AUROPEAN Slovakia s.r.o., Nová 132, 058 01 Gánovce, Slovakia
DOM STEINER s.r.o., Nová 132, 058 01 Gánovce, Slovakia

Slovinky–Gelnica Exploration Area

Review of Geological Work and Results

– Intermediate Report –

Author: Dr. Karol Piovarcsy - DOM STEINER s.r.o.
Reviewed: V. N. Rampton, PhD., P.Eng. – President and CEO Auropean Ventures Inc.

February 2, 2012


JAMA DOROTA
POVRCH : 501,3 m n.m.
37. OBZOR : 42,2 m n.m.
HĹBKA JAMY : 458,6 m
UKONČENIE ŤAŽBY : 1993

CONTENTS **Page**

List of figures **Page**

1. INTRODUCTION

This intermediate-stage report is based on work performed in 2010–2011 on two adjacent exploration areas ("EAs") in Slovakia (62.42 km^2 total), one near the town of Slovinky (Figure 1) and one near the town of Gelnica (Figure 2). The Slovinky EA is 6.38 km^2 (Figure 1). It was approved for Au, Ag, Pb, Zn and Sb exploration by the Ministry of Environment on September 19, 2011[1]. The Gelnica EA is 56.04 km^2 (Figure 2). It was approved for exploration of mineral ores from which metals can be obtained by industrial processes by the Ministry of Environment on September 29, 2011[2]. Since the two EAs are adjoining, they are described together below.

2. MAIN OBJECTIVES

The work carried out involved a comprehensive review of the territory to evaluate the possibility of ore structures (mainly Cu, Au, Ag ores) and included other geological and technical work between the towns of Slovinky, Gelnica and Helcmanovce.

The works was scheduled for 4 years to

- assess previously collected geochemical, petrographical, structural, hydrogeological and geophysical data;
- assess the geology of the area;
- assess the possible continuation of the ore-bearing structures at surface and at depth;
- review of bearings; and
- identify vein structures with trenching and bore holes.

In actuality, Auropean plans to start drilling gold- and silver-enriched copper veins in order to delineate deposits and evaluate their economic viability within the 4 year time period.

3. DESCRIPTION OF WORK

In 2011, we collected pan concentrate samples from Slovinky Creek and its tributaries. We also collected float samples, dump samples, and samples from outcrops of rock and vein structures in the dump areas.

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[1] No. 7639/2011-9.3 file, registration number 53701/2011 the legality of 29.09.2011 transferred to AUROPEAN SLOVAKIA s. r. a., new 132/14, 058 01 Gánovce, Slovakia.

[2] No. 1498/2011-9.3 file, registration number 55969/2011 the legality of 04.10.2011 transferred to AUROPEAN SLOVAKIA s. r. a., new 132/14, 058 01 Gánovce, Slovakia.

3.1 Pan concentrate sampling

Between March 22 and 31, 2011, forty-four pan concentrate samples were collected from the Slovinky Creek and its tributaries by Karol Piovarcsy and Pavol Ujházy. Sample locations were recorded using a Garmin GPS and plotted on a 1:5 000 map. For each sample, a minimum of 10 kg of sediment was shoveled from the bottom of the stream and then wet sieved down to about 1 kg of <0.2 mm sediment. Sampling sites were described in a workbook, noting date of collection, sampling location, GPS coordinates and elevation, weight of pan concentrate before sieving, weight of pan concentrate after sieving, color of pan concentrate, water temperature, nature of the surrounding rocks, and nature of the minerals in the surrounding rocks. The sampling location was marked with reflective tape in a nearby tree.

Each sample filled two plastic bags. These were transported to the warehouse at company headquarters. Subsequently, samples were transported to the laboratory at the Geological Survey of Slovakia in Kosice where they were mechanically divided into 3 fractions, heavy, light and waste. Samples were dried in an electric oven, weighed, and placed into a paper bags. Samples were then analyzed under binocular microscope, noting the percentage of each mineral. Heavy mineral fractions were sent to the ALS Minerals laboratory in Camas, Spain, for analysis.

At the ALS Minerals laboratory, the samples collected during 2011 were crushed to sand-sized particles (80% of sample < 2 mm) and then pulverized to very fine sand and mud-sized particles (85% of sample < 75 microns). Pulps were then sent to Canada where thirty grams were fire assayed for gold with either an AES or AAS finish (ALS: Au-ICP21 and Au-AA23). The remaining elements (Ag, Al, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Cs, Fe, Ga, Ge, Hf, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, Re, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn, and Zr) were analyzed by ICP-MS and ICP-AES after a four acid digestion (ALS: ME-MS61). A number of samples had only selected elements analyzed (Cu, Ag, As, Cd, Co, Mo, Ni, Pb, Zn) (ALS: ME-ACD81).

Samples previously collected during 1998 were crushed, pulverized, sieved (150 mesh) and homogenized in Slovakia prior to a 100 g split being forwarded to Activation Laboratories in Ancaster, Ontario (ActLab) where they were analyzed for gold plus As, Ba, Br, Ce, Co, Cr, Cs, Eu, Fe, Hf, Hg, Ir, La, Lu, Na, Nd, Rb, Sb, Sc, Se, Sm, Sn, Ta, Th, Tb, U, W, and Yb through Instrumental Neutron Activation Analysis (INAA). Copper plus Ag, Al, Be, Bi, Ca, Cd, K, Mg,

Nn, Mo, Ni, P, Pb, Sr, Ti, V, Y, and Zn values were determined by ICP-OES after a four acid digestion (ActLab: 1H:Au+49). Both Activation Laboratories and ALS Minerals are SCC Accredited Laboratories and practice full quality control during all analytical and assay procedures.

3.2. Rock sampling

Three hundred and thirty seven rock samples were collected from April to August 2011 in the Slovinky and Gelnica EAs by Karol Piovarcsy, Pavol Ujházy, Josef Holák, Ľubomír Stašík and Tomáš Piovarcsy (Figure 3). Seventeen vein structures were targeted (Table 1).

Table 1 Veins targeted during the 2011 sampling program

Number	Name of vein	Mineralized samples	Wall rock samples	Outcrop, float samples
1	Krížová	3	3	0
2	Nová	8	0	3
3	Gelnická	8	0	0
4	Nadložná	11	7	1
5	BlauHalde	0	2	2
6	Boží Dar	8	8	2
7	S.Hrubá	10	12	2
8	"S"	20	17	0
9	Zlatá	59	25	0
10	Jakub	0	2	0
11	Jozef	18	30	2
12	Lazík	7	4	0
13	Čierna	12	21	2
14	Zelená	2	1	0
15	Biala	2	0	0
16	Abrahám	1	0	0
17	Žakarovce	1	1	20
	SUBTOTAL	**170**	**133**	**34**
	TOTAL	**337**		

Samples were collected using a geological hammer from natural outcrops and from dumps containing waste rock from previous vein-mining operations. Rock exposed beneath upturned trees was also sampled in places. The sampling location was marked with reflective tape in a nearby tree. Garmin 450T and DAKOTA 10 GPSs were used to determine locations. Each

dump was typically sampled separately from the vein material and separate samples were commonly collected for each rock type. Duplicates were collected for each sample; these are stored in a company warehouse. Each sample location was described in a workbook, noting date of collection; sampling location; GPS coordinates and elevation; dimensions of dump, adit, shaft, and/or outcrop; azimuth of adit; nature of the surrounding rocks; and nature of the minerals in the surrounding rocks. Photographs were commonly taken.

Samples were placed in plastic bags and transported to the warehouse at company headquarters. Subsequently, samples were sent for analysis at the ALS Minerals laboratory in Camas, Spain. Each sample was plotted on 1:10 000 scale and 1:5 000 scale maps.

4. GENERAL GEOLOGY

4.1. Geological setting

We collected no new information regarding the general geology of the area. The description in Harron (2009) remains in force (Figures 4 and 5). In this section, we present a brief geological description of the territory.

The Slovinky–Gelnica ore field (hereinafter SGOF) lies on the northern margin of the Gemeric tectono-stratigraphic Unit in the so called North Gemeric Zone. The ore bodies are hosted in Paleozoic rocks arranged in belts parallel to the margins of the Gemeric Unit. The most important part of the ore field—the Slovinky–Gelnica deposit—occurs in older Paleozoic volcanic-sedimentary rocks of the Gelnica Group.

4.2 Lithostratigraphy

Lithostratigraphic subdivision of the Paleozoic strata in the Gemericum Unit—and especially the older Paleozoic strata—is controversial. Two main lithostratigraphic frameworks have been proposed, one developed primarily by employees of GUDS (Geological Institute of Dionys Stur – Slovak Geological Survey) (e.g. Snopko, 1974; Ivanicka, Snopko, 1989; Bajanik et al., 1983) and another developed by Grecula (1982). We follow the GUDS framework here. In the GUDS framework, the older Paleozoic strata are subdivided into two units, the Gelnica and Rakovec groups (Figure 5).

Gelnica Group

The Gelnica Group forms the stratigraphic base of the Gemericum Unit. It is thought to be Cambro-Silurian in age; Snopko (1967, 1974) interprets it to be a flysch suite deposited during the Caledonian orogenic cycle. Previous estimates of its thickness vary considerably; even the same authors have proposed considerably different values (10–12 km – Snopko, 1974; 4.5–8 km – Ivanicka and Snopko, 1989). The Gelnica Group is subdivided into three formations, the Vlachovo, Bystry potok, and Drnava (Snopko, 1970, 1974; Ivanicka and Snopka, 1989).

Rakovec Group

The Rakovec Group overlies the Gelnica Group stratigraphically, although the succession can be tectonically overturned. It is thought to be Devonian in age; the Rakovec Group consists of a suite of early Variscan volcanogenic rocks. In plan, it forms a continuous, 3–4 km wide belt that fringes the Gelnica Group to the north. It has a stratigraphic thickness of 1.5–2.5 km. Several authors interpret that metasediments fringing the Gelnica Group to the south near the town of Stos likewise belong to the Rakovec Group, although this interpretation is controversial. Lithostraigraphically, the Rakovec Group has been divided into two units, the Smrecinka (former basal) and Sykavka (former volcanogenic) formations. A third unit to the south, the Stos Member, is also assumed to form part of the group. Rocks of the Rakovec Group exhibit greenschist metamorphism.

Klatov Group

Rocks of the Klatov Group form a discontinuous belt along the North Gemeric Zone, beginning at the Stitnik Fault and terminating below Neogene sediment in Kosice Bay. This group does not occur in our area and therefore will not be further described.

Črmel Group

This group occupies a particular position in the northern part of the Gemericum. Lithologically it differs from previous groups and also from the Dobsina Group. The Črmel Group does not occur in our area and therefore will not be described further.

Dobsina Group

Presence of the Dobsina Group in the SGOF is uncertain. The layers of graphitic phyllite in metabasalts of the Zlatnik Member northwards from Rudnany support this assumption. Rocks such as these were intercepted in drill holes that penetrated the Galmus Mesozoic underlier (Biely, 1967). This is significant from the viewpoint of the potential continuation of Rudnany veins into the Slovinky area.

