CONE

MINE EXPLORATION

Henrique Project

Iron Ore

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SUMMARY

1. INTRODUCTION

The Henrique Project aim to integrate operations of mining, processing, production and logistic of the iron ore of the region, with the goal to reach an expressive position in the Brazilian market and abroad.

The Henrique Project owns 20 mineral rights, with a total of 11,500 hectares. Some of them with preliminary exploration work.

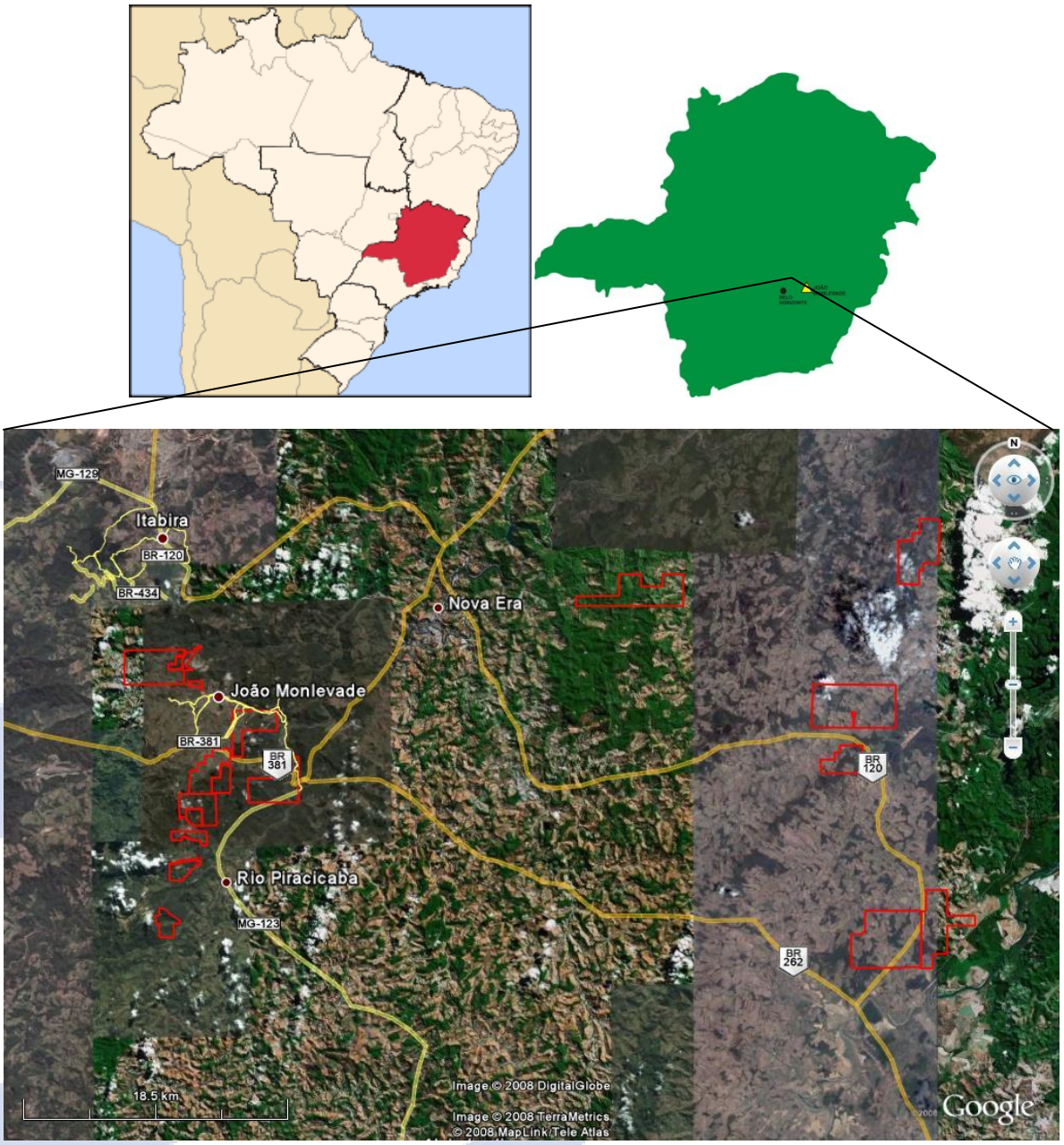
The region has many active iron mines in the same geological horizon of this deposit.

Picture 1: Iron mine of Minas Gerais

2. LOCATION

The deposit is located in the state of Minas Gerais (MG), southeast of Brazil, less than 150 Km from the capital Belo Horizonte.

