CONE
MINE EXPLORATION

1 - INTRODUCTION

1.1 – OBJECTIVE

The follow present report has an objective to describe the accomplished works in offices and fields for the geologic and economic description of the area referring to the Monlevade Project of the Cone Mine Exploration. This work has a main goal elaborate an evaluation of the iron ore reserves in the area of the process, quantifying and qualifying them with accuracy.

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1.2 – MINERAL LEGISLATION IN BRAZIL

The laws that conduct the mining activities in Brazil established that the subsoil belongs to the federal government. That way, activities of prospection, exploration and exploitation just are possible with the government authorization through of its department DNPM (National Department of Mineral Production). Each process of mineral exploration is evaluated by the DNPM based in technique criteria and the authorizations are granted in two stages: Exploration License and The Mine Work Concession. The authorization holder of DNPM has full and exclusive rights about the work execution, as well about the commercialization of the area.

1.3 – MINING IN BRAZIL

Brazil stands out worldwide as one of the main producers of the minerals goods.

The mining industry in Brazil has a highest technology level and technique, being forward of a several obtained innovations in this area in the last decades.

In all regions of the country exists an extensive web of education for the formation of professional that attempt to the mining's demand. The high workforce qualification, together to good infra-structure and low productive cost becomes the mining in Brazil object of a great interest by the part of the foreign and national investors.

Brazil is the second bigger producer of the iron ore (approximately 20% of worldwide production) and the third bigger producer of bauxite (approximately 13% of the worldwide production). Data of the IBRAM (Brazilian

Institute of Mining) presented that in 2008 the Brazilian mineral sector employed 161 thousand people in the mine work activity and the value of the commercialized national production was US$ 29 billion.

Adding the commercialized rude ore production to the production of the sector of mineral transformation, the mining of Brazil generated in 2008 US$ 42 billion, what represents 5.7% of the GIP. The positive scene reflects in the investments of the sector that are foreseen in US$ 47 billion between 2009 and 2013.

1.4 – Iron ore in the Iron quadrangle

The worldwide iron ore reserves (measure + indicated) are in the order of 310 billion of tons. Brazil has 6,7% of this reserves (21,0 billion tons) and it is in a 5th place between the countries which have the biggest volumes of the ore. However the high grade of iron in its ore (60,0 to 67,0% in hematite and 50,0 to 60,0% in the itabirites) takes Brazil to occupy the place of prominence in the worldwide scene, in terms of iron contained in the ore. 70% of the Brazilian reserves can find in the state of Minas Gerais (198 million tons), being the big part of these are in the iron quadrangle, traditional region in the extraction of this mineral goods. The region of the Iron quadrangle, had importants itabirite and hematite iron ore deposits of high grade (Fe > 60%).

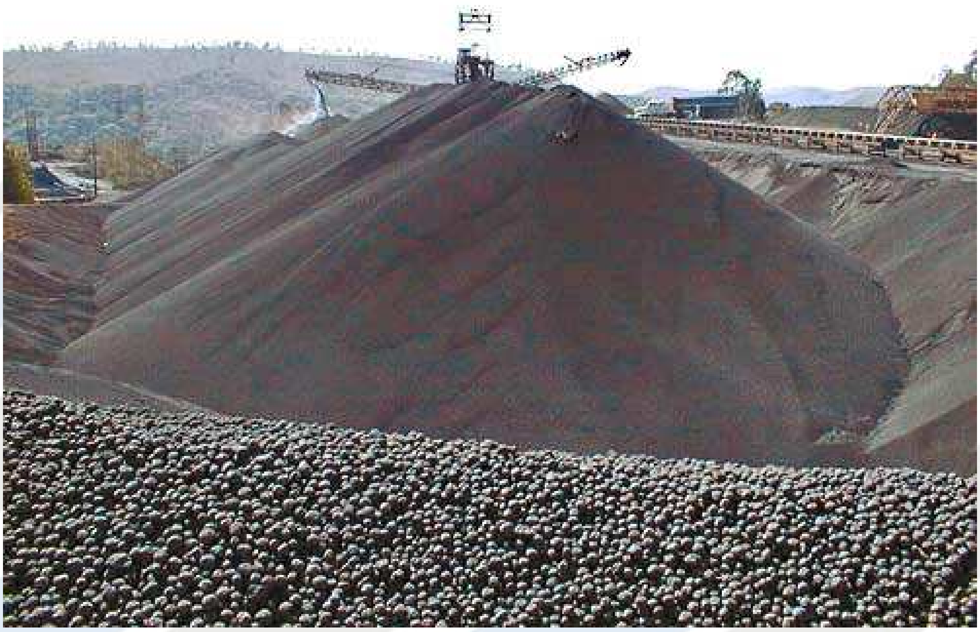

Image 1 – Iron Ore from the Iron quadrangle

1.4.1 – Stratigraphy

Table 1 - Simplified Stratigraphic Column of the Ferriferous-Quadrilateral - CPRM

	RECENT SEDIMENTARY COVERAGE		
PROTEROZOIC	**ESPINHAÇO SUPERGROUP**	Conselheiro Mata Group	Cambotas Formation
	Itacolomi Group		
	MINAS SUPERGROUP	Piracicaba Group	Sabará Formation
			Barreiro Formation
			Taboões Formation
			Fecho do Funil Formation
			Cercadinho Formation
		Itabira Group	Gandarela Formation
			Cauê Formation
		Caraça Group	Batatal Formation
			Moeda Formation
		Tamanduá Group	
ARCHAEAN	**RIO DAS VELHAS SUPERGROUP**	Maquiné Group	Casa Forte Formation
			Palmital Formation
		Nova Lima Group	Schist meta-sedimentary and metavolcanic
		Quebra-Osso Group	Metavolcanic mafic-ultramafic Association
	GRANITE-GNEISSIC-ARCHAEAN TERRAIN		