Krompachy Group

The Krompachy Group, originally termed the North Gemeric Permian, is a Permian rock complex located south of the study area. Lateral and vertical variability of rock types in this group, unclear tectonics, and paucity of fossils has hampered its lithostratigraphic subdivision.

Mesosoic–North Gemeric groups

Siderite-quartz-sulphide mineralization has not been observed in the Mesozoic–North Gemeric groups and for this reason they are not described further.

5. DESCRIPTION OF ORE BODIES

5.1 Mineralization in ore area

In this section we describe vein structures sampled in 2011, which include (1) Slovinská Hrubá Vein, (2) "S" Vein, (3) Zlatá Vein, (4) Bartolomeus Vein, (5) Capistrani Vein, (6) Jozef Vein, (7) Jakub Vein, (8) Čierna Vein, (9) Lazík Vein, (10) Abrahám Vein, (11) Zelená Vein, (12) Biela Vein, (13) Krížová Vein, (14) Nová Vein, (15) Nadložná Vein, (16) Boží Dar Vein, (17) Žakarovský Stockwork (Figure 3).

Mineralization in the SGOF is represented by three genetic types: (1) hematite accumulation in Werfenian Member of the Stratena Group, (2) impregnation Cu ore mineralization, (3) hydrotermal siderite-quartz-sulphide veins.

The hematite ore mineralization is represented by the only occurrence without any practical significance, the Forester mine, at a former forester's cottage in Galmus. We have not studied this deposit in detail. From previous descriptions, we assume that it is a syngenetic, stratiform deposit, probably genetically related to Spalene Stozky at Rudnany.

Impregnation Cu ore mineralization is known from the Lacemberk Valley and the Mochov Stream. Ore mineralization occurs in particular epimetamorphosed volcanogene and basic rocks. The original mineralization is not preserved, except quartz phenocrysts and accessory apatite and zircon. Pyrite and chalcopyrite are finely disseminated in the rock. The ore body has a lenticular form, elongated in the east–west direction, parallel to the rock belts. Its length is approximately 400 m: to the east it wedges out and to the west it terminates against a north–south oriented fault. The ore body dips 20–30° northwards and its maximum thickness (80 m) occurs at the surface of the western termination. Distribution of Cu is irregular and varies by about 0.02%, to a maximum of 2%. Besides pyrite and chalcopyrite, cobaltite, sphalerite, Bi mineral, native Bi and arsenopyrite are present in small amounts.

Hydrothermal siderite-quartz-sulphide veins represent the most economically inportant type of ore mineralization in the whole deposit area. Starting from the north and moving south, we describe below more than twelve ore veins, vein swarms, and ore runs.

5.2 Ore belt of Slovinky

Slovinská Hrubá ("Slovinky Thick") Vein

In terms of mineral potential, the Slovinská Hrubá Vein structure is the most important vein structure in the region (Figure 3). It extends 4 565 m along strike and is open to the west. Mine works extend 460 m below surface (to Horizon 37), which is 42 m above sea level (Figures 6 and 7). From Horizon 37, the vein structure was further verified by drilling to a depth of 100 m below sea level. The Slovinská Hrubá Vein trends approximately E–W to ENE–WSW (76°) and dips between 45°S and 88°N (average 75° S) (Figures 8A to 8G). It is 2.5 m thick on average and reaches a maximum thickness of 14 m. The ore mineralization as shown in plane is irregular and discontinuous. Previous work suggests that the western end of the vein, from the Dorota Shaft to the Adam–Eva Shaft, is the most continuous and contains the highest grades of mineralization.

West of the Dorota Shaft, in Horizon 29, the ore contains 29.6 to 32.1% Cu, 30.1 to 30.5% Fe, 2 to 255 ppm Ni, 120 ppm La, 126 ppm Y, and 5 to 270 ppm Ag. Gold occures in tetrahedrite and also in pyrite. Development of the Slovinská Hrubá Vein structure above and below Horizon 29 has not been verified. Five million and sixty three thousand tonnes of Z2+Z3 reserves and 6.525 million tonnes of prognostic resources P1 are estimated, with an average grade of 0.82% Cu, 0.3–0.85 g/t Au, 12.5–13.2 g/t Ag, and 61.9–62.8 ppm Bi. Gold contents may have been underestimated because of incomplete rock dissolution prior to geochemical analysis. The last reserves calculation for the whole deposit, which was made in 1986, estimated that 9.228 million tonnes of Z2+Z3 reserves existed, with an average grade of 0.89% Cu, 8.71% Fe, 52% SiO_2, and 0.34% As.

In 1985, the content of Au and Ag in concentrate was 1.55 ppm and 117 ppm, respectively, and 10.14 kg Au, 763.1 kg Ag and 71.13 kg As were produced. From 1973 to 1985, 110.1 kg Au, 8 693 kg Ag and 1 069.2 kg As were produced.

In 2011, we mapped and sampled the Slovinská Hrubá Vein west of the Dorota Shaft. Ten samples were collected from mineralized parts of the old dumps around the Cypriani adits and the Matej Shaft. The old tunnel verified in part the upper portion of the Slovinky Hrubá Vein. Quartz-siderite-sulphide mineralization was observed in nearby dump material. Sulphide minerals observed included pyrite, chalcopyrite, tetrahedrite, malachite, azurite and coveline.

Old dumps were mapped to the north over the nameless valley to the opposite side of Jozefka Valley.

Assay results for the ore are listed in Table 2**.** The following results are of interest: Cu up to 1.77%, Ag up to 42.5 ppm, Sb up to 4.87 ppm, As up to 1.45 ppm, Mn up to 13.9 ppm, and In up to 2.09 ppm. Silver exhibited high concentrations in samples where tetrahedrite was present. High contents of Au were not observed.

The western half of the Slovinská Hrubá Vein surveyed in 2011 is the most interesting target in the study area. Accordingly, we recommend that drilling be conducted to verify the vein between Horizon 29 and the surface (see cross-sections 1–1' to 8–8' on Map N). This interval has not been drill tested previously.

Slovinky Hrubá (Thick) vein

Table N. 2

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	Sb	Ce	La
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	0,047	**42,5**	**>10000**	**1,7700**	4870	13,1	5,4
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	0,037	4,46	130,5		74,5	13,85	5,7
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	<0.005	0,79	724		47,6	9,89	3,9
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,007	0,8	152,5		90,4	4,05	1,6
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,042	0,81	7540	0,7540	25,7	20,3	9,5
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	0,079	**33,1**	5990	0,5990	1050	4,66	2,1
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	0,01	1,77	**>10000**	**1,2050**	94,2	5,11	2,5
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	0,028	0,44	308		10,65	16,3	8
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	0,023	2,55	2590		94,3	29	14,4
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	0,02	8,64	7560	0,756	233	13,3	6,5

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Bi	As	Al	Ba	Be	Ca	Cd
DESCRIPTION	sample number	vein			ppm	ppm	%	ppm	ppm	%	ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	**268**	**1455**	0,3	20	0,16	0,2	2,13
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	3,14	38,9	1,59	40	0,4	0,35	0,09
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	0,67	18	0,24	20	0,11	0,11	0,07
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	1,26	9,9	0,51	50	0,32	0,02	0,05
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	1,07	27,7	1,67	80	0,72	0,03	0,04
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	**117**	866	0,38	40	0,21	0,14	0,67
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	1,53	228	0,26	20	0,13	0,08	0,12
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	4,83	33	2,81	220	0,86	0,02	0,05
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	8,5	41,3	3,99	200	1,39	0,05	0,1
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	20,1	30,8	1,07	50	0,48	0,11	0,33

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Co	Cr	Cs	Fe	Ga	Ge	Hf
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	4,1	2	0,23	28,7	2,04	0,42	0,1
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	3,4	32	0,55	1,82	2,92	0,1	0,6
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	4,4	4	0,28	29,4	2,21	0,51	<0.1
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	4	20	0,44	14,95	2,22	0,26	<0.1
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	7,9	37	1,39	8,75	5,16	0,23	0,1
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	53,3	6	0,28	27,6	2,01	0,46	<0.1
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	7	3	0,18	26,4	1,26	0,29	<0.1
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	70	20	1,12	9,69	7,88	0,24	0,2
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	20,5	45	2,24	8,08	12,95	0,24	1
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	8,2	15	0,8	24,8	4,06	0,4	0,2

Continue table N. 2

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	In	K	Li	Mg	Mn	Mo	Na
DESCRIPTION	sample number	vein			ppm	%	ppm	%	ppm	ppm	%
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	1,585	0,09	2,5	7,05	12650	0,75	0,09
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	0,041	0,31	5,8	0,17	521	1,75	0,71
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	1,685	0,11	3,4	3,48	13900	0,32	0,02
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,453	0,21	2,5	0,42	5810	0,97	0,05
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,624	0,64	5,4	1,72	2900	1,74	0,09
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	1,8	0,16	3,9	5,07	12450	0,53	0,03
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	2,09	0,11	1,7	6,54	10650	0,34	0,02
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	0,437	1,15	12,2	1,27	1820	14,05	0,1
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	0,727	1,73	5	1,52	2890	15,2	0,12
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	2,02	0,44	6	5,75	12300	0,89	0,05

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Nb	Ni	P	Pb	Rb	Re	S
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	%
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	0,4	17,1	50	5,8	5,4	<0.002	1,3
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	1,8	3,8	40	3,8	14,6	<0.002	0,09
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	0,5	22,9	60	1,3	5,4	<0.002	0,06
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,4	10,7	80	3,5	9,4	<0.002	0,02
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	2	24,5	70	4,6	38,4	<0.002	0,76
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	0,5	35,5	30	90,8	7	<0.002	3,71
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	0,3	35,3	10	6,5	5,1	<0.002	1,27
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	1,4	23	20	28,5	62,4	0,01	4,84
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	5,2	22,1	160	15,9	94	<0.002	0,77
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	1,6	49,4	60	14,1	27,9	<0.002	0,69

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Sc	Se	Sn	Sr	Ta	Te	Th
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	5,3	2	5,1	19,4	<0.05	0,08	0,3
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	1	2	0,8	14,9	0,25	<0.05	6,3
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	9,1	1	0,4	5	<0.05	0,09	0,4
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	6,7	2	0,5	11,1	<0.05	<0.05	0,4
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	3,1	2	3	14,2	0,14	<0.05	2,6
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	8	3	1,9	5,6	<0.05	0,07	0,7
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	3,4	1	2	5,7	<0.05	0,08	0,3
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	2,7	3	3,2	14,4	0,09	0,35	1,6
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	7,3	1	6,6	17,5	0,37	0,07	6,4
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	10,2	2	3,7	10,3	0,1	0,1	1,4

Continue table N.2

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Ti	Tl	U	V	W	Y	Zn
DESCRIPTION	sample number	vein			%	ppm	ppm	ppm	ppm	ppm	ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	0,006	0,04	0,5	5	0,4	7	552
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	0,012	0,08	0,9	5	0,3	4,7	18
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	0,009	0,03	0,3	12	0,4	5,2	45
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,009	0,04	0,3	34	0,4	3,8	24
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,057	0,16	0,6	15	1,3	5,9	14
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	0,006	0,05	0,2	24	0,6	6,1	169
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	0,008	0,06	0,2	8	0,2	1,8	103
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	0,04	0,28	0,3	17	1,2	1,3	18
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	0,153	0,41	1,7	58	3,2	3,9	36
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	0,04	0,12	0,5	15	0,9	8,3	87

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Zr
DESCRIPTION	sample number	vein			ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	1,3
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	16,7
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	1,6
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	1,3
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	10
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	1,7
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	1,1
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	6,9
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	29,1
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	5,4

Strieborná ("Silver") Vein

The Strieborná Vein is located approximately 150 m north of the Slovinky Hrubá Vein west of the Dorota Shaft (in the Dorota Adit). It is observed at Horizons 15 and 17. It is 0.4–0.6 m thick and at least 1100 m long. It is situated on the border of black phyllite to the north and a variegated volcanic complex to the south. The wall rock surrounding the vein is strongly mylonitized. Mineralization is similar to the Slovinky Hrubá Vein. Silver concentrations of 40 to 1200 g/t are observed.