The access is made from Belo Horizonte using paved roads up to the region and then unpaved roads to reach the deposit location.



Picture 2: Location of the deposit

3. EVALUATED ORES

Using the geological mapping with scale 1:5,000 and the interpretation of the vertical sections, was created a preliminary geological model of the local.

The evaluation was based on geometric data of the area and a macroscopic analysis of the ores.

The siliceous itabirites, in general present a reasonable quantity of iron. It is believed that can reach the 55% of iron rate.

3.1 HEMATITE

THE HEMATITE REPRESENTS THE RICH ORE IN ALL FRACTIONS (NEAR 63% OF IRON). THIS LITHOTYPE OCCASIONALLY OCCURS IN THE MAPPED AREA AND, WHEN PRESENT, IS MAINLY IN THE FORM OF CENTIMETRIC TO DECIMETRIC LENS AMID THE SILICEOUS ITABIRITE.

MACROSCOPICALLY IS DARK GREY TO BLACK COLOR, LOCALLY RED, USUALLY COMPACT AND SLIGHTLY SCHISTOSE.

HEMATITE LENSES APPEAR TO BE DERIVED OF TECTO-METAMORPHIC ACTION, BEING ASSOCIATED TO BENT RICH ITABIRITE.

3.2 SILICEOUS ITABIRITE

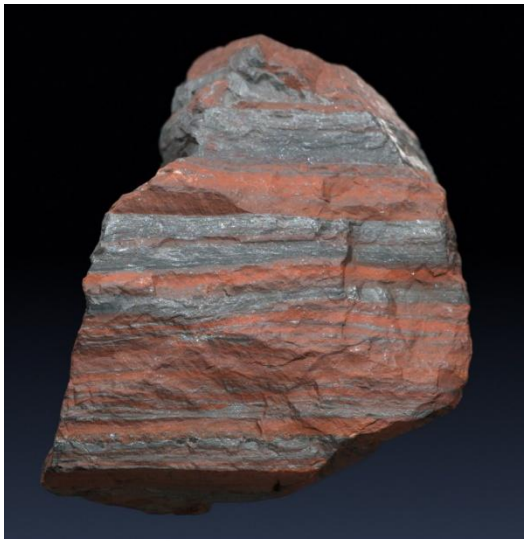
THIS LITHOTYPE OCCURRING THE FIELD OF THE MAPPED IRON FORMATIONS. THE SILICEOUS ITABIRITES HAVE IRON GRADES RANGING FROM 45 TO 63%.

IT WAS OBSERVED IN THE FIELD, COMPACT ITABIRITES AND FRIABLE ITABIRITES WITH 45 TO 55% OF IRON.

MACROSCOPICALLY THE ITABIRITES ARE GRAY TO BLUISH GRAY, ASSUMING A REDDISH COLOR WHEN WEATHERED.

THE BANDS HAVE THEIR THICKNESS AND IRON HATES VARYING.

PICTURE 3: HEMATITE



PICTURE 4: ITABIRITE

4. GEOLOGY

The stratigraphy of the studied area comprehends archean granitic-gneiss basement, compost by TTG gneiss, granite, migmatite, amphibolite and meta-sediments of the Supergrupo Minas, proterozoic.

The region is characterized by the presence of many nappes (tectonic scales) of the Supergrupo Minas, imposed by a ductile tectonic shearing, bestride type. These nappes are interspersed by slides of the basement, mobilized during the shearing event.

This tectonic event generated an intense disruption accompanied by the stretching of the layers, showing in the local imbrications and significant amendments.

These nappes frequently show a tectonic-stratigraphy similar as the one described for the Quadrilátero Ferrífero, from bottom to top:

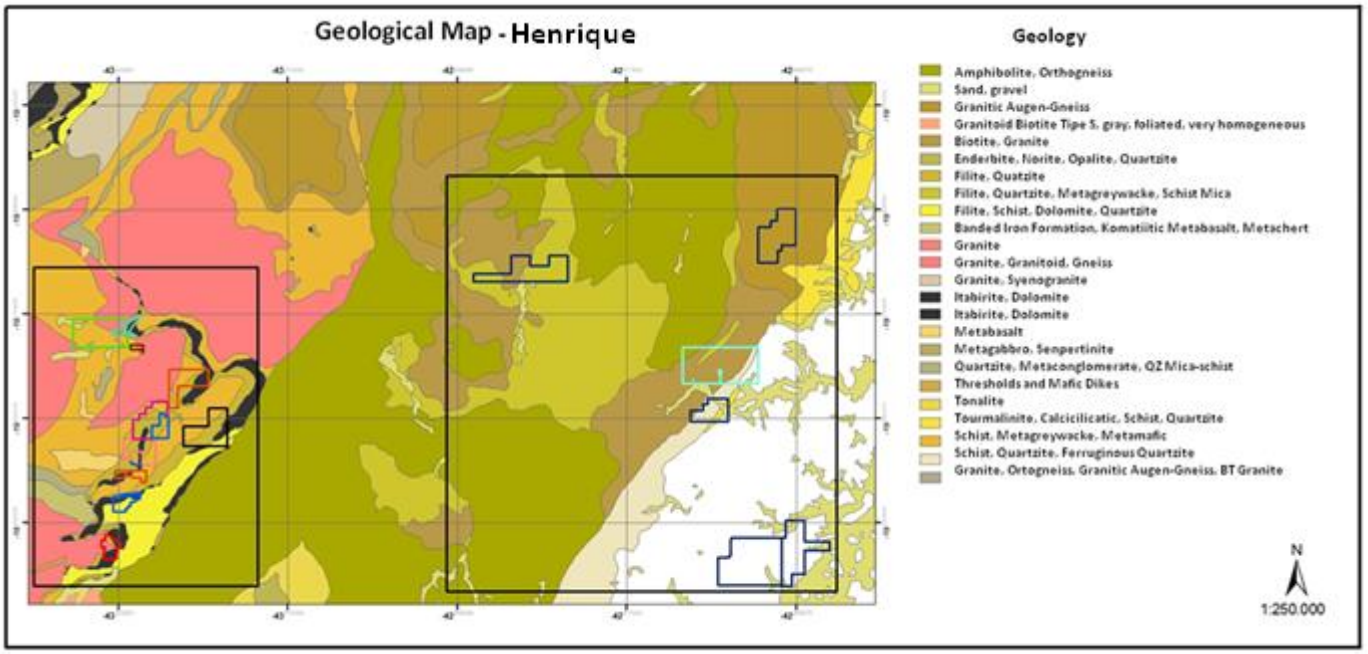
- MOEDA FORMATION: QUARTZITE, SERICITIC, SCHIST AND QUARTZ-SCHIST;
- BATATAL FORMATION: SCHIST, GRAPHITIC SCHIST, MICA-SCHIST WITH GARNET AND SOMETIMES GRAPHITE AND KYANITE;
- CAUÊ FORMATION: SILICEOUS ITABIRITE, SUBORDINATE DOLOMITIC ITABIRITE AND HEMATITE;
- GANDARELA FORMATION: MAFIC META-VULCANIC; META DOLOMITE; DOLOMITIC SCHIST AND META-LIMESTONE;
- PIRACICABA GROUP (UNDIVIDED): MICA SCHIST, QUARTZITE, FERRUGINOUS QUARTZITE AND SCHIST, META-DOLOMITE AND MAFIC SILICEOUS META-DOLOMITE.

The formations described above and the Piracicaba Group display metamorphic grade amphibolite, generating a medium to gross granulation of the lithotype.

In the region are found pegmatite corpses normally associated with the tectonic contact of the nappes basis, where may find gems.

The iron layers of the Cauê Formation, in the nappes, are generally continuous. However, these layers have a tendency to wedging and dismemberment due to their more competent behavior.

In the mapped area the tectonic events generated a foliation generally mylonitic with low dip angle (about 20°) to the south/southeast, associated with a stretching lineation direction EW.



PICTURE 5: GEOLOGICAL MAP OF THE REGION

5. RESEARCH WORKS

The geological map of the area is the result of many works done in the year of 2005.

The area was mapped in the scale of 1:5,000 using orthopictures and topographic bases.

It was created a geological vision for the iron portion. The work resulted in a map and vertical geological sections with surface information, which were used to create a preliminary geologic model.

The research works done are resumed in the icons bellow.

5.1 TOPOGRAPHIC WORK

THE TOPOGRAPHIC BASES WERE PRODUCED IN 1995, USING AEROPHOTOGRAMMETRIC RESTITUTION, IN SCALES 1:20,000 AND 1:5,000, PROVIDED BY THE CUSTOMER.

5.2 GEOLOGIC MAPPING

FOR THE GEOLOGICAL MAP IN THE SCALE 1:5,000 WERE USED ORTOPHOTOS PROVIDED BY CEMIG (1989) IN THE SCALE OF 1:10,000 AND THEIR TOPOGRAPHIC BASES.

THE GEOLOGICAL MAP WAS ELABORATED USING INFORMATION GATHERED DURING WALKS THRU ROADS, RIFGES TALWEGS, TRAILS, ETC. THE OBJECTIVE WAS RAISE THE GEOLOGICAL CONTACTS, EXISTING COVERS, STRUCTURES AND OTHER INFORMATIONS, WHICH TOGETHER CONSOLIDATED THE PRELIMINARY MODEL FOR THE AREA.