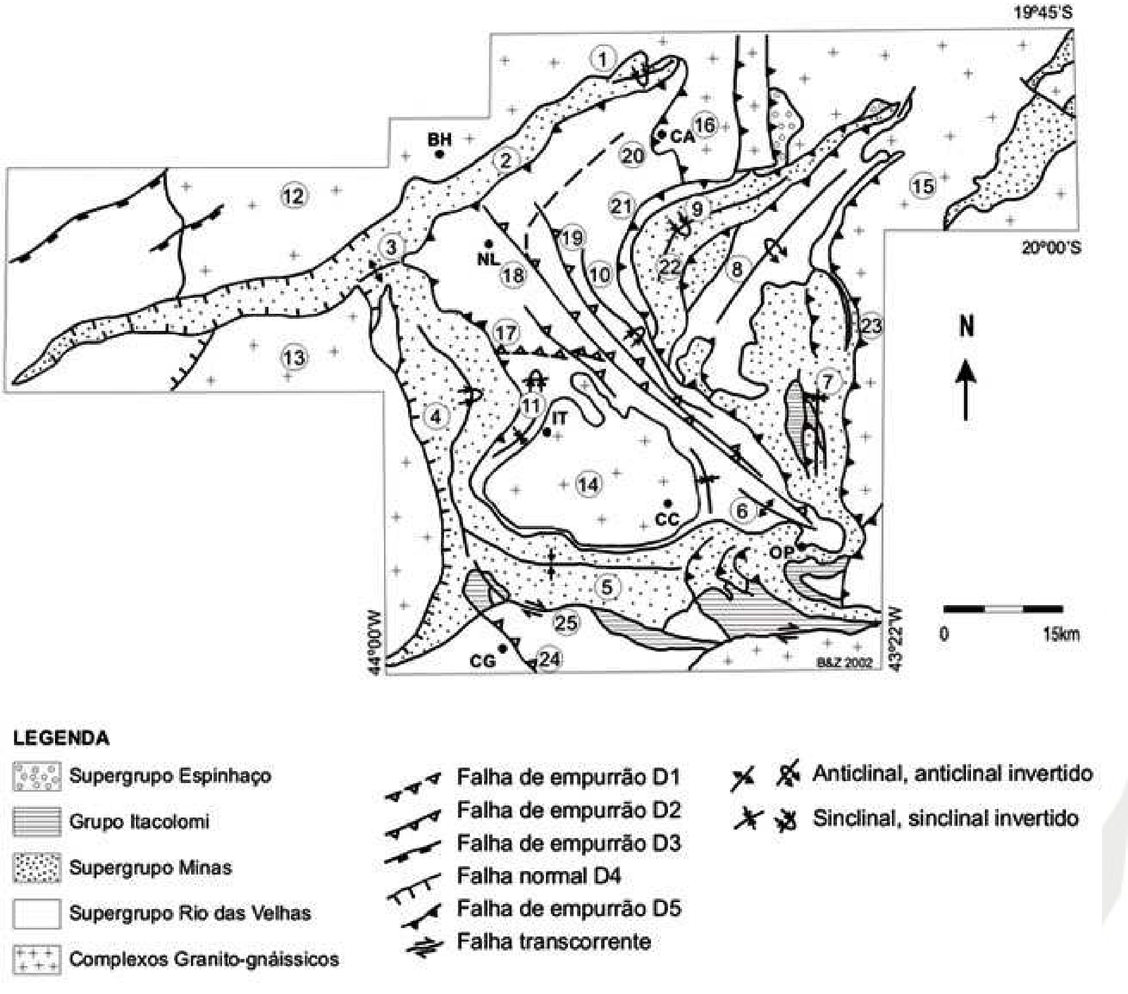

Image 2 - Structural Map of the Iron Quadrangle - CPRM

Subtitles: Fold: 1 - Syncline Piedade, 2 - Homocline Serra do Curral, 3 - Anticline Serra do Curral, 4 - Moeda Sincline, 5 - Dom Bosco Sincline, 6 - Mariana Anticline, 7 - Syncline Santa Rita, 8 - Anticline Conceição, 9 - Syncline Gandarela, 10 - Syncline Vargem do Lima, 11 – Andaimes Syncline. Granite-gneiss Complex: 12 - Belo Horizonte, 13 - Bonfim, 14 - Bação, 15 - Santa Bárbara, 16 - Caeté. Falhas: 17-Bem-Te-Vi, 18 -São Vicente, 19 - Raposos, 20 - Caeté, 21 - Cambotas, 22 - Fundão, 23 - Água Quente, 24 - Congonhas, 25 - Engenho. Cidades: BH - Belo Horizonte, CC - Cachoeira do Campo, IT - Itabirito, NL - Nova Lima, CA - Caeté, CG - Congonhas, OP - Ouro Preto.

1.4.2 – Basic Geology of the Iron Quadrangle

The crystalline basement of the Iron Quadrangle is compound by the gneissic metamorphic complex denominated of Bonfim Complex and Moeda Complex (west side of the Moeda Mountain), Congonhas Complex (to southwest of Iron Quadrangle); Santa Rita Complex (to southwest of the Ouro Branco Mountain Range); Caeté Complex (to east of the Caeté town); Belo Horizonte Complex (to the north of the Curral Mountain); Santa Bárbara Complex (to the east of the Caraça Mountain Range) and Bação Complex (which it is in the center of the Iron Quadrangle).

Geocronological Analyses in rocks' samples by some of these complexes, revealed ages of 2,9-3,2 Ga. And also, two generations of plutons for the Neoarchaean: 2,78-2,77 Ga. (calcium alkaline plutons) and 2,73-2,62 Ga. (granites anorogenic).

Rio das Velhas Supergroup

The ages between 2,776 Ga. and 2,857 Ga. allows say that the Rio das Velhas Supergroup along with the plutonic rocks represents a typical terrain granite-greenstone of the Archaean.

The metavolcanic and metasedimentary rocks form the Rio das Velhas Supergroup, subdividing in two groups (Nova Lima (base) and Maquiné (top)). The Maquiné Group divide in two formations:

- Palmital Formation (base); compound by quartz sericite, quartz phyllite and phyllite.
- Casa Forte Formation; compound by quartz sericite, chloritic, schists and phyllite.

The Nova Lima Group represents a sequence of a “greenstone belt” type subdividing in three units, from the bottom to the top:

- Metavolcanic Unit; compound by serpentine, steatite, Talc-schists, amphibolites metamorphosed, metabasalt and metatuffs, besides of komatiites with spinifex structure.
- Chemistry Metasedimentary Unity, represented by carbonetic schists, metacherts, banded iron formation and phyllites:
- Clastic Metasedimentary Unity, represented by quartz-schists, quartz phyllites, impure quartzite and meta-conglomerates.

Minas Supergroup

The Minas Supergroup is subdividing from the base to the top in the Tamanduá, Caraça, Itabira and Piracicaba Group.

The Tamanduá Group is represented by a set of by a set of quartzite, phyllite, quartz and clay shists, itabirites phyllite and dolomite, conglomerates and coarse quartzite.

The Group Caraça is compound by the Caraça quartzite (Moeda Formation) and Batatal schists (Batatal Formation)

- Moeda Formation represented by conglomerates and coarse quartzite of fluvial origin and fine quartzite and phyllites by transitional-marine origin.
- Batatal Formation; constituted by phyllites sericites, graphitic and locally this formation can presents chloritic and carbonate sediments, being that in the superior part can be seen fine layers of chert and hematite.

The Itabira Group divides in two formations, from the base to the top:

- Cauê Formation; predominatly represented by a iron formation of lake superior kind and subordinate by dolomiticos and amphibolitics itabiritos with small phyllites lenses and marl and some manganiferous horizons.