The Strieborná Vein does not outcrop at surface because the surroundings of Horizon 15 and 17 have been completely re-forested by Rudné bane š.p., the state ore mining enterprise, near the town of Banska Bystrica. The Strieborná Vein will be investigated in the spring of 2012.

"S" Vein

In terms of mineral potential, we rank the "S" Vein third after the Slovinky Hrubá and Gelnica veins. Its extent along strike is difficult to ascertain. However, in the 1960s and 1970s, the "S" Vein was mined along strike for approximately 1000 m. Mining prior to this suggests that it extends another 800 m more; work realized from the Gelnica side of the vein suggests that it may extend eastward and merge with the Nadložná Vein. If this proves to be the case, its total length would exceed 3 km. The known vertical depth range of the "S" Vein is 490 m, and it may extend deeper than this, but possibly only for a short distance because it appears to wedge rapidly at depth. The "S" Vein trends 120–125° and dips 60° to the south-southwest. Its plan form is "wavy", and for that reason it is named "S" Vein. Its average thickness is 1.25 m and its maximum thickness is 3 m. Locally, it splits into 2 to 3 layers.

In 2011, we collected 16 samples from old dumps near the "S" Vein. Mapping and sampling was concentrated over a length of 700 m in the central and eastern portions of the vein, south of the Trinkel Shaft. We suspect that the "S" Vein merges eastward into the Nadložná Vein across a "Blue Sky" area of about 500 m where there are no obvious signs of past mining and where little significant exploration has been conducted.

Dump material near the "S" Vein contained extensive quartz-siderite-sulphide mineralization. Chalcopyrite, pyrite, tetrahedrite, malachite, azurite, and specularite were the main sulphide minerals observed.

Old dumps were mapped to the west end of the Nadložná Vein. The Nadložná Vein is described separately below.

The western part of "S" Vein was in the past intensively exploited to the surface. Exploration and exploitation was discontinued, however, because the former Czechoslovakian government decided to liquidate all ore mines in Slovakia.

Sampling results are detailed in Table 3. Vein material sampled from dumps near the "S" Vein contains up to 2.65% Cu, 140 ppm Ag, 0.524 ppm Au, 10 000 ppm Sb, 773 ppm Bi, 3 060 ppm As, 14 300 ppm, 3.04 ppm In, 63.8 ppm Ni, 1 090 ppm Zn, and 300 ppm Sr. These samples suggest that the "S" Vein may contain significant concentrations of Cu and Ag. The presence of other metals that were not the focus of previous mining or exploration is also interesting. The entire stretch of "Blue Sky" area between the "S" Vein and the Nadložná Vein is yet to be investigated by geophysics.

"S" vein - vein samples

Table N. 3

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Au	Ag	Cu	Cu	As	Cd
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm
Slovinky - 63	125	"S" vein	vein	quartz, siderite (ankerite)	<0.001	<0.5	22		6	<0.5
Slovinky - 76	138	"S" vein	vein	grey white quartz with Fe infiltration, without sulphides	<0.001	0,6	88		<5	<0.5
Slovinky - 78	140	"S" vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	0,195	**49,2**	>10000	**1,5250**	149	0,8
Slovinky - 81	144	"S" vein	vein	siderite, quartz, malachite, tetraedrite	0,8	**>100**	>10000	**6,7000**	2860	6,6

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Co	Mo	Ni	Pb	Zn
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm
Slovinky - 63	125	"S" vein	vein	quartz, siderite (ankerite)	3	<1	4	4	24
Slovinky - 76	138	"S" vein	vein	grey white quartz with Fe infiltration, without sulphides	1	<1	<1	4	26
Slovinky - 78	140	"S" vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	58	5	13	200	106
Slovinky - 81	144	"S" vein	vein	siderite, quartz, malachite, tetraedrite	17	3	3	13	1180

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Au	Ag	Ag	Cu	Cu	Sb
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	%	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	0,075	1,9		4 270	0,427	14
1035	1035	S vein	vein	white quartz, chalcopyrite	0,154	11,55		**>10000**	**2,64**	2740
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,008	1,12		**>10000**	**1,35**	11,15
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,024	0,26		6 720	0,672	10,05
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	0,391	0,32		2 160	0,216	10,95
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	0,524	1,04	**>10000**	**1,005**	135,5	1,92
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	0,143	**>100**	**140**	**>10000**	**2,65**	**>10000**
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	0,006	0,2		1 245	0,1245	20,1
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	0,015	5,27		7 470	0,747	648
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	0,051	32,7		7 270	0,727	3130
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	0,07	**94,8**		**>10000**	**1,68**	**9750**
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,036	15,2		6 910	0,691	1465
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	0,006	0,46		6 850	0,685	135,5
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	0,087	4,33		6 310	0,631	437
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	0,476	24,3		**>10000**	**1,345**	2140
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	0,38	**54,3**		8 310	0,831	**4270**
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	0,066	**40,9**		6 270	0,627	2810

Continue table N. 3

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Ce	La	Bi	As	Al	Ba
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	%	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	0,66	<0.5	0,11	190	0,06	10
1035	1035	S vein	vein	white quartz, chalcopyrite	2,83	1,4	0,35	937	0,17	10
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	1,86	0,8	0,38	6,9	3,12	20
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	1,23	<0.5	0,74	28,3	0,15	10
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	3,97	1,6	1,68	172	0,12	10
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	2,47	0,15	7,7	1	0,15	22,5
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	0,4	1,8	773	**3060**	0,17	10
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	2,54	1,2	0,46	45,9	0,39	20
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	0,77	<0.5	32,2	238	0,04	10
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	3,07	1,7	136,5	622	0,46	40
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	1,34	1,8	438	**1920**	0,13	10
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	1,71	0,8	110	371	0,45	20
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	3,64	1	2,74	9	0,38	20
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	32,4	8,6	26,8	102	0,19	10
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	5,76	2	165,5	467	0,33	10
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	4,32	2,1	255	752	0,12	10
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	0,23	0,5	87,8	251	0,08	10

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Be	Ca	Cd	Co	Cr	Cs
DESCRIPTION	sample number	vein			ppm	%	ppm	ppm	ppm	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	0,1	0,16	0,11	3,7	6	0,14
1035	1035	S vein	vein	white quartz, chalcopyrite	0,11	2,9	1,21	2,6	<1	0,18
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,65	0,02	0,05	5,9	17	0,07
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,09	0,75	0,04	4,8	13	0,17
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	0,12	0,13	0,03	11,6	5	0,19
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	1,34	0,34	<0.1	2,11	0,05	1,6
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	0,28	0,29	11,8	9,4	20	0,24
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	0,23	0,08	0,03	2,4	10	0,43
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	0,11	0,17	0,5	4,8	1	0,12
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	0,39	0,72	1,56	4,8	14	0,47
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	0,14	2,8	5,1	7,3	18	0,18
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,56	0,07	1,75	2,3	36	0,5
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	0,07	10,25	0,11	7,6	11	0,05
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	0,16	0,09	0,54	6,7	8	0,14
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	0,2	0,08	2,94	8,7	7	0,15
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	0,13	0,08	4,61	6,8	1	0,18
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	0,09	0,07	2,9	7,6	9	0,18

Continue table N. 3

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Fe	Ga	Ge	Hf	In	K
DESCRIPTION	sample number	vein			%	ppm	ppm	ppm	ppm	%
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	20,5	1,18	0,39	<0.1	1,385	0,03
1035	1035	S vein	vein	white quartz, chalcopyrite	21,4	1,49	0,43	0,1	2,43	0,09
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	4,2	6,8	0,06	0,1	0,245	0,01
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	16,1	1,31	0,31	0,1	1,37	0,07
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	22,7	1,09	0,3	<0.1	1,11	0,06
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	7,8	**10350**	0,41	0,01	0,2	15,1
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	9,18	1,33	0,17	<0.1	1,505	0,06
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	18,6	2,13	0,29	<0.1	1,16	0,18
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	29,4	1,42	0,42	<0.1	3,04	0,02
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	14,75	2,31	0,24	0,2	1,23	0,21
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	11,25	1,08	0,18	0,1	1,49	0,06
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	8,82	1,77	0,17	0,1	0,812	0,19
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	16,2	1,5	0,12	0,1	2,32	0,01
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	22,5	1,51	0,36	<0.1	1,045	0,05
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	21	1,94	0,34	<0.1	1,32	0,04
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	28,1	1,55	0,39	<0.1	1,83	0,05
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	21	1,89	0,31	<0.1	1,38	0,02

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Li	Mg	Mn	Mo	Na	Nb
DESCRIPTION	sample number	vein			ppm	%	ppm	ppm	%	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	2,3	7,31	9480	0,68	0,02	0,4
1035	1035	S vein	vein	white quartz, chalcopyrite	1,5	7,65	9970	0,65	0,01	0,6
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	2,9	0,84	823	1,4	0,37	0,2
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	1,2	6,12	7640	1,35	0,02	0,3
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	1,7	6,57	**10200**	0,74	0,02	0,2
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	160	3,5	2,4	<0.002	1,07	20,1
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	2,6	3,12	3850	1,65	0,02	0,1
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	2,8	3,07	8540	0,65	0,03	0,4
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	1,4	6,77	**14300**	0,35	0,01	0,3
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	5	4,09	7130	1,23	0,03	0,5
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	1	4,4	6080	1,45	0,01	0,2
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	3,2	2,06	3860	2,29	0,04	0,3
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	11,3	5,86	**13050**	0,74	0,01	0,2
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	1,8	5,83	**12700**	0,59	0,02	0,2
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	2,8	6,02	**10950**	0,84	0,04	0,2
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	1,8	7,98	**13100**	0,3	0,02	0,3
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	2,1	3,94	8860	0,79	0,02	0,2

