and concentration cost bordering $150/ton ilmenite, which covers operational costs. Main profits are made with the rutile and zircon.

The advantages of the Itabo project compared to Moma:

Same reserves and mining rate of 80.000m3/day, but with homogeneous feed and uniform distribution of Ti-V magnetite
Ore grade 20% magnetite between 5 to 7 times higher grade
Production cost proportionally 5 to 7 times lower
Magnetite will concentrate much easier than ilmenite
Close supply of sweet water
Mining one hectare per day, production would be 10 million tons magnetite per year. To produce 1 million tons of magnetite would require to mine only 33m x 33m area, easily done with one large bucket dredge and related earth moving equipment.

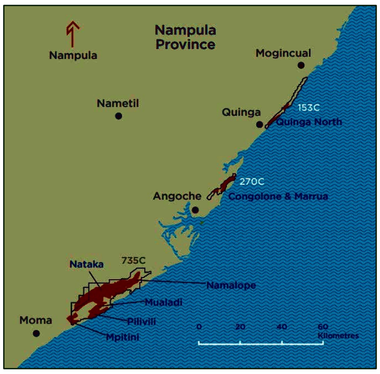
Long life, sustained grades

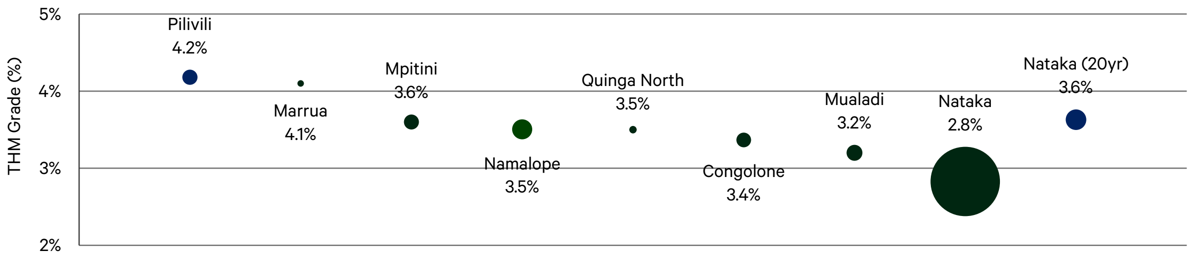
8 billion tonnes of Mineral Resources

- Moma is comprised of a number of different ore zones, which differ due to grades, size, mineral assemblage

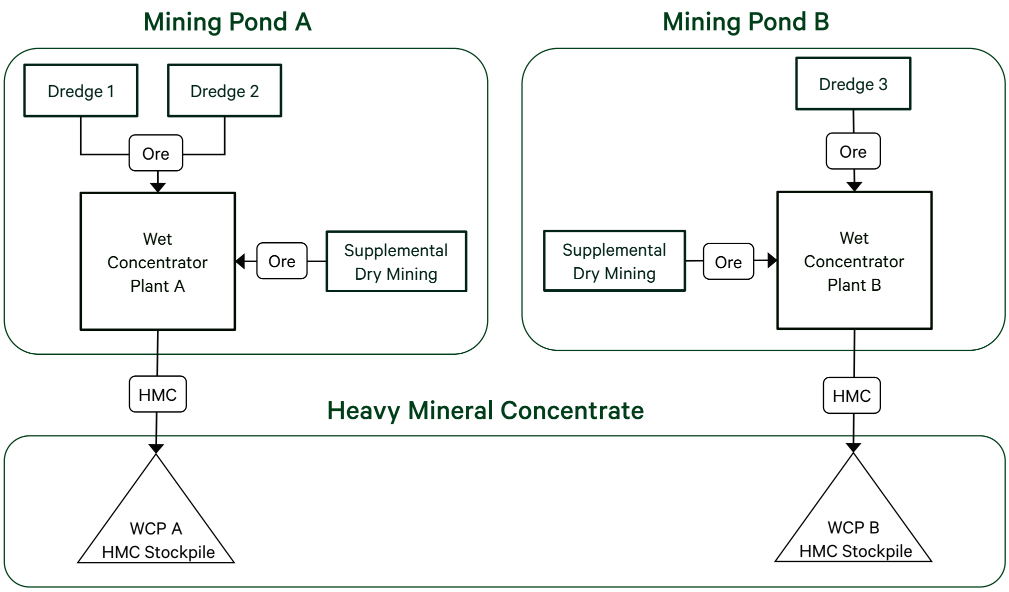
Optimised long term plan, focusing on:

- Namalope: near term production, high-grade WCP C resources
- Pilivili: Highest grade, free flowing sands, good co-products
- Nataka: 20 year high grade path identified





Simplified mining flowsheet



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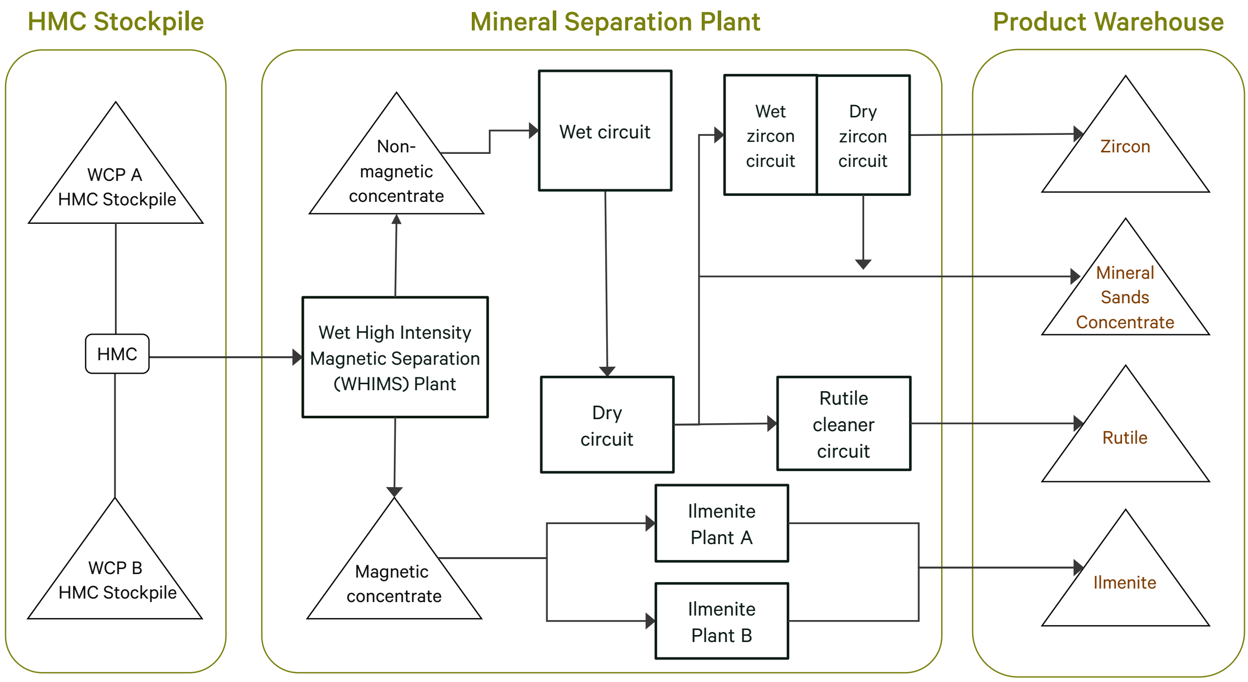
Simplified processing flowsheet



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Mineral Separation Plant (MSP): aerial view

2019 guidance (provided 10 January 2019)

Production		2019 Guidance	2018 Actual
Ilmenite	tonnes	900,000-960 ,000	958,500
Primary zircon	tonnes	44,500-52,000	48,400
Rutile	tonnes	8,100-9,500	8,200
Concentrates*	tonnes	33,500-43,500	28,200

Costs			
Total cash operating costs	US$ m	151-167	N/R[1]
Cash costs per tonne of finished product	US$/tonne	150-160	N/R[1]

- Production is expected to moderate slightly, mainly due to expected lower grades mined
- Ilmenite shipment volumes are expected to be maintained, as finished goods inventory is drawn down
- Total cash operating costs in 2019 are anticipated to be higher than in 2018, the largest elements of which relate to increases in fuel price and labour costs
- Development capital costs are expected to be approximately US$70 million
- Sustaining capital costs are expected to be approximately US$23 million

1. To be reported in full year financial statements.
2. Concentrates includes secondary zircon and Mineral Sands Concentrate.