- Gandarela Formation; compound by layers of carbonate rocks represented by dolomite and subordinate by itabiritos, dolomitic phyllites and phyllites.

The Piracicaba Group divides in five formations, from the base to the top:

- Cercadinho Formation; represented by ferruginous quartzite, ferruginous phyllite, phyllite, quartzite and small interpolated of dolomite;

- Fecho do Funil Formation: represented by dolomitic phyllite, phyllite and impure dolomite;

- Taboões Formation: represented by fine and massive quartzite;

- Barreiro Formation: represented by phyllite and graphitic phyllite;

-Sabará Formation: represented by phyllite, chlorite-schist, greywacke and locally tuffs and cherts.

Itacolomi Group

The Itacolomi Group is represented by quartzite, conglomeratic quartzite and lenses of conglomerate with pebbles of itabirito, phyllite, quartzite and vein quartzite, deposited in coastal and deltaic environment.

1.4.3 – Itabirites of the Iron Quadrangle

The Itabirites are compound by iron rich bands (mainly hematite and magnetite) interpolated with quartz and/or dolomite rich bands (BIF- banded iron formations). The high grade iron ore are mainly compound by hematite, being used directly in blast furnace, as granulated ore.

The process area is in the municipality of Ouro Preto, the old capital of Minas Gerais during the heyday of gold mining in Brazil (XVII and XVIII). In recent decades the region has seen innovations in the use of ultra-fine ore, which allowed the region to be itabirites concentrated to levels exceeding 67% Fe.

1.5 – NEAREST MINING

Near to the local there is a mine in operation owned by Baovale Mining, another area of Vale SA with mining concession and some others areas with exploration request.

Figure 1 – Close Mining

1.5 – ALLOCATION

Figure 2 – Allocation (Source – Google Earth)

1.6 – RIO PIRACICABA COUNTY

1.6.1 – Characterization

Area: 373 Km^2

Altitude:

Maximum: 1340 m
Local: Serra do Seara
Minimum: 643 m
Local: Andre creek
Central Point in Town: 690 m

Temperature:

Average Annual:	20,1 °C
Maximum average annual:	26,5 °C
Minimum average annual:	15,9 °C

Annual average rainfall: 1372 mm

Relief:

Topography:	%
Plan:	10
Corrugated:	20
Mountain:	70

Main Rivers:

PIRACICABA RIVER
CAXAMBU CREEK

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1.6.2. Population

Resident Population in 1970, 1980, 1991, 2000, 2005

ANOS	URBANA	RURAL	TOTAL
1970	7.776	5.456	13.232
1980	9.085	3.527	12.612
1991	10.277	3.399	13.676
2000	10.790	3.221	14.011
2005(1)			14.427

Source: Brazilian Institute of Geography and Statistics - (IBGE)

(1) Preliminary Data

1.6.3. Transport Road

Approximate Distances to the main centers (Km):

Belo Horizonte: 132
Rio de Janeiro: 466
São Paulo: 712
Brasília: 858
Vitória: 410

Main Highways that connects to Belo Horizonte:

BR-381, MG-123

Main Highways to Access the Municipality:

BR-262, MG-123

Boundaries Counties:

BELA VISTA DE MINAS

JOAO MONLEVADE

SAO GONCALO DO RIO ABAIXO

SANTA BARBARA

ALVINOPOLIS

SAO DOMINGOS DO PRATA

Railways:

Distances to the main centers (Km):

Belo Horizonte: 142
Rio de Janeiro: 701
São Paulo: 985
Brasília: 1.315
Vitória: 565

Sources: Departamento de Estradas de Rodagem do Estado de Minas Gerais
Ferrovia Centro Atlântica - FCA
Estrada de Ferro Vitória Minas
Diretoria de Eletrônica e Proteção ao Vôo / Ministério da Aeronáutica

2 – LOGISTIC AND ACCESSIBILITY

2.1 – HOW TO ARRIVE

Departing from Belo Horizonte, the Ring Road highway. Continue to BR-381. Follow this road for 106 km. Passing through the city of Joao Monlevade. Turn right at MG-123 after 7.5 km. Turn right again. The project area is located 550 m.

2.2– MAIN HIGHWAYS OF ACCESS

The main access routes to the area of the process are made through the BR-262, BR-381 and MG-123 besides the vicinal roads next to the process area.

2.3 – AIRPORT

The main airport next to the area of the process is the Tancredo Neves International Airport, located in the Confins County – MG, metropolitan region of Belo Horizonte, in a trajectory of approximately 160 km up to the area. Another important airport present in Belo Horizonte is the Pampulha Airport, which was considered an international airport before the transference of its activities to the Tancredo Neves International Airport. Nowadays Pampulha operates just the regional flights. This airport is located about 130 km of distance to the area of the process, being its access by the Tancredo Neves International Airport route.

Image 3 – Partial View of the Tancredo Neves International Airport

2.4 – RAILWAYS

The nearest railroad to the process area is the EFVM (Railway Vitoria - Minas) under the responsibility of VALE that connects to the port of Tubarão in Vitoria state of Espírito Santo.

There is also access to the railway operated by MRS Logistics, which connects the state of Minas Gerais to some of the main Brazilians ports in Rio de Janeiro, such as Guaíba and Itaguaí.

2.4.1. Terminal de Cargas de Sarzedo

Launched in 2006, located about 40 km of the center of Belo Horizonte, with railroad access of the MRS Logistic and an area of 700 thousand square meters, the Load terminal of Sarzedo movement actually around eight million of tons per year, distributed between Containers, Pig-Iron and Iron Ore, among others loads. Through of the established partnership between the Link Logistic Group, the railway MRS Logistic and the Triunfo Operadora Portuária, was created a new channel of Pig-Iron exportation by the Rio de Janeiro Port. Nowadays, the group is already responsible by the leaking of more than a half of the Pig-iron production from the south system, having concluded the year of 2007 with more than one million tons shipped.

The terminal located in the rural region of the Sarzedo County, was designed for a initial load capacity of 150.000 tons/month, attending an increasing demand by the railroad transport, by ores and others region's product. It was built throughout the railroad of the MRS Logistic and extends for 1.400 meters.