Continue table N. 3

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Ni	P	Pb	Rb	Re	S
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	%
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	9,8	50	1,3	1,5	<0.002	0,35
1035	1035	S vein	vein	white quartz, chalcopyrite	7,3	30	3,4	5	<0.002	2,15
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	63,8	20	1,5	0,3	<0.002	1,04
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	7,2	10	0,9	3,9	<0.002	0,62
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	15,2	20	2,2	2,3	<0.002	0,45
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	2	0,5	80,6	<0.05	0,08	<0.2
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	4,9	20	14,1	3	<0.002	1,86
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	8,2	10	1,6	7,6	<0.002	0,22
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	13,5	10	4,9	1,1	<0.002	0,6
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	7,6	10	3,2	10,6	<0.002	0,17
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	6,1	10	4,4	3,3	<0.002	1,16
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	6	30	12,9	8,6	<0.002	0,58
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	12,2	20	2,9	0,3	<0.002	0,62
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	32,8	50	2,1	2	0,002	0,59
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	39,9	30	6,1	1,7	<0.002	1,27
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	16,3	30	5	2,8	<0.002	0,55
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	21,5	10	15,5	1,5	<0.002	0,14

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Sc	Se	Sn	Sr	Ta	Te
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	29,3	1	0,3	4,4	<0.05	<0.05
1035	1035	S vein	vein	white quartz, chalcopyrite	17	2	0,9	142	<0.05	<0.05
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	2,9	2	1,7	35,1	<0.05	<0.05
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	9,9	1	0,5	31	<0.05	<0.05
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	24,1	2	0,4	4,6	<0.05	<0.05
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	<0.005	0,02	0,3	20	0,1	10,3
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	1,1	1	0,7	7,5	<0.05	<0.05
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	5	2	0,8	3,6	<0.05	<0.05
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	4,6	1	0,5	3,4	<0.05	0,08
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	1,9	1	1,5	11,7	0,05	0,05
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	2,8	2	0,5	48,9	<0.05	<0.05
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	2,6	2	1,9	6,3	<0.05	<0.05
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	18,1	1	5,1	300	<0.05	<0.05
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	10,6	2	1	4,8	<0.05	0,05
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	13,3	5	1,8	6,7	<0.05	0,05
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	5,3	2	0,9	7,1	<0.05	0,08
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	1	1	0,2	5,6	<0.05	0,06

Continue table N. 3

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Th	Ti	Tl	U	V	W
DESCRIPTION	sample number	vein			ppm	%	ppm	ppm	ppm	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	<0.2	<0.005	<0.02	1	14	0,2
1035	1035	S vein	vein	white quartz, chalcopyrite	0,6	<0.005	0,03	0,5	24	0,3
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,7	0,016	<0.02	0,4	23	0,1
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,2	<0.005	<0.02	0,1	8	0,1
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	0,2	<0.005	0,02	0,6	21	0,3
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	<0.2	<0.005	0,02	0,3	20	0,1
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	<0.2	<0.005	0,05	0,3	3	0,1
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	0,7	<0.005	0,04	0,1	6	0,2
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	0,3	<0.005	<0.02	0,2	7	0,2
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	1,7	<0.005	0,06	0,4	6	0,3
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	0,5	<0.005	0,02	0,2	3	0,1
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,6	<0.005	0,04	0,9	6	0,2
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	<0.2	0,015	<0.02	0,3	20	4,3
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	1,4	<0.005	0,02	1,4	11	0,3
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	0,6	<0.005	0,03	1,4	13	0,2
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	<0.2	<0.005	0,02	0,5	8	0,2
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	<0.2	<0.005	<0.02	0,2	3	0,1

LAB SAMPLE	Flow sheet	Name of		Minerals and rocks description	Y	Zn	Zr
DESCRIPTION	sample number	vein			ppm	ppm	ppm
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	6,6	42	<0.5
1035	1035	S vein	vein	white quartz, chalcopyrite	14,3	102	1,7
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	2,1	15	1,8
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	6,5	38	0,9
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	5,9	30	<0.5
1037	1037	S vein	vein	light grey carbonates, dark brown weathered siderite, chalcopyrite	10,3	47	<0.5
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	2,1	1090	<0.5
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	3,5	14	1,7
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	6,6	102	0,5
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	3,5	201	4
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	5,4	973	1
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	7,2	243	1,4
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	27,8	42	1,9
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	10,7	102	0,5
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	9,4	292	0,5
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	8,5	504	<0.5
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	2,7	557	<0.5

Zlatá ("Gold") Vein

Moving westward, the Zlatá Vein runs obliquely up the southern slope of the main ridge, crosses the ridge crest just east of Vysoky Mountain, then descends obliquely down the southern slope (Figure 3). It cuts through older Paleozoic rocks, including porphyroid and metavolcanic rocks in the shallow subsurface and greenish and black phyllite at depth. The vein is 3.5 km long, trends east–west, and dips 80° southward. It extends at least 300 m below ground surface and has an average thickness of approximately 0.9 m (0.1–3 m). It is interpreted to represent a dike that is concordant with the structural fabric.

The Zlatá Vein is mineralized along its entire known extent (Figs. 9A and 9B). Its western end was mined in the past, but only in the shallow subsurface. The extent to which the vein continues at depth is unknown. In 1956–1959 some old adits were reopened. The western end of the vein was observed in a number of these old adits. Here, it exhibited thicknesses of 0.5 to 1 m, Cu concentrations from 0.41 to 0.82%, and Fe concentrations of 17.0 to 27.53%.

The eastern part of the Zlatá Vein has also been observed in old mining works. Here, the vein is 0.7 to 1 m thick. Samples yielded Cu concentrations of 0.16 to 1.35% and Fe concentrations of 17.77 to 21.10%. Near Helcmanovce, significant mining occurred via the Matej (so called Matiaska) Shaft to a depth of 250 m below ground surface. In this area, copper concentrations varied from 0.1 to 8.0% (average 1.35%) and the vein was 0.7 to 1.0 m thick.

The Zlatá Vein material consists of quartz, siderite and ankerite with chalcopyrite, pyrite, tetrahedrite, and lesser amounts of arsenopyrite, galenite, sphalerite, bornite, and Bi sulpho-salts. Zones of massive chalcopyrite and pyrite are present locally that reach thicknesses of 0.3 m and contain copper concentrations up to 20%.

We mapped and sampled the Zlatá Vein in the vicinity of the N–S trending Katarina Adit (Matiaška Dump) over a distance of 1.2 km. We also investigated the Bartolomeus and Capistrani veins, which lie south of the Zlatá Vein, near where these veins are intersected by the Katarina Adit. The Matiaška Dump is interpreted to contain material from all three of these vein structures.

We collected 51 samples from mineralized parts of the old dumps near the Zlatá Vein. Dump material consisted of quartz-siderite and siderite-quartz-sulphide mineralization. Sulphide minerals include pyrite, chalcopyrite, tetrahedrite, malachite, azurite, coveline, limonite, and realgar (?).

Sampling results are detailed in the Table 4. The ore contains up to 7.05% Cu, 2.88 ppm Au, 33.4 ppm Ag, 2010 ppm As, 18 000 ppm Mn, 1130 ppm Ba, 44.7 ppm Ni, 226 ppm Pb, 486 ppm Zn, and 14.9 ppm U.

The central part of the Zlatá Vein was only verified over a length of about 650 m and to a maximum depth of 80 to 100 m. For the rest of the vein, we assume that past mining was shallow, to a maximum depth of 10 to 30 m. In some parts of the vein we observed increased levels of Ag and Au. These metals have never been previously surveyed or mined. Increased levels of Ag suggest that tetrahedrite is present, as observed in the Slovinky Hrubá Vein. Gold is likely to be confined to pyrite, chalcopyrite, and tetrahedrite (?). Two samples contained relatively high concentrations of uranium.

High concentrations of barite are commonly found associated with quartz-carbonate-sulphide mineralization in the upper parts of veins (e.g., in Rudňany) in the Slovinky–Gelnica Ore Field. We consider barite to be excellent indicator of other mineralization.

We confirmed the presence of the Zlatá Vein east and west of the Matiaška Dump. Promising values of Cu, Ag, and Au are present along the whole vein, both laterally and at depth. It has not been well investigated to date.

East of the Zlatá Vein are the Boží Dar veins I to IV. What lies between the Zlatá and Boží Dar veins is unknown and must be investigated by further geological study.

The western continuation of the Zlatá Vein is also not fully known and must be investigated

Sampling results from the Zlatá Vein are detailed in Table 5.

Zlatá (Gold) vein - vein samples

Table N. 4

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	As	Cd	Co
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
Helcmanovce - 21	53	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite,	0,139	1,7	>10000	**1,0250**	325	2,6	3
Helcmanovce - 22	54	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite,	0,111	1,5	9400	0,9400	85	<0.5	1
Helcmanovce - 23	55	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite,	0,147	12	9310	0,9310	1125	4,3	1
Helcmanovce - 24	57	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite	**1,965**	3,2	9060	0,9060	48	<0.5	<1
Helcmanovce - 25	58	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, chalcopyrite	0,017	40	>10000	**1,0750**	88	1	1
Helcmanovce - 26	59	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,256	0,5	2040		14	<0.5	3
Helcmanovce - 27	61	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,122	1,2	3200		324	0,8	6
Helcmanovce - 28	62	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	0,058	<0.5	2140		6	<0.5	1
Helcmanovce - 29	63	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	**2,88**	1,9	6560	0,6560	181	<0.5	<1
Helcmanovce - 35	72	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, malachite, chalcopyrite	0,012	1,9	>10000	**1,1500**	95	<0.5	<1
Helcmanovce - 36	74	Zlatá (Gold) vein	Vein	milk-white quartz, limonite, mouldered carbonates	**1,4**	0,5	8100	0,8100	412	0,5	<1
Helcmanovce - 37	80	Zlatá (Gold) vein	Vein	sometimes quartz, mouldered carbonates, chalcopyrite, pyrite	**1,03**	1,5	5280		24	<0.5	<1
Slovinky - 99	147	Zlatá (Gold) vein	Vein	siderite, chalcopyrite	0,005	1,4	3360		22	1	<1
Slovinky - 101	151	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,049	0,8	1595		19	<0.5	1
Slovinky - 102	156	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,708	0,9	8160	0,8160	18	<0.5	6
Slovinky - 104	158	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, calcopyrite, limonite (?)	<0.001	1	5610	0,5610	36	<0.5	20

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Mo	Ni	Pb	Zn
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm
Helcmanovce - 21	53	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite,	2	11	<2	380
Helcmanovce - 22	54	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite,	2	4	8	41
Helcmanovce - 23	55	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite,	2	8	93	458
Helcmanovce - 24	57	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite	4	8	<2	44
Helcmanovce - 25	58	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, chalcopyrite	5	2	2840	65
Helcmanovce - 26	59	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	2	4	8	21
Helcmanovce - 27	61	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1	9	4	114
Helcmanovce - 28	62	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	2	5	2	11
Helcmanovce - 29	63	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	2	2	2	64
Helcmanovce - 35	72	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, malachite, chalcopyrite	1	3	<2	15
Helcmanovce - 36	74	Zlatá (Gold) vein	Vein	milk-white quartz, limonite, mouldered carbonates	<1	6	<2	115
Helcmanovce - 37	80	Zlatá (Gold) vein	Vein	sometimes quartz, mouldered carbonates, chalcopyrite, pyrite	<1	13	<2	47
Slovinky - 99	147	Zlatá (Gold) vein	Vein	siderite, chalcopyrite	<1	1	125	84
Slovinky - 101	151	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	<1	2	76	27
Slovinky - 102	156	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2	6	12	38
Slovinky - 104	158	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, calcopyrite, limonite (?)	2	6	22	60