Maracás Menchen Mine

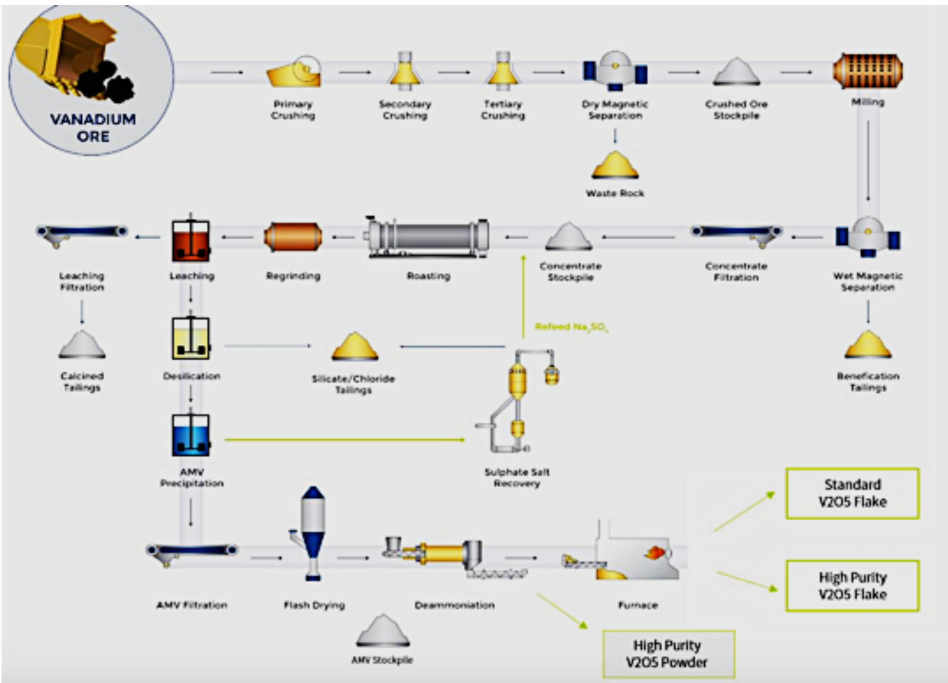
Operations / Maracás Menchen Mine	
Ownership	99.84%
Location	Bahia State, Brazil
Size	17,690 ha
Commodity	Vanadium
Products	V_2O_5 flake, High-purity V_2O_5 flake & powder
Mining type	Open pit
Plant throughput	3,900 tpd
2019 production guidance	10,000-11,000 tpa of V_2O_5
Off-take	100% - Glencore (Expires May 2020)
Reserve life	9 years *

Cutoff grade	0.45% V205
All in operating cost	US$34.20/t
Annual cost lb V_20_5	US$3.45 - $3.65

The Maracás Menchen Mine property totals 17,690 hectares and is located in the eastern Bahia State of Brazil. The mine is roughly 250 km southwest of Salvador (capital of Bahia) and 813 km northeast of Brasilia (capital of Brazil. The Maracás Menchen Mine boasts one of the highest-grade vanadium resources in the world and is one of the lowest-cost producers of the material in the vanadium market. Construction at the Maracás Menchen Mine began in June 2012 and initial production of vanadium flake commenced in Q3 2014. Largo currently has a contracted take-or-pay off-take agreement with Glencore International Plc. for 100% of its vanadium material which expires in Q2 2020. The mine is projected to produce between 10,000 and 11,000 tonnes of vanadium pentoxide in 2019 which is inclusive of high-purity flake and powder powder. The Company announced in April 2018 plans to expand production capacity by 25% at the mine with construction which began in June 2018. The enhanced production rate at the Maracás Menchen Mine is expected to result in an additional 200 tonnes of V_2O_5 being produced per month totaling 1,000 tonnes per month beginning Q3 2019.

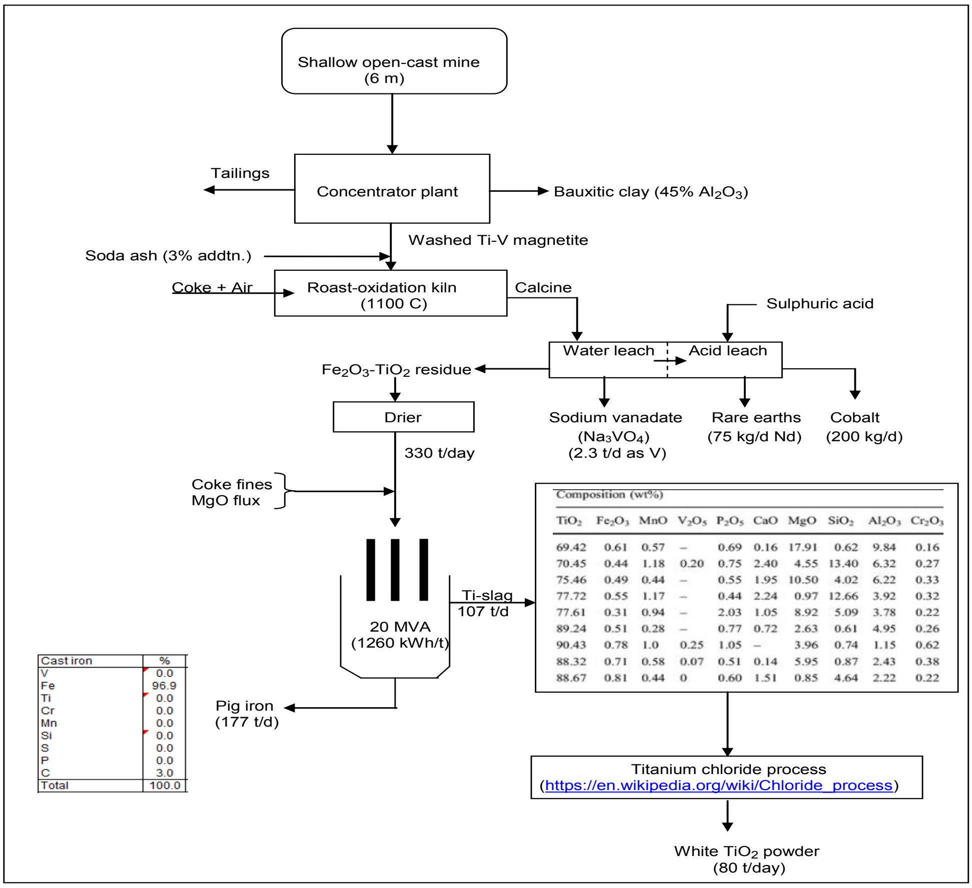
Geology, Mining and Processing

Vanadium at the Maracás Menchen Mine is contained within a massive, titaniferous magnetite and possesses very low levels of contaminants, like silica (SiO_2). The entire strike length of the Maracás Menchen Mine property is rich in vanadium, hosting many deposits of vanadium-rich titaniferous magnetite mineralization, particularly at the Campbell Pit and other deposits such as Novo Amparo Norte, Novo Amparo, Gulcari B and Sao Jose. Ore from the mine will be crushed, milled, and sent through a magnetic separator to create a concentrate. This concentrate is then processed into vanadium pentoxide, high-purity vanadium or vanadium powder where it is then bagged or packed into barrels for sale. It is important to note that Largo is utilizing industry proven equipment and processes to produce vanadium.