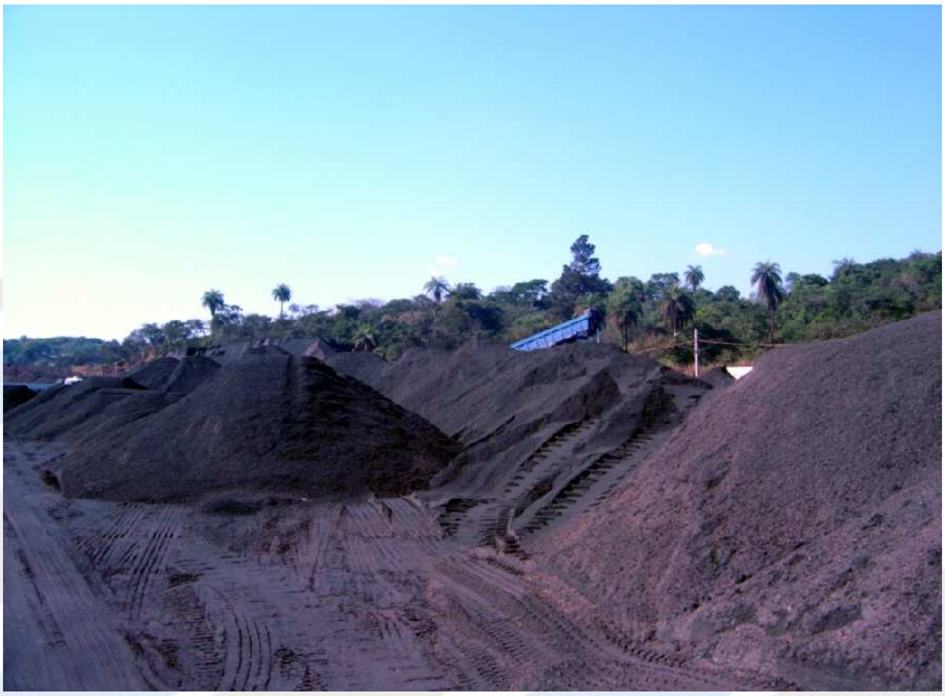

Image 4 - Area of iron ore storage, already existing

The MRS logistic, managed by the VALE, is a concessionary that operates the call “Southeast Mesh” of the Federal Railways Network S.A. It is responsible by the iron ore and pig ore transport which are stored at the Load Terminal of Sarzedo.

The mesh of MRS gives railroad access to the main Brazilian ports: Rio de Janeiro, Itaguaí and Santos, besides attend to the privative terminal of iron ore shipment in the Guaíba Island, located in Angra dos Reis. The market of the load transports in the area of the mesh influence of MRS is extremely favorable to the railway sector, means by the nature of the active products, means by the demand punctual concentration. In this region concentrates 65% of Brazil’s gross domestic product and are installed in the largest industries in the country (mainly siderurgy and cement plants).

2.4.2.1 – Access to the Load Terminal of Sarzedo

The access to the cargo terminal in Sarzedo from the process area can be done by taking the highway MG-443, then follow the BR-040 and continuing by the MG-040 to the town of Sarzedo. In town follow the road parallel to railway line that will give access the cargo terminal.

Figure 5 - Load Trains of the MRS Logistic

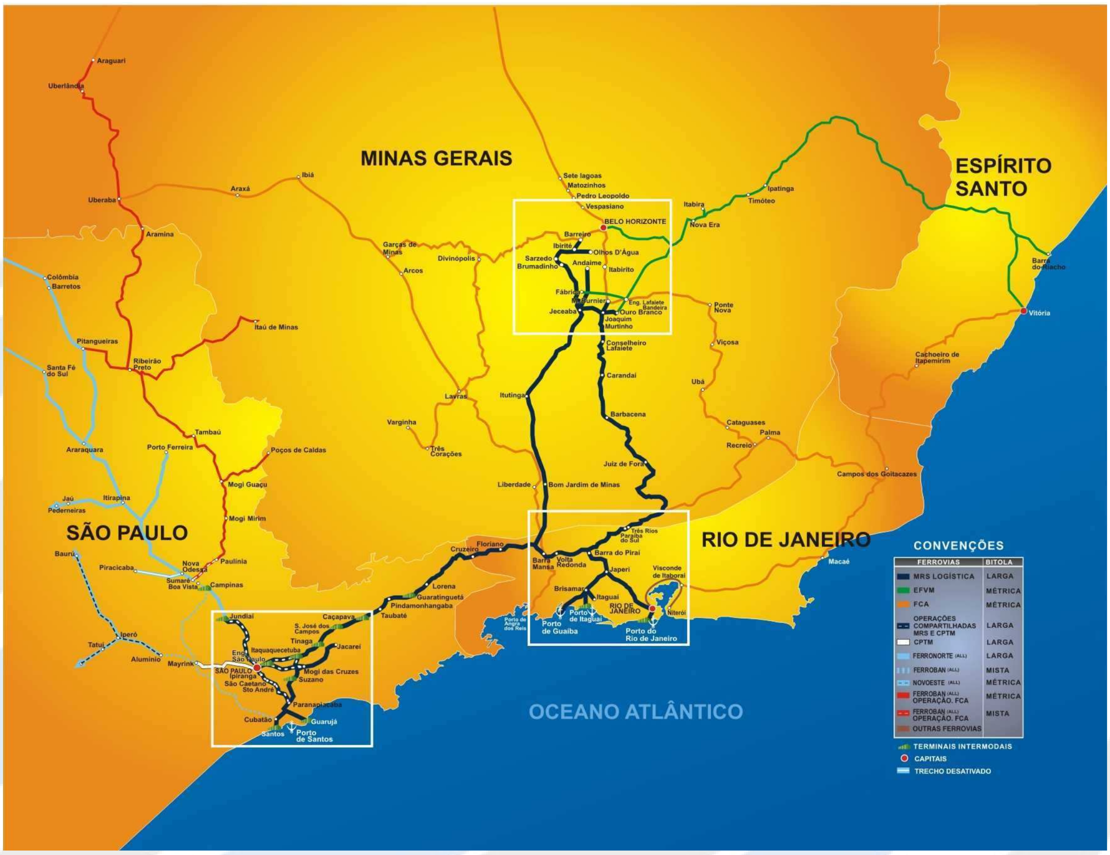

Figure 6 – Railway Network of MRS

LINK: http://www.mrs.com.br/aempresa/popup_mrs_ok.php

2.6 – PORTS

2.6.1 – Port of Itaguaí - RJ

The port of Itaguaí, situated at 553 km of distance (railway line) of the load terminal of Sarzedo, present an area of 10 million square meters by flat area, a channel of access with up to 20m by depth and ranks of docking in sheltered waters, with industrial logistic infrastructure and technology in telecommunication and supply, multimodal accesses and facilities of transports. Itaguaí port will offer immediately cost reduction for the user in an international level of productivity. The Itaguaí Port, modernized to follow the competitiveness of the national and international port trade, will be the 1st HUB PORT of the South Atlantic. In a distance of 500 km are located productive agents responsible by the formation around 70% of the Brazilian GDP (Gross Domestic Product). It is a singular port between the Brazilian and Latin-American ports. With competitive physics characteristic, have a maritime access to receive big and updated ships above of 6.000 TEUs.