5.3 GEOLOGICAL MODEL

THE INTERPRETATION OF THE GEOLOGICAL MODEL IS THE RESULT OF THE INTEGRATION OF INFORMATION FROM THE RESEARCH WORK, MAINLY FROM SURFACE GEOLOGICAL MAPPING.

THE MODEL IS MADE OF FIVE VERTICAL GEOLOGICAL SECTIONS WITH IRREGULAR SPACING.

5.3.1 TYPOLOGY OF THE ORES

THE TERMS ITABIRITE AND HEMATITE HAVE GEOLOGICAL DEFINITIONS WITH GENETIC IMPLICATIONS. ACCORDING TO DORR & BARBOSA (1963), ITABIRITE IS A METAMORPHIZED BANDED IRON FORMATION OF THE FACIES OXIDE, WHILE HEMATITE (HIGH-GRADE ORE) COULD BE FORMED FROM SILICEOUS ITABIRITES BY METASOMATIC HYDROTERMAL ALTERATION. HOWEVER, IT IS BELIEVED THAT THE SAMPLES OF HEMATITE ARE DERIVED FROM ORIGINAL SEDIMENTATION, BEING DISMEMBERED AND EMPHASIZED BY TECTONIC AND METAMORPHIC EVENTS.

VARIATIONS IN THE WEATHERING DEGREE IS A FACTOR THAT INFLUENCES THE TYPE OF THE ORE, VARYING FROM A VERY BROKEN OR WEATHERED ORE TO HARD AND COMPACT ORES.

IN THE AREA ARE OBSERVED JUST FRIABLE TO SEMI-COMPACT ITABRITES.

5.3.2 VERTICAL GEOLOGICAL SECTIONS

BASED ON THE TOPOGRAPHY WORK, IN SCALE 1:5,000 WERE GENERATED TOPOGRAPHIC PROFILES AND WITH THE ADDICTION OF THE SURFACE INFORMATION WERE INTERPRETED THE GEOLOGICAL SECTIONS.

THE GEOLOGICAL MAP COULD BE DETAILED USING THE INTERPOLATION OF THE SAME WITH VERTICAL SECTIONS.

5.4 EVALUATION METHODOLOGY OF RESOURCES AND POTENTIAL

USING THE INTERPRETED VERTICAL GEOLOGICAL SECTIONS, WAS PERFORMED A PRELIMINARY EVALUATION OF THE RESOURCES AND POTENTIAL OF THE DEPOSIT.

THE EVALUATION OF THE RESOURCES WAS MADE FOR SILICEUS ITABIRITES, THAT REPRESENTS MOST PART OF THE IRON FORMATION, BEING DISMISSED THE HEMATITE LENS BECAUSE OF THEIR SMALL DIMENSION.

THE TONNAGE WAS OBTAINED BY THE VOLUME CALCULATION USING THE VERTICAL SECTIONS METHOD. THIS METHOD GENERATES SOLIDS OF THE LITHOTYPES OF THE INTERPRETED AREA IN THE SECTIONS.

THE DENSITY ADOPTED FOR THIS STUDY WAS 2.7 T/M³ FOR BANDED IRON FORMATION. THIS VALUE WAS ESTIMATED FROM STUDIES DONE IN THE PAST.

THE EVALUATION METHODOLOGY USED TOOK INTO CONSIDERATION THE TOTAL INTERPRETED AREA FOR VERTICAL SECTIONS. WAS TAKEN AS PIT LIMIT THE LIMIT OF THE PROCESS AND THE RELATIONSHIP STERILE/ORE 1:1.

THE EVALUATION PERFORMED ESTABLISHES THAT THE TOTALITY OF THE RESOURCE MAY BE CONSIDERED AS EXPLOTATED RESERVE.

Abstract of the deposit

Type	Reserve (t)
Measured	1.671.048
Indicated	3.341.296
Inferred	100.119.840
Total	**105.132.184**

Table of Contents

Substance	Average Grade (%)	Substance	Average Grade (%)
Fe	60,38	Mn	0,033
SiO_2	10,35	TiO_2	0,167
Al_2O_3	1,02	CaO	0,004
P	0,049	MgO	0,009
PF	2,15		

6. CONCLUSION AND RECOMMENDATIONS

The content of the iron formation is interesting, mainly considering silica liberation, chemical characteristic and granulometry of the ore.

It is recommended for a better characterization, the execution of boreholes and new physical-chemical tests, aiming to create a more precise model for the area.