Pilot plant for Ti-V magnetite at Itabó

To go into large-scale production, it would be advisable to implement a pilot plant, which includes a smelter and the processing plant for the Ti02 and V205 and cobalt if recoverable. This flow sheet does not include the recovery of gold and native copper, which would take place in the concentration plant. According to specifications, a 20 MVA furnace and other related processes would require a feed of 286 tons of Ti-V magnetite per day to produce 124 tons of pig iron, 60 tons of Ti02 powder and 2 tons of V205 powder.
The magnetic contents in the laterites are over 20%; for the present exercise a recovery of 12% of coarser-grained Ti-V magnetite will be used.
To obtain about 300 tons of this coarse Ti-V magnetite, one would require to mine and wash 1500 cubic meters of laterites per day (2500 tons/day), a very small and straight forward mining operation.
The proposed exploitation exercise in the document would be 50 times de size of this pilot operation.



Cast iron	%
V	0.0
Fe	96.9
Ti	0.0
Cr	0.0
Mn	0.0
Si	0.0
S	0.0
P	0.0
C	3.0
Total	100.0

Composition (wt%)

TiO_2	Fe_2O_3	MnO	V_2O_5	P_2O_5	CaO	MgO	SiO_2	Al_2O_3	Cr_2O_3
69.42	0.61	0.57	–	0.69	0.16	17.91	0.62	9.84	0.16
70.45	0.44	1.18	0.20	0.75	2.40	4.55	13.40	6.32	0.27
75.46	0.49	0.44	–	0.55	1.95	10.50	4.02	6.22	0.33
77.72	0.55	1.17	–	0.44	2.24	0.97	12.66	3.92	0.32
77.61	0.31	0.94	–	2.03	1.05	8.92	5.09	3.78	0.22
89.24	0.51	0.28	–	0.77	0.72	2.63	0.61	4.95	0.26
90.43	0.78	1.0	0.25	1.05	–	3.96	0.74	1.15	0.62
88.32	0.71	0.58	0.07	0.51	0.14	5.95	0.87	2.43	0.38
88.67	0.81	0.44	0	0.60	1.51	0.85	4.64	2.22	0.22

Figure 1. Alternative Ti-V magnetite processing option

The above chart shows an elevated figure of 177 t/d pig iron and 80 t/d Ti02 powder, according to new calculations as shown in following chart, where output is 3227 t/month pig iron produced over 26 days and 22 hours/day equivalent to 125 t/d; the titania slag would amount to 77 t/d, which would produce around 60 t/d Ti02 powder and around 2 t/d V205.

The above chart shows a process to produce Na3V04, which requires an additional process to first precipitate out the vanadium in the form of ammonium vanadate by adding ammonium sulfate. The ammonium vanadate is then roasted at about 800 C to drive off the NH3 so leaving behind V2O5, which can be sold.

Table 1. Mass & volume flows

	Furnace size:	8 MVA		20 MVA		
		(t/h)	(m^3/h)	(t/h)	(m^3/h)	Temp (C)
Inputs to Roaster kiln:	Filtered Ti-V magnetics ex Concentrator	5.2	1.7	13.0	4.3	22
	Soda ash	0.13	0.12	0.32	0.29	22
	Low-ash crushed coal or anthracite	0.5	0.42	1.4	1.05	22
	Blower air (@ STP)	6.1	4,722	15.2	11,804	22
Outputs from Roaster:	Hot calcine	4.6	1.4	11.4	3.6	1100
	Hot gas (@ STP)	7.4	5,836	18.5	14,589	1100
Outputs from leach plant:	V	0.029		0.072		
	Nd	0.001		0.003		
	Co	0.003		0.006		
Inputs to drier:	Moist Fe-Ti-O leach residue	5.4	1.8	13.5	4.5	22
	Hot gas ex roasting kiln	7.4	5,836	18	14,589	1100
Outputs from drier:	Dry Fe-Ti-O leach residue	4.4	1.8	11.1	4.4	408
	Humid gas to cooling tower	8.4	7,048	20.9	17,621	408
Inputs to furnace:	Warm Fe-Ti-O leach residue	4.4	1.8	11.1	4.4	408
	Coke fines	1.0	0.9	2.6	2.3	22
	Magnesite flux	0.039	0.02	0.096	0.05	22
Outputs from furnace:	Gas (@ STP)	1.9	1,466	4.6	3,664	1653
	Titania slag	1.4	0.5	3.5	1.2	1653
	Cast iron	2.3	0.3	5.6	0.8	1653
	Cast iron:- tonnes per 572 hr month:	1,291		3,227		
Inputs to boiler:	Gas ex furnace (@ STP)	1.9	1,466	4.6	3,664	1,653
	Air for combustion	4.9	3,834	12.3	9,586	22
	Water for steam generation	2.9	2.9	7.3	7.3	22
Outputs from boiler:	Gas to baghouse (@ STP)	6.8	4,598	36.2	11,496	987
	Steam ex boiler (@ 10 Bar gauge)	2.9	518	7.3	1,294	185
Turbine output	Steam converted to electrical power (MWh)	2.1		5.2		

Gross estimate of capital cost of the project to production

Exploration to feasibility for pilot project

Fieldwork:

Select the optimal area to mine an initial 1500 cubic meters per day, 100 hectares would suffice for a 14 year operation. For the total installations, 50 hectares should be contemplated. The cost per hectare of producing soya fields are around $15.000 to $20.000.

To outline proven reserves over 100 hectares or 1km X 1km, a grid with 50m X 50m spacing should be satisfactory. This grid with 576 intersections one would execute 25 auger holes 7 meters deep and 551 auger holes 2 meters deep.

Total 1277 meters auger holes, grid lines, etc.	$ 40.000
2000 soil samples assays & shipping @ $50/each	$ 100.000
Metallurgic tests inc. bulk sample collection, engineering	$ 500.000
43.101 or equivalent geologic independent final report	$ 100.000
Various	$ 260.000
Sub-total	$1,000.000

Administration:

Under Paraguayan law, the Itabó Project has to be approved by the Paraguayan Congress, where the senate will approved and publish a specific law for the mining company to exploit the various commodities of Itabó, where this law outlines all the rights of the company to exploit, refine and commercialize the final products under specific technical and economic parameters, where taxes and royalties are fixed over the next 20 years, renewable. These terms are negotiable with Congress; Congress may not change over time any articles of the law, but the contractor may apply for technical or financial required modifications in the benefit of the project.

It would appear that the exploration phase should take no more than two years to apply for the exploitation phase and start construction to production.