Terminal of Ore – To assist the crescent demand of its ore, Vale is developing in the Itaguaí Port an investment of US$ 120 million dollars. With that it will be enable to export, in the future, from 15 to 20 million tons of iron ore. In the future it will assist ships with up to 230 thousand DWT, in a pier with depth of 18,7m. Its modern equipments allow the ship's loading in a rate up to 10 thousand tons/hour. For the second stage, after additional dredging for 20 meters of depth, the Terminal of Ore Exportation will load super bulkers with up to 230.000 DWT, so assisting the tendency prevailed in the transoceanic trade of the bulks. Through the MRS railroad capable to move up to 70 million tons of iron ore per year.

The MRS has exclusive access to the terminal of the Itaguaí Port, among them the Sepetiba Tecon (Containers), CSN Tecar (Bulks) and CPBS - VALE (Iron Ore Exportation).

Figure 7 – Partial View of the Itaguaí Port.

2.5.2 – BRAZORE - Port Terminal in the Sepetiba Bay - RJ

An Adriana Resources Inc. through its subsidiary in Brazil, the BRAZORE, is developing an iron ore port in the Brazilian coast, which will operate initially with a capacity of twenty million tons per year with prevision of expansion to the fifty million tons through the development of the deep sea port terminal.

The port area is located 70 kilometers west-bound Rio de Janeiro in the Sepetiba Bay in Brazilian coast, and have direct access to the extensive railway and transportation network. The property consists in 857.575 square meters of low area in the east of Itacuruça Channel. The MRS Logistic Railway passes through the northen edge of the property. The Highway BR-101 runs parallel to the railway, and the Highway RJ-14 runs next to the western side of the property. The Ingussu River forms the eastern boundary and a smaller river called Rio do Papai runs through the property near the western boundary.

The port potential building should start in 2009, and should take from 18 to 24 months to be ready. The fast-start installation will consist of railway wagon receiving, storage, recovery and equipment of barge loading. The iron ore will be loaded in a transfer barge Seabulk of shallow draft “lighters” which will carry and load it directly on the oceanic vessels employees in the transport and maritime trade of iron ore. This transshipment will occur in a deeply place approximately distant 8 nautical miles from the port. With the processed quantity increase, the installation of the terminal will be expanded and will become more efficient with addition of collector forklift stacker-reclaimers and a second anchorage for loading. The maritime capacity will be expanded and will become efficient with the integration of storage floating and transfer vessel permanently anchored near the coast.

Figure 8 – Illustration of the transshipment vessel.

Competitive Advantage

The port site is located 70 kilometers west-bound Rio de Janeiro in the Sepetiba Bay in Brazilian coast, and have direct access to the extensive railway and transportation network.

- The port will provide access to the global steel market for the iron producers and minimized the bottleneck in the iron ore exportation in Brazil.
- Strategic partners ArcelorMittal, Worldlink Resources Ltd and Athena Resources LLC.
- Opportunity to determine the strategic working relations with significant number of independently iron mines, and also with deposit of iron ore and mines acquires recently by big mining company, with or without port limited access.

- The urbanization, globalization and industrialization in China, Índia and others emerging countries indicates the needs to expand the capacity of the iron ore exportation.
- The Iron Quadrangle, located in the Minas Gerais States in Brazil, provides access to some of the largest iron coal bed unexplored in the world.

The Company is evaluating iron ore projects in Brazil, especially in Minas Gerais with a view to obtaining participation on this project of the iron ore or mine development, being the increase of the metals demand, specifically iron ore, in countries that are developing as China and India has created some of the best infrastructure in the last years.

The opportunity of infrastructure in Brazil to the independent iron ore port, become an excellent opportunity to capitalize the restricted market of the many small and medium iron ore producers located in the State of Minas Gerais.

Figure 9 – Proposed place for anchorage of the transshipment vessel.

2.5.3 LLX – Southeast Port– RJ

The Southeast Port is a privative terminal of mixing use located in the Itaguaí County, Sepetiba Bay, Rio de Janeiro, next to the public port of Itaguaí.

With a depth of 20 meters, the Southeast Port will be able to receive ships capesize, and will be used for shipment of iron ore.

With an internal area of 52,1 hectares, the Southeast Port will shelter court to stockage and handling of iron ore with storage capacity of 25 million of tons per year (mtpa), in a first phase, may expanding its capacity to 50 million (mtpa) in a 2nd phase. The LLX have already got the previous environmental license for 2 cradles with total of 50 million tons per year.

Figure 10 – Artistic Conception of the port in operation.

With a privileged allocation, the Southeast Port will going to benefit of the infra-structure of terrestrial and maritime access already existent. Its integration with railroad MRS (MRS Logistic S.A) will allow that the Southeast Port attend some of the main miners regions located in Minas Gerais. Besides that its connection with the future Anel Rodoviário of Rio de Janeiro will allow an easy access to the metropolitans region of Rio de Janeiro and São Paulo.

The Southeast Port will start the operations around the second semester of 2011, with the goal to accomplish the iron ore loading proceeding from the State of Minas Gerais of the MMX Southeast mines and of the other independent miners, than exploring its contiguous privileged condition to the Sepetiba Port. In the first phase, the project will have 1 cradle of mooring, which may, in the second phase, reach 2 cradles of mooring with capacity of 50 million tons per year.

Link: http://www.llx.com.br

3 - Final Report of Mineral Research

3.1 Abstract

The purpose of this report is to present the result of exploration conducted in the area, mainly in outcrops, where evidence has been mapped by the geologist of the iron formation in the area to above.

The main works performed were:

Maps are initially purchased for refund aerophotogrammetric scale 1:5,000, with digitization and expansion of 1:2000 scale maps. Materialized at the vertices of polygonal landmarks as specified by the DNPM. The geological work were carried out in a large survey in the years 1999 and 2000 at 1:20,000 scale, based on, or changing the items they generated in doubt.

Were made 21 wells of exploration on the NE side, with most of them positive iron formation, with a total of 112.60 m.

The scaling of geological resources was 105,132,184 tons, being 1,671,048 t calculated, 3,341,296 t indicated and 100,119,840 t inferred.

The cost of exploration was R $ 62,800.00 (sixty-two thousand eight hundred reais).

Average results of the products obtained from the ROM crushed to 10.00 mm, chemical quality.