									Continue table N. 4		
LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	Sb	Ce	La
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	0,025	0,68	3 710		117,5	2,81	1,4
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	0,014	0,5	2 080		3,84	2,13	1
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	<0.005	0,1	417		14,15	2,38	1,2
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,028	1,43	993		5,01	2,46	1,1
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	0,025	1,6	2 490		13,65	0,28	<0.5
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	0,043	1,13	600		117,5	10,8	5,9
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	0,546	0,98	1 845		9,79	35,6	19,1
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	**1,09**	6,23	**>10000**	**1,56**	29,1	2,31	1,1
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	???????						
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,044	9,3	**>10000**	**1,825**	85,6	21,3	11,2
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,005	4,57	**>10000**	**4,2**	26,8	28,4	15,3
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	0,045	3,1	5 210	0,521	7,13	**148**	**73,6**
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,055	0,92	6 690	0,669	44,8	8,83	3,9
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	<0.005	0,44	5 620	0,562	28	30,7	15
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,019	15,95	**>10000**	**3,58**	9,14	4,07	2,2
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	**0,864**	2,5	5320		7,28	1,21	0,6
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	<0.005	0,64	25,1		0,74	14,8	7,6
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	<0.005	0,07	82,1		1,68	33,7	17,9
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,035	0,71	6980	0,6980	9,54	0,33	<0.5
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,07	5,47	**>10000**	**2,7900**	5	19,6	10,4
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,202	1,03	**>10000**	**2,6900**	13,5	2,49	1,4
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,012	0,42	1780		1,85	0,4	<0.5
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,054	0,91	**>10000**	**1,0100**	8,2	1,97	0,9
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	**1,2**	1,02	2090		7,92	1,21	0,5
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,006	0,46	1110		14,95	9,12	3,9
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,078	10,25	**>10000**	**2,19**	11,2	5,45	2,7
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	0,17	3,47	**>10000**	**1,71**	134,5	0,46	<0.5
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,041	1,11	**>10000**	**1,995**	8,99	1,75	0,7
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	**8,76**	14,85	**>10000**	**7,05**	359	2,07	1
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	0,494	1,43	5 030		92,3	6,56	2
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	0,06	4,02	2 130		478	0,46	<0.5
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,014	1,68	6 450		70,3	0,75	<0.5
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,022	2,21	5 080		790	0,33	<0.5
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,136	4,73	**>10000**	**2,49**	550	0,69	<0.5
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	0,051	**21,3**	**>10000**	**2,5**	140,5	1,32	0,5
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	0,018	1,6	**>10000**	**1,88**	72,3	0,74	<0.5
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,087	9,13	7 450	0,745	177	8,59	4,2
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,035	1,41	3 540		34,6	12,1	6,5
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,22	**33,4**	**>10000**	**1,615**	300	2,86	1,3
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,243	16,9	**>10000**	**3,82**	211	1,89	0,9
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,233	3,61	9 010	0,91	247	12,35	5,8
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	0,031	3,03	5 570		28,2	4,42	1,9
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	**1,645**	**61,9**	**>10000**	**3,25**	**4160**	1,51	1,1

									Continue table N.		
LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Ti	Tl	U	V	W	Y	Zn
DESCRIPTION	sample number	vein			%	ppm	ppm	ppm	ppm	ppm	ppm
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	<0.005	0,03	0,1	8	0,1	13,7	86
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	<0.005	0,09	18,4	18	0,5	8,3	23
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	<0.005	0,03	0,4	9	0,3	3,4	25
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	<0.005	0,05	1,4	7	0,5	6,6	22
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	<0.005	0,02	0,2	11	0,2	1,5	23
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	0,035	0,13	6,4	77	2,7	8,7	384
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	0,078	0,31	2,4	28	2,4	3,6	24
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	<0.005	0,36	9,9	17	0,6	4,9	439
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite							
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,04	0,29	12,6	23	1,7	8,9	448
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,048	0,38	61,5	17	2,1	18,1	126
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	0,264	0,98	17,4	75	10,5	8,4	35
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,008	0,11	10,4	5	0,6	9,8	101
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	0,051	0,18	1	21	1,2	28,5	19
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,011	0,08	0,6	3	0,4	0,8	119
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	<0.005	0,05	10,7	10	0,2	7,8	28
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	0,056	0,15	0,4	15	0,9	3,2	54
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,105	0,11	0,8	15	2,7	6	16
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	<0.005	0,04	14,9	1	0,2	3,4	29
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,06	0,13	3,1	21	2,4	1,9	91
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	<0.005	0,1	10,7	12	0,2	2,2	27
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,005	<0.02	0,2	9	0,1	0,2	5
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	<0.005	0,06	2,5	15	0,2	3,7	23
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	<0.005	0,1	2,6	18	0,2	4,9	20
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,005	0,04	6,3	16	0,4	10	37
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,008	0,04	0,8	9	0,5	3,6	457
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	<0.005	<0.02	0,2	1	<0.1	1,3	27
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,008	0,05	1,6	13	0,4	5,8	64
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	0,006	0,02	5,9	6	0,2	2,3	197
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	<0.005	0,02	17,8	14	0,3	18	120
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	<0.005	0,02	2,2	6	0,1	5,7	251
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	<0.005	0,03	0,9	2	0,1	2,3	26
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	<0.005	<0.02	0,6	2	0,1	0,8	28
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	<0.005	0,02	0,3	5	0,1	11	291
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	<0.005	0,03	1,4	17	0,2	6,8	164
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	<0.005	0,02	0,6	2	0,1	3,4	78
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,009	0,06	1,1	10	0,5	5,8	188
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,005	0,04	0,9	7	0,3	6,5	89
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	<0.005	0,02	3,5	5	0,2	5,7	203
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	<0.005	0,02	0,5	5	0,1	9,8	486
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,011	0,05	0,8	7	0,4	4,8	189
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	0,006	0,02	0,3	6	0,3	4,5	49
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	<0.005	0,16	8,4	18	0,5	1,7	605

Continue table N. 4

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Sc ppm	Se ppm	Sn ppm	Sr ppm	Ta ppm	Te ppm	Th ppm
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	7,4	2	0,7	5,1	<0.05	0,07	<0.2
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	9,9	1	4,5	6,2	<0.05	<0.05	0,7
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	5,6	1	0,4	5,4	<0.05	<0.05	0,3
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	6,7	1	4,2	15,5	<0.05	<0.05	0,2
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	5	1	1,9	11	<0.05	<0.05	<0.2
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	2,1	4	6,2	9,7	0,09	0,12	2,3
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	5,8	1	7,8	9,7	0,17	<0.05	4,3
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	7,2	1	5,3	24,1	<0.05	<0.05	0,3
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite							
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	4,8	2	11,6	6,2	0,08	<0.05	3,3
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	5,2	2	9,3	4,2	0,11	<0.05	8
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	14,4	1	102	12	0,56	0,05	16,7
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	2,8	1	2,7	11,3	0,2	<0.05	0,7
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	4,4	2	3,2	21,2	0,13	<0.05	2,2
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,3	3	22,6	7,2	<0.05	<0.05	0,7
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	13,9	3	1,8	12,5	<0.05	0,05	0,3
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	3,1	1	1,1	14,4	0,14	<0.05	2,8
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	2,8	1	0,9	94,8	0,31	<0.05	5,8
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,6	1	2	9,6	<0.05	<0.05	<0.2
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	4,9	5	21,2	19,2	0,14	<0.05	2,9
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	21,2	3	2,9	8,1	<0.05	<0.05	0,2
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	5	1	1	10,5	<0.05	<0.05	<0.2
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	21,7	2	2,6	7,8	<0.05	<0.05	0,2
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	17,2	2	3,6	6,2	<0.05	<0.05	<0.2
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	6,4	2	1,3	11,7	<0.05	<0.05	0,7
230A	230A	Zlatá (Gold) vein 4	Vein	quartz, siderite, chalcopyrite, pyrite	3,4	2	5,9	4,8	<0.05	0,06	0,4
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	0,8	2	2,3	1	<0.05	<0.05	<0.2
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	6,9	2	3	3,8	<0.05	<0.05	0,2
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	2,5	5	9	4,3	<0.05	<0.05	<0.2
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	7,3	1	0,8	19,6	<0.05	0,07	<0.2
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	3,3	1	0,2	15,2	<0.05	<0.05	<0.2
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	1,9	1	1,4	2,4	<0.05	<0.05	<0.2
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	1,2	1	0,5	2,2	<0.05	<0.05	<0.2
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2	1	1,6	2,8	<0.05	0,06	<0.2
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	6,9	1	6,9	16,9	<0.05	0,06	0,2
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	1,6	1	28,9	99,5	<0.05	<0.05	<0.2
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2,9	1	5,3	21,2	0,06	<0.05	1
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2,6	1	1	10,3	<0.05	<0.05	0,5
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	4,3	1	5,6	36	<0.05	<0.05	0,2
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,2	2	9,3	6,5	<0.05	0,06	<0.2
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	7,4	1	2,4	13,9	<0.05	<0.05	0,6
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	3	1	2,4	26,5	<0.05	<0.05	0,4
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	9,2	1	3	7,6	<0.05	<0.05	0,2

Continue table N. 4

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Nb ppm	Ni ppm	P ppm	Pb ppm	Rb ppm	Re ppm	S %
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	0,3	8,6	60	2,4	2,3	<0.002	0,4
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	0,5	6,6	20	3,2	15,1	<0.002	0,2
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	0,3	4,9	30	1,6	5	<0.002	0,05
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,3	5,5	20	226	9,2	<0.002	0,17
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	0,2	3,9	10	8,4	4,2	<0.002	0,29
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	2,3	44,7	610	154,5	19,6	0,026	0,18
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	2,5	6,4	260	6,2	71,7	<0.002	<0.01
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	0,6	10,4	590	9,3	12,9	<0.002	0,01
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite							
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	1,2	28	1750	11,9	44,1	<0.002	0,01
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	1,8	20,7	2690	14	61,3	<0.002	<0.01
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	10,7	12,4	670	10,5	214	<0.002	0,13
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	1,2	26,2	560	17,8	15,2	<0.002	0,23
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	1,7	6,1	210	3,1	33,7	<0.002	0,49
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,5	6,2	30	3,4	13,2	<0.002	3,45
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	0,3	11,1	510	64,3	3	<0.002	0,11
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	2,1	11,8	590	85,1	29,2	<0.002	<0.01
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	4,5	10,8	320	2,9	22,2	<0.002	0,62
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,1	7,2	10	8,9	5,6	<0.002	0,82
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2,3	13,7	80	7,4	27,7	<0.002	2,79
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,2	6,9	90	4,9	4	<0.002	1,52
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,2	4,3	10	2,5	1,2	<0.002	0,13
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,2	4,6	120	2,7	12,6	<0.002	0,61
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	0,1	8,6	120	7,9	26,2	<0.002	0,45
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,3	7,1	70	16,5	9,1	<0.002	0,26
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,4	11,8	30	13,5	8	<0.002	2,26
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	0,1	1,9	40	78,1	0,5	<0.002	1,29
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,3	7	30	3,9	10,4	<0.002	1,88
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	0,5	8,7	140	129,5	2	<0.002	4,32
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	0,4	11,2	70	16,6	2,1	<0.002	0,12
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	0,3	16,9	120	2,8	1,6	<0.002	0,03
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,1	3,5	70	2,4	1,1	<0.002	0,39
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,1	3,2	20	2,1	0,9	<0.002	0,45
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,4	10,1	20	10,6	1,3	<0.002	1,62
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	0,4	12,6	10	66,5	6,5	<0.002	2,06
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	0,2	4,6	20	5,5	1,9	<0.002	1,97
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,9	7,3	100	18,9	13,5	<0.002	0,89
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,4	24,9	40	6,1	7,3	<0.002	1,16
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,4	18,7	40	322	4,3	<0.002	2,86
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,4	21,3	50	156	1,2	<0.002	4,95
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,5	12,3	80	44,9	12,2	<0.002	1,22
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	0,4	7,8	410	3,8	5,5	<0.002	0,67
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	0,2	4	100	15,5	25,7	<0.002	0,09