Management including legal, technical, accounting, transportation, office, good standing of concession, etc. over two years	$2,000.000

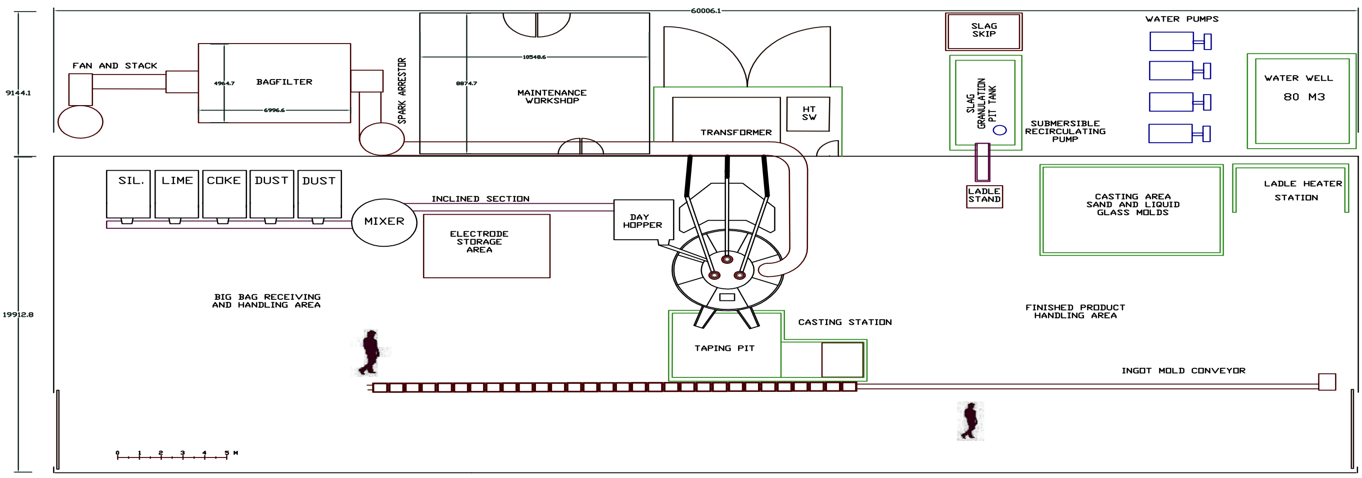
Total estimated costs to production

Exploration to feasibility	$ 3,000.000
Land purchase 150 hectares @ $20.000/ hectare	$ 3,000.000
General installation, buildings, power lines	$ 2,000.000
Civil works and earthmoving equipment 1500 m3/day	$ 1,000.000
Concentration plant to obtain 300 t/d Ti-V magnetite	$ 1,000.000
20 MVA furnace and related equipment	$15,000.000
Management to production one year and 6 months operation	$ 2,000.000
Unforeseen, various 10%	$ 3,000.000
Total	$30,000.000

To estimate total sales of the three commodities, conservative sales values are used (CIF):

125 t/d pig iron @ $400/t	$ 50.000
60 t/d Ti02 powder @ $1500/t	$ 90.000
2 t/d V205 flakes @ $15.000/t	$ 30.000
Total	$170.000 per day
Total per year, 26 d/month	$ 53 million per year

Taxes in Paraguay are 2.5% royalties and 10% corporate tax. For exports one obtains a 10% tax credit, which will equate to no corporate tax.



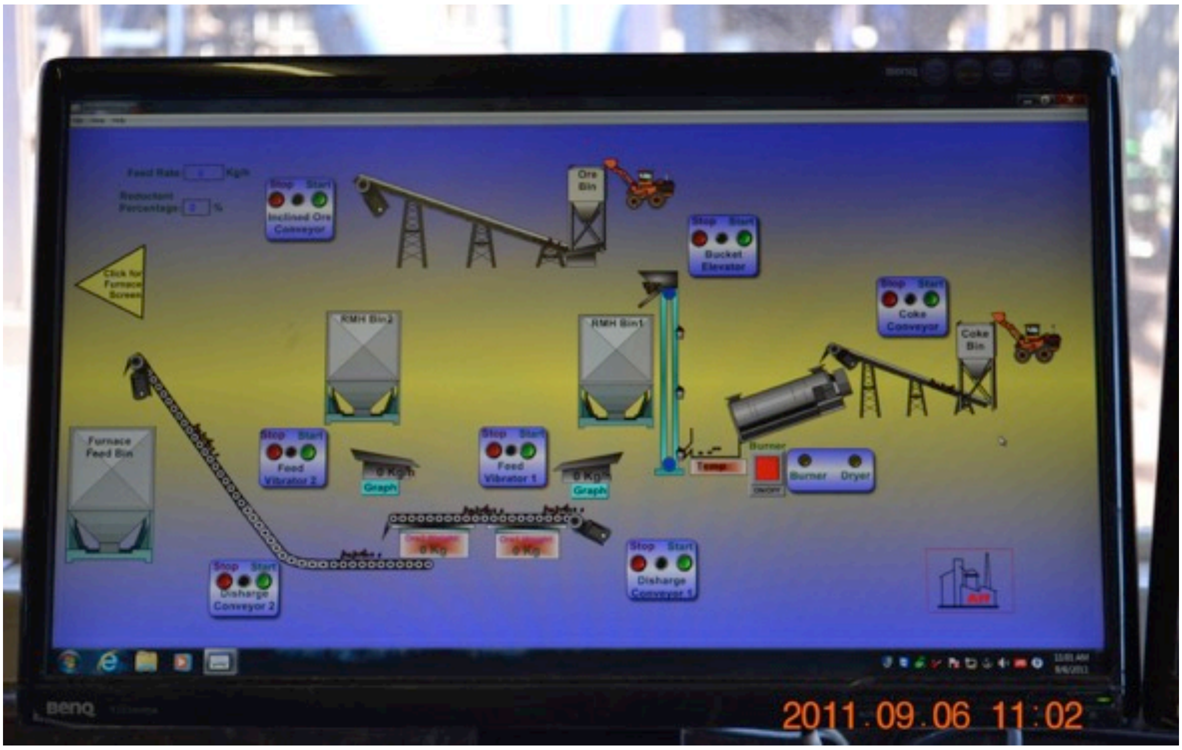
Some views of related project in South Africa