RANGE Nº	WEIGHT (%)	CHEMICAL (%)								
		Fe	**SiO_2**	**Al_2O_3**	**P**	**LI***	**Mn**	**TiO_2**	**CaO**	**MgO**
+10,00	7,57	57,96	12,48	1,32	0,069	2,93	0,093	0,267	0,005	0,011
-10,00+6,40	8,35	57,81	12,51	1,83	0,068	3,09	0,034	0,289	0,005	0,014
-6,40+1,00	16,25	58,78	11,38	1,33	0,054	2,87	0,036	0,191	0,004	0,010
-1,00+0,10	24,40	62,82	8,67	0,47	0,031	1,06	0,014	0,082	0,004	0,005
-0,10	3,65	62,12	7,56	0,79	0,059	2,42	0,017	0,142	0,004	0,009
AVERAGE	60,22	60,38	10,35	1,02	0,049	2,15	0,033	0,167	0,004	0,009

***LI = Loss on Ignition test**

Results of the products obtained from the cubed ore by transverse vertical sections 105,132,184 t x (P. ROM%) =

RESERVE (t)	WEIGHT (%)	SINTER FEED PRODUCT	CHEMICAL (%)								
			Fe	**SiO_2**	**Al_2O_3**	**P**	**PF**	**Mn**	**TiO_2**	**CaO**	**MgO**
105.132.186	60,22	63.310.598	60,38	10,35	1,02	0,049	2,15	0,033	0,167	0,004	0,009

3.2 - PROSPECTION AND EXPLORATION WORK

3.2.1 - Infrastructure

There was no need for deployment of infrastructure in place, because people are moving, daily, at the beginning and end of the day.

3.2.2 - Topographic survey

Maps were initially purchased for refund aerophotogrammetric (GEORAMA) 1:5,000 scale and detailing area was restricted to mineralized zones and small bands wrapped.

We conducted a demarcation of the permit; determined to be the point of attaching the geographic North by observation of an absolute zenith distance, making up six target to get the average, the variation or approximation, not exceeding 15 "(fifteen seconds), where the zenith distance was corrected for parallax and refraction of the semi diameter, with corrections for the zenith and instrumental level. He settled in concrete milestones to mark the vertices of the polygon.

3.2.3 - Geological Mapping

The works were based on geological mapping surveys of the squares of the Piracicaba River and John Monlevade, made by Robert G. Reeves, scale 1:25,000, and regional mapping carried out by M. Antonio Carlos, scale 1:20,000. After the materialization of the polygon, it was a geological survey in detail, visiting and following all the outcrops of iron formation, differing from the various lithologies, shale, quartzite cave and cover and basement granite-gneiss.

It was highlighted three main areas, where the iron formation outcrop in the area within the perimeter of the polygon: 1st zone SW (southwest), 2nd zone center and zone 3 SW NE (northeast).

By having the data produced vertical cross-sections of mineralized zones: in the 1st zone SW 4 sections; in the 2nd zone center / SW 4 sections in zone 3 and northeast (NE) 7 sections. A total of 15 sections covering the entire mineralized area.

3.2.4 - Exploration by Wells

The area iron formation was investigated in the next 3 or northeast (NE). The wells were made at irregular mesh covering the entire mineralized area. Most of these wells were positive and some wells were located in quartz-mica schist cover training in Annex 04, has a list of wells and their depths, according to the perforated material and Annex 04, there is a description of wells.

3.2.5 - Ore Processing - Chemical Analysis

The ore samples itabirite received treatment crushing and normal, to obtain the thin type "sinter feed. The samples were crushed and sieved, separating the grain size range in thick and thin series, we used the following screens: 38 mm 31 mm 25 mm 19 mm 15.9 mm, 12.9 mm and -12 9 mm. For the series, we used thin screens of 10 mm, 8 mm, 6.35 mm, 6 mm, 4 mm, 3 mm 2 mm 1 mm, 0.50 mm, 0.25 mm, 0.15 mm, 0.10 mm, 0.074 mm and -0.074 mm.

Samples of the respective intervals were prepared for chemical analysis an aliquot of the following elements: Fe and SiO_2.

Based on the results of the granulometric and chemical similarity with minerals and other products from neighboring mines, in operation today, Morro Agudo and Agua Limpa, the ore is a typical grain size of coarse itabirite, specularite and magnetic and shall be subject to the gravimetric concentration

Or flotation, in order to obtain fine, or concentrates of high purity. It appears that the products resulting from the ore and its mixtures have a competitive product on the market. The average content of 41.21% Fe with silica and fully released, presenting as ore typical of the region's current mining district of Rio Piracicaba, with features of high grade concentrates and finer material.

It was found that the layer of iron formation, this polygon is continuous and has in some restricted areas, a concentration of hematite content.

In a second step, providing for a total use, other jobs will run, especially after the viability of current made.

3.2.6 - Physical and Chemical properties of the Ore

The ore is represented by a specularite the most mass, secondarily, hematite and magnetite.

For this report were not made metallurgical testing. These will be made when feasible and that it becomes necessary to submit a test batch of pre extraction.

It is expected that the behavior of the products do not present major discrepancies in the ore, now processed at the plants of CVRD, particularly, Agua Limpa and Morro Agudo.

Predominates itabirite also composed of coarse quartz and specularite in platelets. Superficially, there is a high incidence of flat iron, which shows a higher average grade of ore.

The itabirite is colored light gray breast with crisp, coarse quartz, with an average grade of 41.21% Fe from the outcrops visited a low incidence of this compact and itabirite silica is only released when grinding, it is expected that any compact itabirite reverts to sterile.

In the package of the iron formation is intercalation of mica in passages centimetric and metric as well as segregation and quartz veins. Itabirite surface is crispy, a variation with depth, and retention and or fractures through which helps percolation.

Another characteristic is that the minerals leach easily, greatly facilitating the release of silica and grains of hematite / specularite.

The phosphorus content is equal to 0.01%, the body is homogeneous and small passages are observed lens hematite. They may also be conditioned to their faults and formation probably due to the occurrence of metasomatic enrichment processes hypogenic. There is an iron formation on the surface, partially hydrated, and crusts with changeover yoke, all the fractures are filled by iron hydroxides. It is observed that recrystallization of quartz, or nodule.

The degree of compactness was established by macroscopic observations and tap. Itabirites compacts that have content above 30% of iron are itabirites merge with hematite, which explains some good results obtained by gravimetric separation itabirite semi compact.

3.2.7 - Calculation of Chemical Content

The following is the chemical content obtained in the testing of wells positive in iron formation.

WELL Nº	METERS (m)	CHEMICAL CONTENT (%)	
		Fe	SiO_2
01	2,40	61,32	8,25
	1,75	33,06	47,50
06	0,85	28,65	51,80
07	3,00	66,81	0,72
	2,20	28,85	51,50
12	2,00	45,38	22,60
	2,80	12,16	48,80
AVERAGE	15,00	41,21	29,62

Observe that was included in the sample itabirite very poor, which should be discarded in the extraction and to the survey we can obtain other intervals of hematite and content of ROM (Run of Mine) increase.