Continue table N. 4

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	In ppm	K %	Li ppm	Mg %	Mn ppm	Mo ppm	Na %
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	3,6	0,04	2,7	4,3	**12200**	0,39	<0.01
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	1,52	0,36	3,7	7,55	**9950**	0,53	0,03
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	0,724	0,14	2,3	3,41	5990	0,2	0,02
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,344	0,25	2,7	2,42	4320	0,35	0,02
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	0,407	0,14	2,8	2,51	3830	2,32	0,03
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	0,076	0,4	25,2	0,06	169	21,2	0,02
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	0,39	1,41	5,3	0,17	1500	1,37	0,04
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	1,335	0,28	2,8	0,14	**11350**	3	0,01
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite							
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,562	0,99	9,9	0,23	862	3,03	0,02
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,263	1,35	10,4	0,21	1040	3,19	0,03
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	0,182	4,77	15,1	0,6	233	15,15	0,07
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,779	0,35	4,4	0,07	4180	2,46	0,02
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	0,443	0,73	11	0,81	1660	0,66	0,05
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,181	0,31	2,3	0,05	193	1,54	0,02
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	2,31	0,06	5,9	0,11	7160	1,53	0,02
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	0,128	0,54	14,8	0,48	4570	0,42	0,17
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,064	0,37	2,8	0,43	2970	1,26	1,69
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,075	0,12	1,8	0,08	343	1,58	0,03
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,696	0,52	8,9	1,46	2720	1,58	0,03
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	1,12	0,1	17,6	0,08	4220	4,15	0,01
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,046	0,03	1,7	0,12	243	0,6	0,07
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,479	0,24	11	0,12	3240	1,78	0,03
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	0,459	0,51	9,5	0,22	3290	2,83	0,04
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,266	0,19	14,4	1,19	2850	1,84	0,04
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,22	0,17	2,3	3,89	6600	1,36	0,02
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	2,16	0,01	1,2	0,01	878	0,51	0,01
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,5	0,22	2,4	2,12	4350	1,69	0,03
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	4,54	0,03	2,2	0,11	1540	8,25	0,02
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	4,52	0,05	0,5	0,37	**18000**	7,02	<0.01
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	2,22	0,04	0,5	0,14	**16100**	1,83	<0.01
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	1,43	0,02	1,4	0,05	3120	0,51	<0.01
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,529	0,02	0,7	0,05	1840	2,05	<0.01
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	4,74	0,03	1	6,24	**13600**	0,59	<0.01
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	1,625	0,14	2,4	8,66	9100	0,84	0,01
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	0,521	0,04	5	4,19	2980	0,73	0,01
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,18	0,31	2,3	5,18	8010	0,45	0,01
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,73	0,17	2,1	6	**10550**	0,62	0,01
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2,1	0,1	2,2	6,43	9180	0,79	<0.01
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	3,61	0,03	1,6	5,98	**11300**	1,06	<0.01
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,37	0,25	2,1	4,69	7210	1,33	0,01
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	0,804	0,13	2,8	4,16	5960	2,04	0,04
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	1,16	0,61	4,2	0,12	3690	1,74	0,01

Continue table N. 4

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Co	Cr	Cs	Fe	Ga	Ge	Hf
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	1,8	5	0,28	25,4	1,29	0,37	0,1
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	1,7	3	0,85	22	3,6	0,31	<0.1
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	1,5	8	0,46	13,85	2,45	0,2	0,1
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2,5	12	0,48	10	1,68	0,13	<0.1
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	1,6	34	0,44	8,84	1,28	0,13	<0.1
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	11,6	37	1,66	5,32	3,77	0,11	0,4
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	3,3	35	2,86	6,43	11,2	0,13	0,5
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	4,2	6	1,65	29,7	2,26	0,4	<0.1
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite							
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	42,6	21	7,39	14,2	7,48	0,22	0,4
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	21,3	11	15,25	13,2	7,81	0,23	0,7
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	14,6	87	6,33	5,52	45,2	0,26	2
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	54,8	24	2,9	18,5	2,49	0,24	0,2
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	2,1	25	1,71	5,34	5,5	0,13	0,3
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	5,3	20	0,58	4,98	2,28	0,11	0,1
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	5,3	21	2,27	17,35	1,23	0,29	<0.1
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	5,1	19	0,95	4,32	5,64	0,11	0,3
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	6,1	36	0,85	2,79	4,94	0,1	0,6
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2,3	33	0,4	2,76	1,66	0,07	<0.1
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	9,8	21	1,23	9,03	4,73	0,17	0,3
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	4,5	18	2,03	12,75	0,98	0,2	<0.1
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,8	34	0,19	1,35	1,74	<0.05	<0.1
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	1,8	20	0,97	10,55	2,29	0,13	<0.1
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	6,4	46	1,44	9,43	4,22	0,15	<0.1
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	3,2	27	0,69	8,17	1,6	0,12	0,1
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	4,2	19	0,6	16,9	1,94	0,24	0,1
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	0,5	11	0,1	7,91	0,44	0,14	<0.1
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2,5	24	0,57	12,95	1,83	0,2	0,1
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	3	59	0,54	12,6	0,87	0,2	0,1
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	2,5	27	1,96	37,8	1,11	0,51	<0.1
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	16,1	14	4,58	28,7	0,66	0,31	<0.1
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	1,1	14	0,71	10,05	0,38	0,09	<0.1
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,9	33	0,27	5,53	0,28	0,06	<0.1
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	3,6	<1	0,15	29,6	0,81	0,36	<0.1
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	16,4	3	0,44	22,3	1,53	0,27	<0.1
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	2,5	9	0,28	6,97	0,57	0,07	<0.1
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	4,8	6	0,63	18,2	1,74	0,2	0,2
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	27,3	4	0,51	21,5	1,37	0,26	0,1
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	25,8	1	0,32	21,1	0,89	0,26	<0.1
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	19,4	<1	0,2	28,9	0,79	0,31	<0.1
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	9,8	18	0,52	17,55	1,94	0,18	0,1
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	7,3	22	0,4	13,6	1,1	0,14	0,1
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	14,9	12	4,57	9,49	3,15	0,11	0,1

Continue table N. 4

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Bi ppm	As ppm	Al %	Ba ppm	Be ppm	Ca %	Cd ppm
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	0,07	284	0,11	30	0,16	0,15	0,43
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	0,05	3,7	0,73	60	0,53	0,33	0,04
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	0,02	23,5	0,27	20	0,3	0,11	0,1
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,48	6,1	0,47	30	0,47	0,37	0,06
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	0,06	5,4	0,27	20	0,51	0,53	0,08
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	5,84	218	0,89	90	0,51	0,06	4,71
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	0,12	10,6	2,9	150	1,53	0,01	0,11
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	0,2	32,2	0,55	40	0,47	0,04	3,92
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite							
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	1,49	143	1,86	140	1,51	0,02	1,57
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,52	201	2,73	180	1,47	0,01	0,8
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	3,64	173,5	9,06	740	3,27	0,02	0,62
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	1,37	130	0,71	50	0,46	0,02	0,76
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	1,06	35	1,71	100	1	0,04	0,07
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,23	9,6	0,68	40	0,69	0,04	2,19
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	0,68	4,1	0,24	20	0,24	0,01	0,11
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	1,52	1	2,05	100	0,55	0,15	0,06
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,18	1,8	2,93	70	0,44	1,42	0,07
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,11	7,2	0,29	20	0,44	0,03	0,6
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,27	25,3	1,21	50	0,93	0,25	0,91
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,47	10,4	0,31	170	0,51	0,03	0,16
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,03	1,7	0,54	10	0,11	<0.01	0,02
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,1	13,1	0,61	350	0,46	0,02	0,06
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	0,27	3,3	1,26	1130	0,9	0,01	0,05
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,07	57	0,45	70	0,62	0,05	0,18
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,53	13,3	0,35	30	0,25	0,12	4,05
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	4,41	**778**	0,03	<10	<0.05	<0.01	0,15
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,48	66,8	0,46	30	0,33	0,08	0,59
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	14	**786**	0,14	10	0,05	0,04	3
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	1,87	386	0,09	30	0,11	0,06	1,03
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	6,41	472	0,03	10	0,07	0,03	3,09
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,23	172,5	0,05	10	0,07	0,01	0,11
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,41	457	0,03	10	<0.05	0,01	0,26
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	3,19	**1560**	0,05	10	<0.05	0,22	2,27
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	52,7	947	0,29	20	0,21	0,65	2,42
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	2,16	138	0,12	10	0,15	6,55	0,34
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,23	613	0,59	30	0,28	0,51	2,3
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,21	126,5	0,33	20	0,16	1,29	0,6
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	5,48	273	0,19	10	0,17	3,54	6,2
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2,76	548	0,06	10	0,08	0,29	7,19
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,12	45,9	0,51	30	0,3	0,4	1,99
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	0,67	41,4	0,33	20	0,12	1,06	0,89
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	**544**	**1460**	1,15	140	0,94	0,02	3,29

				Continue table N. 4	
LAB SAMPLE	**Flow sheet**	**Name of**	**Type**	**Minerals description**	**Zr**
DESCRIPTION	**sample number**	**vein**			**ppm**
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	<0.5
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	0,7
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	1,6
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,5
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	<0.5
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	18,1
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	15,7
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	0,9
176	176	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	12,4
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	19,8
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	70,8
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	3,4
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	9,3
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	4
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	<0.5
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	10,4
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	18,9
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	<0.5
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	10,5
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	<0.5
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,5
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,6
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	<0.5
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	1,6
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	<0.5
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,6
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	1,1
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	<0.5
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	<0.5
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,5
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	<0.5
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	<0.5
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	0,8
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	<0.5
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	3,7
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,9
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,8
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,5
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	2,2
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	2,1
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	1,7

Capistrani Vein

The next vein south the Zlatá Vein is the Capistrani Vein, which also runs east–west (Figure 3). The Capistrani Vein is 1 200 meters long and its central part is at least 50 m deep. In the past it has been studied together with Zlatá Vein by the former Geological Survey s.e.