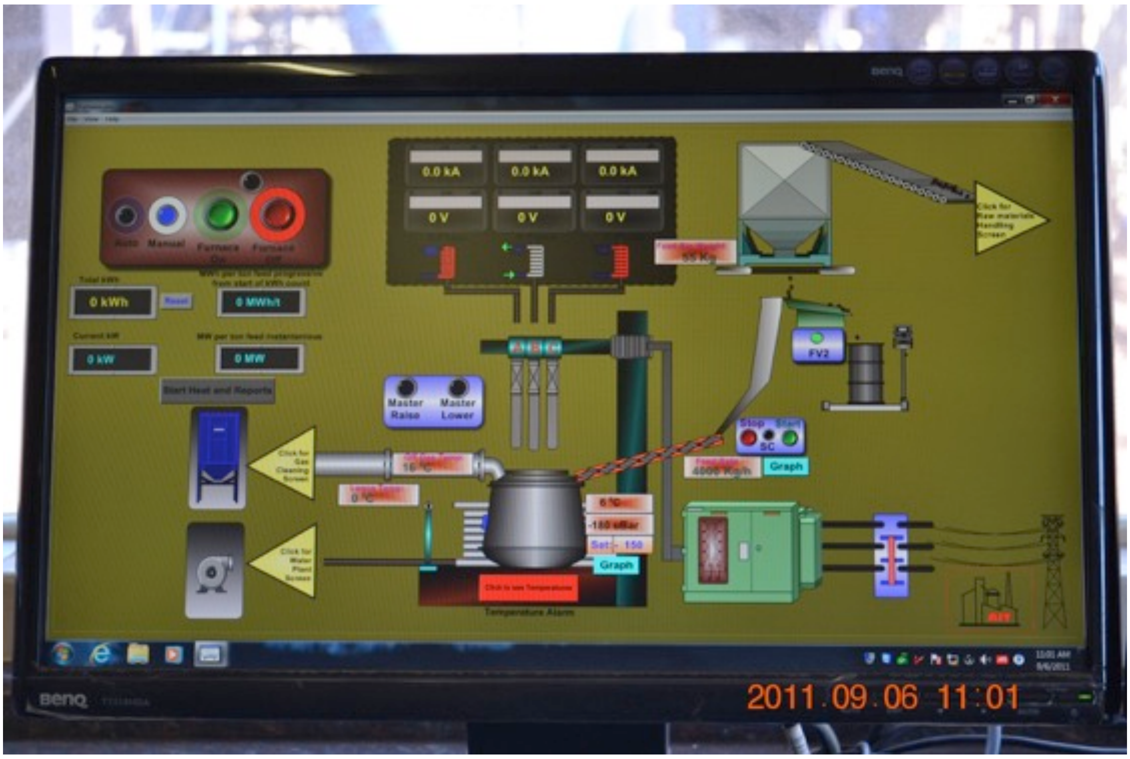
Furnace 5 MVA

Lancing open the metal tap hole

2 x Fume extraction with energy recovery

Bag filter 1 erection




0.0 kA
0.0 kA
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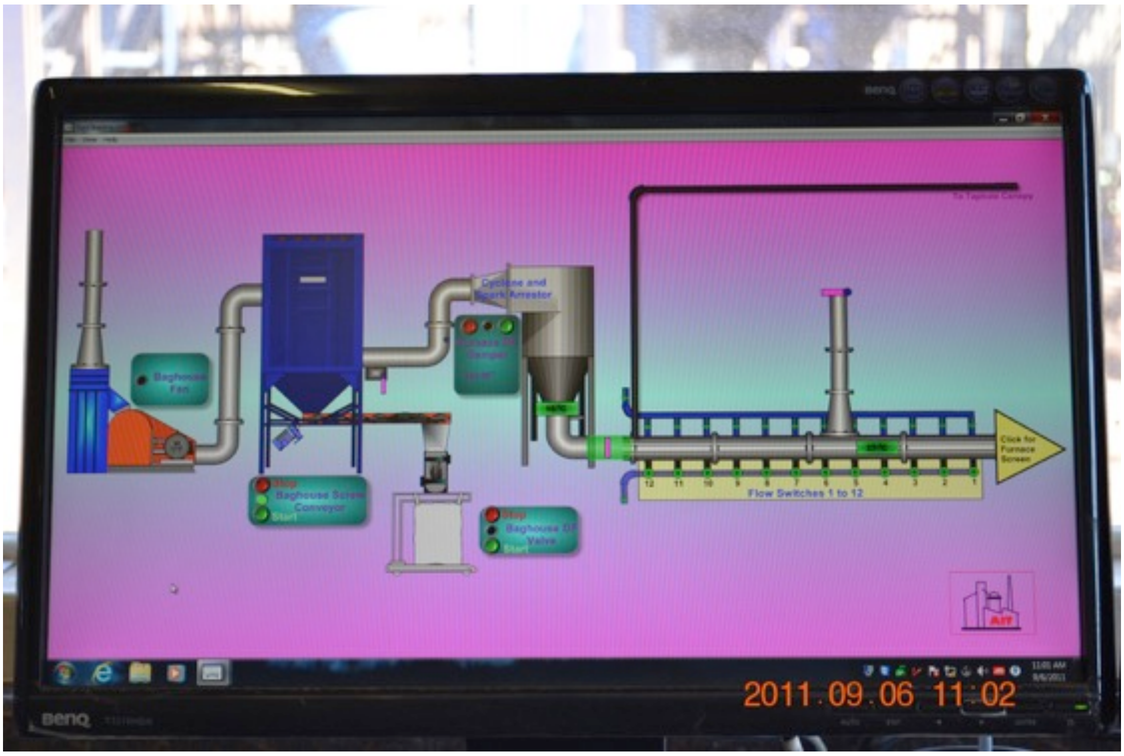
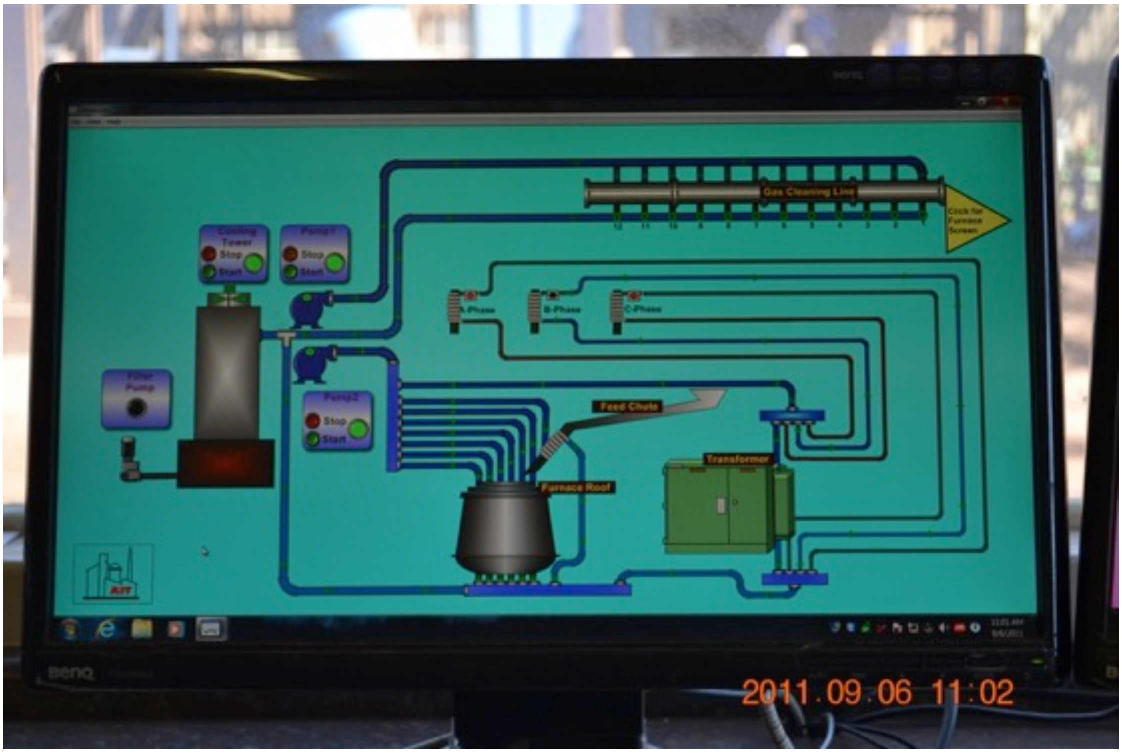
Master Raise
Master Lower
FV2
Graph
Graph
2011.09.06 11:01


Temperature Probe Position
Value °C
A Bottom
6537
B Bottom
6
C Bottom
8
A Side
8
B Side
1
C Side
9
Metal Taphole Left
10
Metal Taphole Right
4
Slag Taphole Right
6512
Gas
16
Wall
8
Lance
0
Elbow Gas
27
Return Water - Furnace
17
Shell water supply
18
Shell warter return
20
To Furnace
2011.09.06 11:01



Cyclone and Spark Arrestor
Flow Switches 1 to 12
Baghouse Screw Conveyor
Baghouse Fan
2011.09.06 11:02



Gas Cleaning Line
Feed Chute
Transformer
Furnace Roof
Pump2
2011.09.06 11:02

Example of a control cabinet

REPUBLIC OF SOUTH AFRICA REPUBLIEK VAN SUID AFRIKA

PATENTS ACT, 1978

CERTIFICATE

In accordance with section 44 (1) of the Patents Act, No. 57 of 1978, it is hereby certified that

APPLIED INDUSTRIAL TECHNOLOGIES SERVICES CC

Has been granted a patent in respect of an invention described and claimed in complete specification deposited at the Patent Office under the number

2010/08381

A copy of the complete specification is annexed, together with the relevant Form P2.

In testimony thereof, the seal of the Patent Office has been affixed at Pretoria with effect from **29 February 2012**.