The analysis of the ROM of the wells showed 41.21% Fe, we performed a re-sampling of wells, generating seven samples which were tested to determine the concentration level of the bench, whose average result is presented below.

a) Result (average) of +10.00 mm to 31.50 mm crushed ROM of exploration wells:

RANGE Nº	WEIGHT (%)	CHEMICAL (%)								
		Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
+10,00	7,57	57,96	12,48	1,32	0,069	2,93	0,093	0,267	0,005	0,011

b) Outcome of medium size analysis of crushed ROM to 10.00 mm:

MESH (mm) / SIMPLE WEIGHT (%)																			
9,50	**7,90**	**6,40**	**5,60**	**4,80**	**3,60**	**2,40**	**1,00**	**0,60**	**0,30**	**0,21**	**0,15**	**0,105**	**0,074**	**0,053**	**0,044**	**0,037**	**-0,032**	**-1+0,1**
0,73	3,29	4,31	2,45	5,22	6,18	5,19	9,57	5,99	20,03	13,75	9,09	5,82	2,56	1,50	0,95	0,35	2,99	54,68

c) Average result of chemical analysis of bead-ROM crushed to 10.00 mm:

RANGE Nº	WEIGHT (%)	CHEMICAL (%)								
		Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
-10,0 +6,4	8,35	57,21	12,49	1,83	0,0068	3,09	0,034	0,289	0,005	0,012
-6,4 +1,0	28,65	53,52	18,54	1,33	0,060	3,28	0,037	0,173	0,005	0,011
-1,0	63,04	46,77	30,51	0,61	0,099	1,83	0,012	0,077	0,006	0,012
ROM CALC.	100,00	49,69	25,47	0,93	0,047	2,37	0,021	0,124	0,006	0,011

d) Results of tests average friability and mass recovery of ROM crushed to 10.00 mm:

FRIABILITY AVERAGE (%)	RECOVERY IN MASS MIDDLE (%)
72,35	52,67

e) Average result of the products obtained from the ROM crushed to 10.00 mm (concentrated):

Range –10,00 +6,40mm

WEIGHT ROM (%)	CHEMICAL (%)								
	Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
8,35	57,81	12,51	1,83	0,068	3,09	0,034	0,289	0,005	0,014

Range -6,40 +1,00mm (PANNING CONCENTRATE)

WEIGHT ROM	CHEMICAL (%)								
(%)	Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
16,25	58,78	11,38	1,33	0,054	2,87	0,036	0,191	0,004	0,010

Range -1,00 +0,10mm (PANNING CONCENTRATE)

WEIGHT ROM	CHEMICAL (%)								
(%)	Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
24,40	62,82	8,67	0,47	0,031	1,06	0,014	0,082	0,004	0,005

Range -0,10mm (PANNING CONCENTRATE)

WEIGHT ROM	CHEMICAL (%)								
(%)	Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
3,65	62,12	7,56	0,79	0,059	2,42	0,017	0,142	0,004	0,009

f) Quality of the average chemical products:

RANGE	WEIGHT	CHEMICAL (%)								
Nº	(%)	Fe	SiO_2	Al_2O_3	P	LI	Mn	TiO_2	CaO	MgO
+10,00	7,57	57,96	12,48	1,32	0,069	2,93	0,093	0,267	0,005	0,011
-10,00+6,40	8,35	57,81	12,51	1,83	0,068	3,09	0,034	0,289	0,005	0,014
-6,40+1,00	16,25	58,78	11,38	1,33	0,054	2,87	0,036	0,191	0,004	0,010
-1,00+0,10	24,40	62,82	8,67	0,47	0,031	1,06	0,014	0,082	0,004	0,005
-0,10	3,65	62,12	7,56	0,79	0,059	2,42	0,017	0,142	0,004	0,009
AVERAGE	60,22	60,38	10,35	1,02	0,049	2,15	0,033	0,167	0,004	0,009

g) Calculation of the product obtained considering the concentration measured reserves, indicated and inferred from 105,132,184 tons, considering that 60.22% of the ore processed is equal to a product "sinter feed, whose result is presented below:

RESERVE (t)	WEIGHT (%)	SINTER FEED PRODUCT	CHEMICAL (%)								
			Fe	**SiO_2**	**Al_2O_3**	**P**	**LI**	**Mn**	**TiO_2**	**CaO**	**MgO**
105.132.186	60,22	63.310.598	60,38	10,35	1,02	0,049	2,15	0,033	0,167	0,004	0,009

3.3 - GEOMETRY AND DISTRIBUTION OF ORE

The basic lithologic constitution is composed roughly by a continuous layer of iron formation, with the direction of the layer of NE. The hematite is present in intercalated itabirite. Literally is contained in the penultimate sequence of the iron formation, composed of successive thrust fault, being the primary cause for her to be contained within the intercalated quartzite sericitic Currency, the limpet training.

This layer has its wedging in doubles in the NE side and wedging a sharp and lenticular SW.

The iron formation shows a deep weathering profile, rarely being found in surface and compact portions of ore. Some portions of bodies of hematite can be compact in depth, prevailing, however, the condition of a semi-crispy.

3.3.1 - Ore Paragenesis and Aspects about Genesis

L. W. Von Eschwege (1822-1833) in his studies of Precambrian geology of Minas Gerais, said the first foundations of the genesis of iron ore from the Iron Quadrangle.

In the later studies of Eschwege, not very different theories have been put forward by the initials, just additions.

There are two fundamental theories, among many others, to explain the genesis of banded iron formations. The first was posited by Djalma Guimarães (1961) and establishes the chemical sedimentation of ferric hydroxides associated with submarine basaltic flows in a sedimentary basin.

The theory of the formation of hematite accepted by D. Guimaraes (1961), Guild and Barbosa (1952), and many other geologists associate the process of metasomatic replacement of character with the phenomena of hydrothermal leaching of quartz. The substitution would give rise to the richest ore lenses.

It is considered that the role of regional metamorphism would also be responsible for the segregation of richer regions, as well as the actions given by tectonism tending to dismember bodies and differentiate.

The second main theory for the formation of itabirites was enunciated by Edson Suszinski and admits the possibility of continental contribution, ie, from metabasites, hydroxides would be deposited in an oxidizing environment and siliceous nature.

The formation of hematite would be related to dehydration of hydroxides, as a consequence of regional metamorphism, which also produce the lamination itabirites.

It is also believed that the hematite may have a sedimentary origin, where, for any deficiency in silica in the environment, would be deposited only iron hydroxides.

There are some levels locally rich in chlorite and other holders of magnetite (in contacts with the footwall shales). However, the primary mineralogy is represented by hematite and quartz.

3.3.2 - Types of Ore

It was observed the predominance of bodies itabirite buddies rich with silica and fully released, with low in silica and phosphorus, according to the analysis performed, the ore is compatible with the use today, compared to "cut off" currently adopted in other mines surrounding the deposit, representing a great book for an overall utilization of the entire mining district of Rio Piracicaba.