Quartz, siderite, limonite, chalcopyrite, and malachite were observed on 6 dumps near the Capistrani Vein. The metal content of samples is shown in Table 5. Samples from dumps contained the following maximum values: 4.2% Cu, 9.3 ppm Ag, 1.09 ppm Au, 11 350 ppm Mn, 1.34 ppm In, 448 ppm Zn, 148 ppm Ce, 73.6 ppm La, 214 ppm Rb, and 61.5 ppm U.

The Capistrani Vein has not been systematically sampled. Our results show high values of Ce, La, Mn, Rb, and U.

Capistrani vein - vein samples

Table N.5

LAB SAMPLE DESCRIPTION	Flowsheet sample number	Name of vein	Type	Minerals description	Au ppm	Ag ppm	Cu ppm	Cu %	Sb ppm	Ce ppm	La ppm
174	174	Capistrani vein	vein	quartz, siderite, limonite,	0,546	0,98	1 845		9,79	35,6	19,1
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	1,09	6,23	>10000	1,56	29,1	2,31	1,1
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,044	9,3	>10000	1,825	85,6	21,3	11,2
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,005	4,57	>10000	4,2	26,8	28,4	15,3
179	179	Capistrani vein	vein	quartz, siderite, malachite	0,045	3,1	5 210	0,521	7,13	148	73,6
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,055	0,92	6 690	0,669	44,8	8,83	3,9

LAB SAMPLE DESCRIPTION	Flowsheet sample number	Name of vein	Type	Minerals description	Bi ppm	As ppm	Al %	Ba ppm	Be ppm	Ca %	Cd ppm
174	174	Capistrani vein	vein	quartz, siderite, limonite,	0,12	10,6	2,9	150	1,53	0,01	0,11
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	0,2	32,2	0,55	40	0,47	0,04	3,92
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	1,49	143	1,86	140	1,51	0,02	1,57
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,52	201	2,73	180	1,47	0,01	0,8
179	179	Capistrani vein	vein	quartz, siderite, malachite	3,64	173,5	9,06	740	3,27	0,02	0,62
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	1,37	130	0,71	50	0,46	0,02	0,76

LAB SAMPLE DESCRIPTION	Flowsheet sample number	Name of vein	Type	Minerals description	Co ppm	Cr ppm	Cs ppm	Fe %	Ga ppm	Ge ppm	Hf ppm
174	174	Capistrani vein	vein	quartz, siderite, limonite,	3,3	35	2,86	6,43	11,2	0,13	0,5
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	4,2	6	1,65	29,7	2,26	0,4	<0.1
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	42,6	21	7,39	14,2	7,48	0,22	0,4
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	21,3	11	15,25	13,2	7,81	0,23	0,7
179	179	Capistrani vein	vein	quartz, siderite, malachite	14,6	87	6,33	5,52	45,2	0,26	2
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	54,8	24	2,9	18,5	2,49	0,24	0,2

LAB SAMPLE DESCRIPTION	Flowsheet sample number	Name of vein	Type	Minerals description	In ppm	K %	Li ppm	Mg %	Mn ppm	Mo ppm	Na %
174	174	Capistrani vein	vein	quartz, siderite, limonite,	0,39	1,41	5,3	0,17	1500	1,37	0,04
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	1,335	0,28	2,8	0,14	11350	3	0,01
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,562	0,99	9,9	0,23	862	3,03	0,02
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,263	1,35	10,4	0,21	1040	3,19	0,03
179	179	Capistrani vein	vein	quartz, siderite, malachite	0,182	4,77	15,1	0,6	233	15,15	0,07
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,779	0,35	4,4	0,07	4180	2,46	0,02

Continue table N. 5

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Nb	Ni	P	Pb	Rb	Re	S
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	%
174	174	Capistrani vein	vein	quartz, siderite, limonite,	2,5	6,4	260	6,2	71,7	<0.002	<0.01
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	0,6	10,4	590	9,3	12,9	<0.002	0,01
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	1,2	28	1750	11,9	44,1	<0.002	0,01
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	1,8	20,7	2690	14	61,3	<0.002	<0.01
179	179	Capistrani vein	vein	quartz, siderite, malachite	10,7	12,4	670	10,5	**214**	<0.002	0,13
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	1,2	26,2	560	17,8	15,2	<0.002	0,23

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Sc	Se	Sn	Sr	Ta	Te	Th
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm
174	174	Capistrani vein	vein	quartz, siderite, limonite,	5,8	1	7,8	9,7	0,17	<0.05	4,3
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	7,2	1	5,3	24,1	<0.05	<0.05	0,3
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	4,8	2	11,6	6,2	0,08	<0.05	3,3
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	5,2	2	9,3	4,2	0,11	<0.05	8
179	179	Capistrani vein	vein	quartz, siderite, malachite	14,4	1	102	12	0,56	0,05	16,7
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	2,8	1	2,7	11,3	0,2	<0.05	0,7

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Ti	Tl	U	V	W	Y	Zn
DESCRIPTION	sample number	vein			%	ppm	ppm	ppm	ppm	ppm	ppm
174	174	Capistrani vein	vein	quartz, siderite, limonite,	0,078	0,31	2,4	28	2,4	3,6	24
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	<0.005	0,36	9,9	17	0,6	4,9	439
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,04	0,29	12,6	23	1,7	8,9	448
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,048	0,38	**61,5**	17	2,1	18,1	126
179	179	Capistrani vein	vein	quartz, siderite, malachite	0,264	0,98	17,4	75	10,5	8,4	35
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,008	0,11	10,4	5	0,6	9,8	101

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Zr
DESCRIPTION	sample number	vein			ppm
174	174	Capistrani vein	vein	quartz, siderite, limonite,	15,7
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	0,9
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	12,4
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	19,8
179	179	Capistrani vein	vein	quartz, siderite, malachite	70,8
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	3,4

Čierna ("Black") Vein

The Čierna Vein runs from the Ostry Mountain saddle to the mouth of the Mochov Stream in Lacemberska Valley, over a distance of 1750 m, making it one of the longest veins in the region (Figure 3). The Čierna Vein sits approximately 880 m north of the Zlatá Vein, trends east–west, and dips 60–70° south and 70° north in areas east and west of the Adam–Eva Shaft, respectively.

Based on dump material from old mining works it is assumed that the Čierna Vein is irregularly developed and that is has a variable thickness (average probably 1.50 m). The vein fill is composed of sideritic-quartzy material with minor sulphides in the form of chalcopyrite, pyrite, tetrahedrite, arsenopyrite, galenite, sphalerite, and stannite. Maximum grades are suspected to occur near the Rudolfi Adit on the western margin and near the Ludovit Adit on the eastern margin. The ore is variable in quality (0.1–0.3% Cu, 4.8–21.5% Fe) and contains relatively little copper (Figure 10).

Mapping and sampling was conducted along the Čierna Vein west of the valley of the Adam–Eva Shaft. The Čierna Vein was not sampled east of this, where differentiation of the Jakub and Čierna veins becomes difficult.

We collected 12 samples from old dumps. The old tunnels verified partly the upper part of the Čierna (Black) vein. Dump material consisted of quartz siderite-sulphide mineralization. Sulphide minerals included pyrite, chalcopyrite, malachite, and coveline; limonite was also present.

Sampling results are shown in Table 6. The samples yielded the following maximum values: 1.815% Cu, 0.327 ppm Au, 39.5 ppm Ag, 2 680 ppm Sb, 2 750 ppm As, 12 950 ppm Mn, 1.53 ppm In, 73.3 ppm Ce, and 34.4 ppm La.

The Čierna Vein extends at least 10 to 20 meters into the subsurface. High concentrations of Ag and Au were observed locally. These metals have never been previously surveyed. High contents of Ag are suspected to be associated with the tetrahedrite, as is observed in the Slovinky Hrubá Vein, although tetrahedrite was not observed in the Čierna Vein dumps. Gold is likely confined to pyrite and chalcopyrite. The content of La and Ce in the Čierna Vein samples is interesting. It is possible these elements are associated with the mineral xenotim. The content of rare earth elements (REEs) in all veins in the region is poorly understood, as REEs were not the focus of previous mining and exploration efforts.

We recommend that the eastern part of the Čierna Vein be sampled up to the Ostrý Mountain. The continuation of the vein at depth is still unknown and needs to be tested.

Čierna (Black) vein - vein samples

Table N. 6

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	Sb	Ce	La
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
1069A	1069A	Čierna (Black) vein	vein	quartz, limonite	<0.005	0,02	11,9		1,45	1,29	0,5
1070	1070	Čierna (Black) vein	vein	quartz, limonite	<0.005	<0.01	2,8		2,39	73,3	34,4
1071A	1071A	Čierna (Black) vein	vein	limonite with pyrite and chalcopyrite impregnations	0,079	0,84	38,1		6,52	4,36	2,1
1071B	1071B	Čierna (Black) vein	vein	quartz with pieces of rock and pyrites	0,327	0,91	10,6		25,6	15,95	6,7
1075	1075	Čierna (Black) vein	vein	quartz, carbonates	0,01	0,04	33,6		4,87	5,85	2,9
1079	1079	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	0,015	2,23	7760	0,7660	3,19	0,83	<0.5
1080A	1080A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	0,028	1,47	1430		9,85	9,82	4,9
1081	1081	Čierna (Black) vein	vein	quartz, siderite, malachite	0,043	**39,5**	**9630**	**0,9630**	2680	13,95	8,3
1088A	1088A	Čierna (Black) vein	vein	siderite, quarz, ankerite	0,007	0,18	338		7,15	1,32	0,5
1092A	1092A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite	0,021	7,73	**>10000**	**1,5650**	85,3	23,9	12,1
1093A	1093A	Čierna (Black) vein	vein	quartz, siderite, pyrite	0,242	8,46	**9660**	**0,9660**	52,3	0,95	0,5
Slovinky - 62	124	Čierna (Black) vein	vein	siderite, limonite, chalcopyrite, coveline, few quartz	0,021	4,6	**>10000**	**1,8150**	23	0,6	4

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Bi	As	Al	Ba	Be	Ca	Cd
DESCRIPTION	sample number	vein			ppm	ppm	%	ppm	ppm	%	ppm
1069A	1069A	Čierna (Black) vein	vein	quartz, limonite	0,05	2,2	0,44	10	<0.05	0,01	<0.02
1070	1070	Čierna (Black) vein	vein	quartz, limonite	0,07	1,1	8,04	870	2,64	0,1	<0.02
1071A	1071A	Čierna (Black) vein	vein	limonite with pyrite and chalcopyrite impregnations	2,05	46,2	0,6	110	0,32	1,43	0,14
1071B	1071B	Čierna (Black) vein	vein	quartz with pieces of rock and pyrites	6,27	132,5	1,18	110	0,77	0,01	<0.02
1075	1075	Čierna (Black) vein	vein	quartz, carbonates	0,37	7,1	0,14	10	0,13	1,17	0,1
1079	1079	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	0,41	74,7	0,08	10	0,09	0,12	0,11
1080A	1080A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	3,64	103	0,48	40	0,35	0,02	0,03
1081	1081	Čierna (Black) vein	vein	quartz, siderite, malachite	8,58	**1705**	0,31	110	0,68	0,07	6,55
1088A	1088A	Čierna (Black) vein	vein	siderite, quarz, ankerite	0,1	17,8	0,09	30	0,11	0,66	0,14
1092A	1092A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite	0,44	**1380**	2,13	230	0,91	0,31	0,23
1093A	1093A	Čierna (Black) vein	vein	quartz, siderite, pyrite	26,1	**2750**	0,1	20	0,12	0,02	0,14
Slovinky - 62	124	Čierna (Black) vein	vein	siderite, limonite, chalcopyrite, coveline, few quartz	2	7	173	77			

Jozef ("Joseph") Vein

The Jozef Vein starts at the Mochov Stream and continues eastward to the Velky Haladej River valley. It trends east-west, is 4 km long, and and dips 60–80° south-southeast. Traces of former mining activity are present along its entire length and are especially prominent in its western end. Ore mineralization consists of siderite (frequently with high content of manganese), quartz, and sulphide impregnations.