PATENT OFFICE REPUBLIC OF SOUTH AFRICA PATENTKANTOOR REPUBLIEK VAN SUID AFRIKA PRETORIA

Registrar of Patents

Second stage with large-scale exploitation

The dredging and smelter units are modular, where one may increase the production as desired at $30.000.000 each additional module and another $10.000.000 for related expansion equipment.

As an exercise, the following model is based in mining one hectare per day with 65.000m3 or 100.000 tons, a smaller operation than at the Moma Minerals Mine in Mozambique with 80.000m3.
This operation would produce 6.5 million tons of Ti-V magnetite per year, over six times larger than the largest placer operation for Ti-V magnetite in the world. Mine life would be 70 years.

Gross estimate capital investment $3'600.000.000 with $7'000.000.000 gross sales/year.

With the known large and quite homogeneous reserves, more than one operation may be in production simultaneously. Of course, just with one operation, it would become the largest in the world for these commodities. The closest would be the Moma Minerals Mine in Mozambique by Kenmare Resources (page 45), which mines about 80.000 cubic meters per day, but contains only 2.8%-4.2% ilmenite, where it produces close to one million tons ilmenite per year.
If one wants to match the Moma operation, with the much higher grade of 23% Ti-V magnetite, one would need to mine only one third of a hectare (33m X 33m x 6.5m), about 7000 cubic meters of soil easily done with one large bucket dredge and related earth moving equipment at a very low capital cost.

Mining operation	1 hectare/day (65.000 m3 or 107.000 tn/day)
Mine life	70 years
Production/day (85% recovery)	21.000 tons Ti-V magnetite /day
Production/year	6.5 million tons magnetite/year
V205/day	140 tons V205/day
V205/year	44.000 tons V205/year
Ti02/day	4.200 tons Ti02/day
Ti02/year	1.3 million tons Ti02/year
Fe/day	8.750 tons Fe/day
Fe/year	2.7 million tons Fe/year

Year sales 6.5 million tons Ti-V magnetite @ $200 = 1.3 billion
Production costs:
Mining & processing @ $10/m3 x 65.000m3/day = $650.000
Shipping @$40/ton/day X 21.500 tons = $860.000
Total cost + shipping $1´510.000/day.
Total cost per year = $471 million
Profit ratio 2.7 to 1

If commodities sold purified
Year sales 44.000 tons V205 @ $16.700/ton = $ 734 million
Year sales 1.3 million tons Ti02 @ $ 2.900/ton = 3.77 billion
Year sales 2.7 million tons Fe ingot @ $ 900/ton = 2.43 billion
Total sales $7 billion/year

Economics certainly warrants to process the Ti-V magnetite in situ with their own iron smelter and Ti02 & V205 purifier.

Typical view of laterites over the basalt.

Third stage including the aluminum smelter using bauxitic clays

RTZ wanted to build an aluminum smelter in Paraguay, about 200km south of this project, because of low energy cost of Paraguay. The bauxite was being shipped from a long distance in Brazil, where transportation cost would have been very high. RTZ offered to pay $35 per megawatt, while Paraguay wanted $45 per megawatt. They required about 700 MW, equivalent to the energy of one of the 20 turbines at ITAIPU. Intended investment of the aluminum smelter was $4.000.000.000

The bauxitic clays are a side product by separating the magnetite and the quartz sand; hence, it comes for "free" and represents about 10.000 tons Al/day. Total reserves are 680.000.000 tons aluminum. At $2.380/tn Al, gross sales/year would be $7'425.000.000

The reminder of the washed laterites is an average of 32.7% quartz sand. The crystal clear and well-rounded quartz grains over 10 mesh in size might very well apply for fracking in the oil industry, which is required, for example, in Brazil. Using the lowest price for quartz sand around $30 for any industrial uses, would still represent at a daily production mining one hectare per day of 46.000 tons quartz/day @ $30/ton= $1'380.000 per day.

Total reserves of quartz sand is 853.000.000 tons
At @30/ton, gross sales/year would be $430 million/year

If all commodities are commercialized as final products, total sales would be $15 billion/year with a mine life of 70 years with a total capital investment of $7'200.000.000.

Land purchase and Reclamation Program

The best option to mine the laterites is to purchase the land. Current price of producing soya/wheat/corn plantations in that region is between $15.000-$20.000. Even considering an outrageous price of $40.000/hectare, each hectare contains 80.000 cubic meters of laterites; the cost for each cubic meter would be in this extreme case $0.50, a very small cost in relation to gross sales of any of the commodities. After mining each parcel, this ground gets refilled with one meter of soils if bauxitic clays and quartz are sold, otherwise with 6 meters of soil, which would be enriched with nearby dolomite containing 18% magnesium and phosphates from nearby carbonatites, where the ground would be sold to local cooperatives subsidized to nearby Indian communities.

The advantages of the Itabo Project in relation to all others are:

- This project is in laterites, all others are in hard rock.
- Low cost to establish indicated and proven reserves to go into production.
- Inexpensive equipment to separate the magnetite from the laterites.
- Exploitation may commence in the third year.
- Very large profits versus capital investment and cost of mining.
- Access, power, water are all in place
- Paraguay is the most stable country in the region with practically no foreign debt with a consistent 4.5% economic growth, politically conservative, no history of nationalizations, lowest tax regime in the region.

Facts about Vanadium

Vanadium occurs naturally in about 65 minerals and in fossil fuel deposits. It is **produced** in China and Russia **from steel smelter slag**; other countries produce it either from **magnetite directly**, flue dust of heavy oil, or as a by-product of uranium mining. It is mainly used to produce specialty steel alloys such as high-speed tool steels. The most important industrial vanadium compound, vanadium pentoxide, is used as a catalyst for the production of sulfuric acid.

The most important vanadium-ore minerals are vanadinite (19 percent V_2O_5), descloizite (22 percent), cuprodescloizite (17-22 percent), carnotite (20 percent), roscoelite (21-29 percent), and patronite (17-29 percent). Vanadium is present as an admixture in the following ore minerals: **titanomagnetite (up to 8.8 percent V_2O_5),** magnomagnetite (1.6 percent), magnetite (0.6 percent), rutile (1 percent), and ilmenite (0.4 percent).

Endogenic Vanadium-ore deposits are found in areas of ultrabasic, basic, and alkaline rocks and may be magmatic (titanomagnetite, magnetite-ilmenite, and ilmenite-hematite in pyroxenites, hornblendes, olivinites, gabbro, norites, anorthosites, and gabbro-diabases), contact-metasomatic (magnetite in scarned rock), or hydrothermal-magnomagnetite (in regions of widespread traps). **Endogenic ore deposits are characterized by a low vanadium content (0.1-1 percent V_2O_5), but the reserves are very large. Vanadium occurs in deposits of titaniferous magnetite, in which it constitutes less than 2 percent of the host rock.**

Titaniferous magnetite is allegedly the most important source for vanadium, accounting for 85 percent of its world production.

Vanadium is a grey, soft and ductile high value metal with several unique characteristics that positions it strongly in the steel, alloys and chemicals sectors. Most vanadium is recovered from magnetite and titan-magnetite ores, either as the primary product (17 per cent of global supply in 2016 according to Vanitec) or more commonly as a co-product with iron processed for steel production (73 per cent). It can also be recovered as a secondary product (accounting for the 10 per cent balance of supply in 2016) from fly ash, petroleum residues, alumina slag, and from the recycling of spent catalysts used for some crude oil refining.

The two main traded vanadium products are vanadium pentoxide (V_20_5) and ferrovanadium ("FeV"). V_20_5 is the most common intermediate product from treatment of magnetite iron ores, vanadium-bearing slags and secondary materials, and can be used directly by some non-metallurgical applications and in the production of vanadium chemicals. It is also used as an intermediate product for the production of FeV, the vanadium alloy used as a strengthening/hardening agent in manufacturing of high-strength steel (vanadium's dominant end use).