3.3.3 - Types of Sterile

In a final pit mining, or even sterile intercalations observed, are represented by a friable quartzite sericitic and a micaxist, both are easy to dig, to promote a positive progress in the mining works. The bodies of ironstone are easily removed with explosives and will be used as rich ore.

3.4 - ESTIMATE OF RESERVES

In this report we tried to estimate the mineral resources and the three areas where the iron formation outcrop, which were divided according to its location on the polygon of the study area, where: South SW-S/SW area, center area - SW (C / SW) and the North East (NE). These areas was only drilled exploration wells in the area northeast (NE), a total of 21 wells, one positive. Initially, it was estimated the total resource of iron formation by measuring the area in each section and each section (S / SW), (E / SE) and (NE), multiplying by the distance of influence of 200 m equidistant between sections, resulting in the volume, multiplied by the density of d = 2.8 t/m^3, you get the tonnage (t). Followed up a level for the calculation of the total reserves of around 900m.

As noted in the spreadsheet 03, the action of the iron formation in the three areas where the ore outcrops, there is 105,132,184 t. It is noteworthy that only 21 wells were located on the NE a total of 112.60 m, according worksheet 02, the iron formation has reached 48.00 m.

3.4.1 - Calculation of Measure Reserve

To calculate the reserve measure, the area was measured in vertical sections 01, 03, 04, 05, 06 and 07, considering the depth of the positive wells, ie, who reached the iron formation in each section. It is a measure of the column depth of positive wells in column 2 or stretch the perimeter of the surface of iron formation, by multiplying the values in column 1 x column 2 gives the area of the reserve measure, multiplied by the distance influence between sections, 200 m, gives the volume, multiplied by the density of 2.8 t/m^3, we get the tonnage, or 1,671,048 t of total reserves measure.

3.4.2 - Calculation of Indicated Reserve

The indicated reserve was calculated in the same vertical sections were measured in areas of the reserve measure, ie, sections 01, 03, 04, 05, 06 and 07, taking two times the water depth footage of the positive wells, as shown 03 on the worksheet, multiplying column 1 x column 2, we obtain the reserve area is multiplied by the distance of influence 200m, has the volume, multiplying by the density of 2.8 t/m^3, is obtained you get 3,341,296 t.

3.4.3 - Calculation of Inferred Reserve

Takes Reservations are inferred by subtracting the total resource of iron formation, obtained in the three areas C NE + / SW + S / T SW = 105,132,184 - 1,671,048 tons (measured reserve) - 3,341,296 tons (Indicated reserve) has 100,119,840 t (Inferred reserve).

The values measured + indicated reserves will be augmented with additional research planned on continuing studies. Must be stuck areas and south-central SW / SW with wells and in-depth research in order to be proposed boreholes in complementary research.

3.4.5 - Summary of Reserves

TYPE	TONNAGE (t)
MEASURE	1.671.048
INDICATED	3.341.296
INFERRED	100.119.840
TOTAL	**105.132.184**

4 – COSTS

4.1 – MINE WORK AND PROCESSING

The cost with the mine work of iron ore for monthly production estimate in 250.000 tons and its respective processing are presented as follow:

4.1.1. Production Datas (Monthly Estimates)

					Production rate	
Mines' extraction	9	h/day	26	day/month	**1068**	**t/hour**
Processing	9	h/day	26	day/month	**855**	**t/hour**

Monthly Production of the Extracted Ore = 250.000 tons

Monthly Production of the Processed Ore = 200.000 tons

*P.S..: Considering a recovery of 80% in the process.

Considering the relation sterile/ore = 2/1

4.1.2. Cost of the Mine work (Monthly Estimates)

Cut and ROM Load (R$1,00/t) = R$ 250.000,00

ROM Transport = R$ 200.000,00

Drilling and Dismounting = R$ 250.000,00

Road Maintenance = R$ 100.000,00

Sterile Transport (R$0,50/t) = R$ 250.000,00

Cut and Load of Sterile (R$0,50/t) = R$ 250.000,00

General Expenses = R$ 87.500,00

Unit Cost = R$ 5,55 / ton (US$ 3.00)

MONTHLY TOTAL (USD) = US$ 750,000.00

4.1.3. Cost of the Processing (Monthly Estimates)

Material/Maintenance = R$300.000,00

Crusher Feeding = R$150.000,00

Electric Energy = R$ 150.000,00

General Expenses = R$ 100.000,00

Quality Control = R$40.000,00

Unit Cost = R$ 3,70 (US$ 2.00) / ton of product

MONTHLY TOTAL (USD) = US$ 400,000.00

4.3 – ROAD TRANSPORT

The considered road transport is in relation to the distance between the area and FCA Railroad in Ponte Nova City. The estimative base is about R$ 0,1875/km/ton of sinter in dump trucks of 30 tons.

Mine-terminal distance: 80km

Unit Cost = R$ 8,11 (US$ 4.38) / ton

MONTHLY TOTAL (USD) = US$ 1,621,621.62

4.4 – STORAGE AND LOADING – LOAD TERMINAL

The whole receiving, weighing, handling, storage, transshipment and loading, besides the whole relative documentation to these operations, will be making in the Load Terminal of Sarzedo. So for a monthly estimate, we have:

Unit Cost = R$ 10,17 (US$ 5.50) / ton

MONTHLY TOTAL (USD) = US$ 1,100,000.00

4.5 – RAILROAD TRANSPORT

The railroad transport will be making by the iron train of the FCA - Railroad up to the destination port.

Unit Cost = R$ 37,00 (US$ 20.00) / ton

MONTHLY TOTAL (USD) = US$ 4,000,000.00

4.6 – PORT

The port costs involve unloading, stockage and loading in ships. The estimated average cost for ports in Rio de Janeiro is about R$27,75/ton of sinter-feed ore.

Unit Cost = R$ 27,75 (US$ 15.00) / ton

MONTHLY TOTAL (USD) = US$3,000,000.00

5 – ECONOMIC POTENTIAL OF THE ENTERPRISE

Verifying the exploration positive result according to the accomplished estimates, the enterprise will make possible the commercialization of the ore FOB (Rio de Janeiro) to the monthly cost of **US$ 10,871,621.62** to 200 thousand commercialized tons. Considering an extra US$10.00/ton for additional costs, this give us a FOB cost of **US$64.36/tonelada**.

This represents a rude profit potential of **US$ 20.64/**commercialized **ton**, equivalent of **31% of a profit over the total cost** of the productive chain.

Considering the reserve of 100 million tons, it is evaluated, with basis on the expected profitability and in a recovery of processing by 90%, that the enterprise has a **NPV undiscounted in time and without consideration of CAPEX by US$2,064,000,000.00**.

Consideration: Exchange: US$1.00 = R$1,85 and sale's value of the ore = US$ 85.00).