Vanadium is not an exchange-traded commodity, pricing is instead negotiated by contract between supplier and customer (often through an intermediary trader). Vanadium pentoxide prices are quoted by US Dollar per pound of V_20_5 (generally on an FOB basis), while ferrovanadium prices are quoted by US Dollar per kilogram of contained Vanadium (with a range of prescribed minimum Vanadium levels, e.g. 50 per cent and 80 per cent).

Vanadium supply

On the supply side, world vanadium production totalled 80,000 MT last year, up slightly from 79,000 MT in 2016, as per the most recent data from the US Geological Survey. Only four countries contributed to that output, and below is a brief overview of all of those producers.

China; Vanadium reserves: 9 million MT; *Mine production: 43,000 MT*

China was the world's top vanadium producer in 2017 with output of 43,000 MT. That's down from the 45,000 MT it put out the previous year. The Asian nation far outpaces all other countries in terms of vanadium-mining output, and is also a large consumer of the metal. As mentioned, vanadium is largely used in the production of steel. Although Chinese steel output has declined in recent years, the country remains a major vanadium consumer.

Russia; Vanadium reserves: 5 million MT (¿); *Mine production: 16,000 MT*

Production in **South Africa** 15.000 MT, **USA** with 600 MT.

With the rising demand, now much of the world's vanadium production is sourced from **vanadium-bearing magnetite** found in ultramafic gabbro bodies. **If this titanomagnetite is used to produce iron most of the vanadium is ending in the slag and is extracted from there**. Most vanadium is used as a steel alloy called ferrovanadium. Ferrovanadium is produced directly by reducing a mixture of vanadium oxide, iron oxides and iron in an electric furnace. **The vanadium ends up in pig iron produced from vanadium-bearing magnetite. Depending on the ore used, the slag contains up to 25% of vanadium.**

Vanadium deposits worldwide

Titaniferous magnetite is reportedly the most important source for vanadium, accounting for 85 percent of its world production.
The world's largest mines of vanadium are from titaniferous magnetite reserves accounting for 85 percent of its world production. The best-known deposits are in the USSR (Gusinaia Gora), the Republic of South Africa (Magnet), the USA (abandoned Tahawus), Canada (Lac Tio), Sweden (Taberg), and Finland (Otanmäki).

At the time the basalt flows initiated 130 million years ago, South America just started to separate from Africa. At that time the edge was Paraguay, where the gabbros and related basalt flows from the rift were located right next to the gabbros in South Africa, which are the source of the “same” Ti-V magnetite beds in the Bushveld intrusives.

The assays for some of the Bushveld Ti-V magnetite deposits:

TABLE I
Some Chemical Analyses of Vanadiferous Titanomagnetite in the Bushveld and Trompsburg Complexes

Sample Locality	Villa Nora Body	Potgietersrus Body[1]	Mphatleles Loc.[2]	Onderstepoort 266 JR	Main Layer	Main Layer De Hoop 886 KS	Main Layer Uitvlugt 887 KS	Main Layer Steelpoort Park 366 KT	Main Layer Zwartkop 142 JS	Main Layer Mapochsgronde 500 JS	Tromsburg Complex[3]
Fe_2O_3	25,5	55*	53,7*	67,34	55,8–57,5*	56,1*	55,8*	55,9*	56,0*	56,1*	36,2
FeO	27,3			9,59							32,9
TiO_2	18,6	13,0	14,8	12,6	12,2–13,9	12,9	12,7	12,7	12,9	13,0	15,3
V_2O_5	0,11	1,7	1,73	1,02	1,40–1,66	1,66	1,63	1,58	1,66	1,59	1,8
SiO_2	1,68	3,0	14,8	3,03	0,90–1,54	1,02	1,02	1,33	1,44	0,90	0,3
Al_2O_3	2,52	4,5	4,1	2,91	2,53–3,50	3,6	3,3	3,8	3,5	3,22	5,3
MgO	0,50	NA	0,7	0,72	0,24–1,26	1,0	<0,9	<0,9	<0,9	1,14	4,5
MnO	0,22	NA	NA	0,52	NA	NA	NA	NA	NA	NA	0,3
CaO	13,28	0,6	0,12	0,50	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	0,6
P_2O_5	9,54	NA	NA	Tr	<0,05	<0,5	<0,5	<0,5	<0,5	<0,5	NA
Cr_2O_3	NA	0,2	0,43	NA	0,13–0,45	0,45	0,15	0,23	0,35	0,29	NA
S	NA	NA	NA	0,07	0,02–0,04	0,02	<0,02	0,02	0,03	0,02	NA
Cu	NA	0,1	NA	NA	<0,02–0,03	<0,2	0,2	<0,2	<0,2	<0,2	NA

* Total iron as Fe_2O_3.
[1] Magnetic concentrate, analysis by permission of Mining Corporation.
[2] Float material, analysis by permission of Highveld Steel and Vanadium Corporation.
[3] Ortlepp (1959).
All other analyses from unpublished reports of Highveld Steel and Vanadium Corporation.

Examples Ti-V-magnetite in India & Russia

The lodestone of the V-Ti Magnetite (Lodestone) Layers of the Kurihundi Area of Sargur Schist Belt, Dharwar Craton contains high TiO_2 (20 to 22.59 wt%), with V_2O_5 (0.85 to 1.15%) and $Fe_2O_3^t$ (72.03 to 74.25%).

The chemical composition of titaniferous magnetite ores and concentrates of Gusevogorsky and Kachkanarsky fields of Russia is shown in Table 1 [1].

Table 1. Chemical composition of ores and concentrates, %.

Field	Ore			Concentrate		
	Fe	V_2O_5	TiO_2	Fe	V_2O_5	TiO_2
Gusevogorsky	16.6	0.13	1.23	61.5	0.59	2.5
Kachkanarsky	16.6	0.14	1.24	63.0	0.60	3.6

Another reserve example the Lac Tio deposit, which represents the largest body of titanium ore of its type in the world has an indicated reserve of 125 million tons. Reserves at Itabo are over 1.7 billion tons Ti-V magnetite.

To compare, the average of the TI-V magnetite in Itabo contains 47.7% Fe or 68% Fe203, 20% Ti02 and 0.62 V205.

One should keep in mind that a laterite is the concentrated pulp of the original host rock, where the soluble minerals have been leached out over millions of years and the Ti-V magnetite has been further concentrated.

Main Vanadium Companies

With global demand for vanadium expected to leapfrog significantly over the next decade, here's a look at some vanadium companies developing and advancing projects.

VanadiumCorp (TSX:VRB): VanadiumCorp has a number of projects in Quebec, with hopes of becoming the only primary producer of vanadium in North America, together with becoming the world's first vanadium battery electrolyte producer.

In particular, the company has the Lac Dore vanadium project, encompassing a vanadium-bearing titaniferous magnetite deposit with a concentrate grade of 1.08 percent. Its other vanadium project, the Iron-T vanadium deposit is currently in the development stage for long-term growth. According to its website, VanadiumCorp's vanadium resource is estimated at 621,214,000 pounds inferred in concentrate.

Largo Resources (TSX:LGO): Largo Resources alleges it is the only pure-pay producer of vanadium, currently focused on production at its Maracas Menchen mine in Brazil. Production commenced in August 2014, and has achieved record production in 2016, producing just under 6,000 tonnes year-to-date. It has an annual production of 9,600 tonnes.

Location	Bahia State, Brazil
Size	17,690 ha
Commodity	Vanadium
Products	V_2O_5 flake, High-purity V_2O_5 flake & powder
Mining type	Open pit
Plant throughput	3,900 tpd
2019 production guidance	10,000-11,000 tpa of V_2O_5
Off-take	100% - Glencore (Expires May 2020)
Reserve life	9 years *

Bushveld Minerals (LON:BMN): The Bushveld Vanadium project is located in South Africa and contains approximately 20 billion tonnes of vanadium as well as titanium, representing 26 percent of the world's vanadium reserves. According to the company's website, the region is a growing vanadium-producing region, with four operations comprising of 25 percent of global vanadium production.

TNG (ASX:TNG): Based in Australia, TNG is currently focused on developing its Mount Peake vanadium-titanium-iron project. The deposit was discovered in 2008, when TNG outlined a magnetite-bearing gabbro containing high-grade vanadium, titanium and iron.

Mount Peake FE V TI Project – Australia by TNG

. JORC compliant resource estimate of 160Mt @ **0.28% vanadium** (V205), 5.3% titanium (TiO2) and 23% iron (Fe), 118Mt of which is a .Measured Resource status;

- Total production - 3.5Mt titanium pigment, 243,000t V_2O_5, and 10.6Mt Fe_2O_3
- 17-year mine life
- Mining rate 3Mtpa (Stage 1) expanding to 6Mtpa (Stage 2) after 4 years
- A$4.7 billion NPV (at 8% discount rate
- 44% IRR
- Pre-production Capex of A$853 million
- Capital payback 3 years
- Net annual operating cash flow A$738 million
- Life of Mine net cash-flow A$11.7 billion

Gossan Resources (TSXV:GSS): Gossan Resources holds a diverse portfolio in a number of resources.The company holds a 50 percent interest in the Pipestone Deposit, although it has been on hiatus for quite some time. Discussions regarding the future of the project resumed in July 2016.

The Pipestone Lake Property is located in north central Manitoba, approximately 150km south of Thompson and 550km north of Winnipeg. It is situated within Northern Flood Agreement Selection Site 1.9, an area that is otherwise withdrawn from staking as a potential and possible future site for a reserve. At the Pipestone Lake's Areas 1 and 2, drilling to date has outlined an a non-compliant NI-43-101 historic indicated resource of 156.8 million tonnes grading 5.56% TiO_2, 28.11% Fe_2O_3 and 0.22% vanadium pentoxide and an inferred resource of 150 million tonnes at a similar grade.

Vanadium market

2018 has been an excellent year for vanadium. The metal is used as an alloy in steel production, but is gaining interest as word spreads of its energy storage potential.

The vanadium redox battery for energy storage has become an important application with ever growing demand in the future.

With demand for the element expected to increase, mining companies are exploring potential sites. Exploration sites in the United States, Canada, and Central and South America also show promise. **But, despite all the searching, finding a commercially viable deposit is still rare, finding a world class deposit is ever rare.**

Like lithium and cobalt, which have become vital to the small-scale battery manufacturing sector, vanadium is proving instrumental in large-scale energy storage systems, particularly the vanadium redox flow battery (VRFB). The metal saw significant price growth in 2018 and even reached highs not seen in over a decade. “Really, 2018 was the year of vanadium,” said Jack Bedder, director at Roskill. “Prices increased considerably in 2017, but in 2018 the price rise intensified.”

“Q1 prices averaged US$62 per kilogram, Q2 prices US$69 and Q3 prices US$86,” he explained. “In October, prices reached an average of US$115 and **US$120** in November. This put prices at 13-year highs.”

Vanadium outlook 2019: Higher prices, smaller supply

After spiking to its 13-year high in November, the price of V2O5 flake used in energy storage has come down from roughly US$33 per pound to US$23.90. Ferrovanadium used in steel manufacturing also experienced a price drop and now sits at US$98 per kilogram. However, insiders see the price decrease as a momentary hiccup, and expect the positive trajectory experienced in 2018 to continue.

“The expectation is that vanadium prices will continue to rise and the development of new mineral properties previously uneconomically viable will grow,” said CellCube’s Neylan. **“Companies with high vanadium production costs will have difficulty if prices moderate or decline.”**

This positive outlook was reiterated by Moore of Energy Fuels. “We believe vanadium markets will remain strong in 2019 and 2020,” said Moore. “Today’s market strength is caused by significant production cuts, primarily in China, for environmental, health and safety reasons, along with significant increased demand, primarily due to new rebar standards in China that can only be met through increased use of vanadium.”

The vanadium redox battery for energy storage has become an important application with ever growing demand in the future.

Some facts about Ti02

The most important application areas are paints and varnishes as well as paper and plastics, which account for about 80% of the world's titanium dioxide consumption. Other pigment applications such as printing inks, fibers, rubber, cosmetic products and food account for another 8%. The rest is used in other applications, for instance the production of technical pure titanium, glass and glass ceramics, electrical ceramics, catalysts, electric conductors and chemical intermediates.

The five largest TiO pigment processors are in 2019 Chemours, Cristal Global, Venator-Huntsman, Kronos and Tronox, which is the largest one. Major paint and coating company end users for pigment grade titanium dioxide include Akzo Nobel, PPG Industries, Sherwin Williams, BASF, Kansai Paints and Valspar. Global TiO pigment demand for 2010 was 5.3 Mt with annual growth expected to be about 3-4%.
It is verified that the contract price of TiO_2 remains unchanged within three quarters in North America and this is the first time for three years that the manufacturers do not increase the price. According to the estimation of ICIS, the contract price of TiO_2 in North America maintains at 2.00 to 2.12 $/lb. Since the fourth quarter of 2009 when the contract price was 1.09 to 1.19 $/lb, it keeps climbing up straightly, resulting in the present price has increased 90% compared to that of three years ago.

Industrial Minerals assessed prices for titanium dioxide pigment, high quality, bulk volume, cfr Asia, at $2,600-3,000 per tonne on August 9, compared to a yearly high of $2,800-3,100 per tonne last assessed on June 7.

According to USGS, in 2013, the leading producers of *titanium* concentrates included South Africa (1.22 million tonnes), Australia (1.39 million tonnes), the US (300 thousand tonnes), China (950 thousand tonnes), Canada (770 thousand tonnes) and India (366 thousand tonnes).

This is a **list of countries by titanium sponge production** in 2010–2016 based on USGS figures. The production figures are for titanium sponge, units are in metric tons.

Rank	Country/Region	2010	2011	2012	2013	2014	2015	2016
	World	137,0	186,0	200,0	209,0	194,0	160,0	170
1	China	57,80	60,00	80,00	105,0	110,0	62,00	60,0
2	Russia	25,80	40,00	44,00	44,00	42,00	40,00	38,0
3	Japan	31,60	56,00	40,00	42,00	25,0	42,0	54,0
4	Kazakhstan	14,50	20,700	25,000	12,000	9,000	9,000	9,000
5	Ukraine	7,400	9,000	10,000	6,300	7,200	7,700	7,500
6	India	-	-	-	-	-	500	500

Nearby village of Katueté.

Paraguayan Mining Law

Prospection surface area cost is $0.50/hectare for one year plus half year. One has to invest $1.00/year/hectare in the field. Exploration over 4 years is $1.00/hectare/year surface rights.
To proceed in Paraguay, the exploration-exploitation concession passes through Congress, where they prepare a specific law for the project. The clauses specify the right to exploit, commercialize and export the mined commodities at a fixed royalty for a period of 20 years renewable. This specific law, where terms may be negotiated before its publication, may not be changed by any government in the future as outlined in the Constitution, but may be modified by request of the concession holder if financial requirements have a justified merit.

There are only two taxes: 10% company taxes and 10% sales tax for sales of commodities in Paraguay. One obtains 10% tax credit for exports, an amount which would be higher than the corporate tax.
Royalties would fluctuate around 2.5%. Investments over 5 Million are corporate tax exempt over the first 5 years.