We collected 18 samples from old dumps near the vein (Figure 11). The old tunnels verified partly the upper part of the Jozef Vein. Dump material exhibited quartz-siderite-sulphide mineralization. Sulphide minerals included pyrite, chalcopyrite, arsenopyrite, malachite, and coveline; limonite was also present.

Sampling results are shown in Table 7. Samples yielded the following maximum values: 8.92% Cu, 0.234, 0.234 ppm Au, 84.1 ppm Ag, 6070 ppm Sb, 562 ppm As, 2620 ppm Bi, 9580 ppm Mn, 484 ppm Pb, 751 ppm Zn, 3000 ppm P, 18.2 ppm U, 71 ppm Ce, and 35.6 ppm La.

Jozef vein - vein samples

Table N. 7

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	Sb	Ce	La
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	0,021	4,48	>10000	1,1400	234	19,9	9,8
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	0,112	84,1	>10000	2,1200	6070	2,01	1,5
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	0,06	20,2	>10000	1,0900	1360	9,12	3,9
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	0,007	0,42	1925	0,1925	47,2	8,56	3,6
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	0,081	4,52	3480	0,3480	95,4	5,81	3
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	0,234	7,95	>10000	2,2700	217	33	16,9
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	0,018	6,9	>10000	6,2100	135	24,3	12,9
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	0,116	8,33	2260	0,2260	322	0,41	<0.5
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	0,005	0,41	6030	0,6300	13,05	71	35,6
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	0,025	15,1	>10000	8,9200	240	11,55	5,2
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	0,054	43,9	6960	0,6960	3030	10,75	5,7
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	0,03	1,64	606	0,0606	31,3	8,1	3,4
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,006	0,64	7 030	0,7030	12,4	30,8	16,7
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,055	6,7	>10000	1,5800	51,1	6,92	3,7
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,006	10,25	3 780	0,3780	901	13,65	7,4
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,041	29,9	4 060	0,4060	843	13,7	7,6
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	<0.005	0,36	2 900	0,2900	3,97	1,75	0,9

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Bi	As	Al	Ba	Be	Ca	Cd
DESCRIPTION	sample number	vein			ppm	ppm	%	ppm	ppm	%	ppm
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	36,6	37,4	1,1	60	0,53	0,09	0,51
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	532	562	0,21	10	0,18	0,04	5,97
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	434	130,5	0,35	20	0,21	0,03	1,62
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	40,3	79,3	0,41	30	0,32	0,04	0,3
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	18,25	384	0,91	40	0,6	0,09	0,13
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	60,1	297	2,97	260	1,16	0,02	0,27
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	49,1	69,8	0,58	40	0,46	0,01	0,25
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	7,4	149,5	0,07	10	0,08	0,06	1,02
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	17,85	19,8	3,98	240	1,97	0,01	0,1
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	2620	241	0,74	40	0,63	0,03	0,62
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	169,5	373	0,96	50	0,59	0,05	4,19
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	2,5	56,6	1,7	110	0,94	0,17	0,14
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	12,75	21,5	1,84	90	1,21	0,02	0,02
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	26,1	101	1,2	60	0,66	0,08	0,16
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	64,6	102	0,37	20	0,46	0,04	0,84
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	80,6	132,5	1,05	450	0,79	0,09	1,08
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	0,35	0,9	0,19	10	0,06	0,07	0,09

Continue table N. 7

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Co	Cr	Cs	Fe	Ga	Ge	Hf
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	5,5	16	1,16	19,3	3,47	0,21	0,2
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	9,5	16	0,25	8,12	1,37	0,1	<0.1
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	4,4	29	0,26	10,05	1,7	0,12	0,1
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	3,9	16	0,44	5,99	1,2	0,09	0,1
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	37,8	55	1,02	4,94	3	0,09	0,3
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	7,6	39	2,73	7,06	9,76	0,1	0,5
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	0,8	27	0,5	8,29	1,55	0,44	0,2
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	0,9	11	0,17	21,9	1,2	0,12	<0.1
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	0,5	18	3,52	1,73	12,2	0,09	0,9
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	1,5	30	0,76	4,39	1,27	0,16	0,1
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	3,9	30	1,04	3,69	5,45	0,14	0,2
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	8,4	25	1,27	5,14	5,35	0,06	0,2
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	7,3	26	1,35	3,12	5,44	0,09	0,4
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	9,2	42	0,92	10,05	4,5	0,21	0,3
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	4,5	11	0,21	9,69	2,7	0,17	0,1
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	4,7	19	1,29	11,8	3,73	0,2	0,1
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	2,1	25	0,24	4,85	0,87	0,09	<0.1

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	In	K	Li	Mg	Mn	Mo	Na
DESCRIPTION	sample number	vein			ppm	%	ppm	%	ppm	ppm	%
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	1,86	0,51	3	3,93	8800	1,94	0,02
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	1,05	0,08	2,3	1,5	2730	0,7	0,01
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	0,871	0,12	2,5	1,29	3630	1,76	0,02
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	0,23	0,17	21,4	0,39	1840	0,48	0,01
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	0,29	0,4	3,9	0,4	660	11,75	0,02
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	0,909	1,23	9,2	0,45	1110	3,11	0,07
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	**3,53**	0,25	4,6	0,03	102	2,82	0,02
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	1,06	0,02	2,3	4,91	**9580**	1,63	0,01
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	0,301	1,79	8,3	0,23	115	1,59	0,05
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	1,34	0,16	8,4	0,02	69	6,95	0,02
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	0,302	0,48	5,1	0,64	1000	4,35	0,03
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	0,149	0,85	7,8	0,58	912	2,4	0,04
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,422	0,72	32	0,28	502	0,78	0,08
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	1,11	0,52	6,2	0,96	3520	26,2	0,04
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,488	0,15	2,8	2,71	3770	0,6	0,02
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,423	0,44	15	3,11	4500	0,88	0,02
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	0,867	0,06	2,6	0,34	4470	1,33	0,02

Continue table N. 7

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Nb	Ni	P	Pb	Rb	Re	S
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	%
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	1,3	14,9	50	14,6	24,8	<0.002	1,19
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	0,2	7	40	232	4	<0.002	1,65
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	0,2	6,7	50	381	5,3	<0.002	0,96
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	0,3	7,2	140	31,6	9,2	<0.002	0,3
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	1,3	27,4	380	16,8	24,1	0,014	2,93
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	2,2	18,3	120	28,9	60,8	<0.002	2,58
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	0,4	4	150	14,5	13,3	<0.002	4,77
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	0,1	6,5	80	8	0,9	<0.002	0,18
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	2,8	3,7	930	9,1	88	<0.002	0,48
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	0,5	15	3000	484	8,2	0,008	4,59
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	0,6	3,5	60	14,6	24,8	<0.002	0,86
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	2,9	5,8	30	46,2	27,7	<0.002	3,45
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	2,2	11,2	100	8,3	36,5	<0.002	0,79
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	1,5	24,7	280	19,7	28,6	0,013	2,3
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,4	9,5	40	29,1	6,3	<0.002	0,31
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	1,2	13,5	70	52,8	20,6	<0.002	0,35
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	0,2	4,8	150	0,7	2,9	<0.002	0,27

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Sc	Se	Sn	Sr	Ta	Te	Th
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	3,3	2	1,9	4,5	0,09	0,05	1,5
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	1,2	2	0,7	4,5	<0.05	0,06	0,2
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	1,7	1	0,7	6,5	<0.05	<0.05	0,5
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	3,2	4	0,7	8,4	<0.05	<0.05	0,5
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	1,4	3	3,1	10,7	0,08	0,15	1,1
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	3,8	3	16,6	13,5	0,18	0,15	4,2
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	0,7	6	35,7	7,1	<0.05	<0.05	1,3
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	2,6	1	0,8	2,5	<0.05	<0.05	<0.2
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	6,4	2	6	11,4	0,23	<0.05	6,5
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	0,8	31	71,2	17,3	<0.05	0,1	0,6
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	1,8	1	1,4	3,7	<0.05	<0.05	1,5
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	0,7	1	3,7	7,2	0,63	<0.05	0,8
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	3,1	2	3,6	16,1	0,16	<0.05	2,7
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	3,8	6	4,5	11	0,1	0,29	1,3
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	2,5	1	0,8	4	<0.05	<0.05	0,9
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	3,3	1	1,6	10,9	0,07	<0.05	1,5
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	2,4	1	1	4,7	<0.05	<0.05	0,4

Continue table N. 7

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Ti	Tl	U	V	W	Y	Zn
DESCRIPTION	sample number	vein			%	ppm	ppm	ppm	ppm	ppm	ppm
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	0,033	0,11	0,5	15	1,2	3,6	70
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	<0.005	0,04	0,2	3	0,1	1,1	751
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	<0.005	0,03	0,4	3	0,2	5,9	198
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	0,008	0,05	0,4	5	0,3	3,7	51
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	0,031	0,17	1,4	79	1,4	2,5	24
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	0,073	0,37	0,8	53	1,5	1,8	50
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	0,005	0,11	1	2	0,3	24,4	68
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	<0.005	0,02	1,3	28	0,1	1,9	142
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	0,048	0,51	1,7	32	1,9	15,4	10
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	0,011	0,56	18,2	46	0,6	13,9	77
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	0,018	0,1	6,8	17	0,4	2,1	513
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	<0.005	0,13	2	11	0,6	6,6	24
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,065	0,18	0,6	17	1,1	9,8	9
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,04	0,24	1,3	84	1,5	3,2	51
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	<0.005	0,03	0,3	5	0,3	32	139
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,033	0,14	0,4	13	0,9	1,8	162
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	<0.005	0,02	0,1	1	0,1	1,5	21

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Zr
DESCRIPTION	sample number	vein			ppm
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	5,6
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	0,8
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	1,3
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	1,9
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	13,6
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	14,1
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	3,1
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	<0.5
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	22,3
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	4,3
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	5,8
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	2,9
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	11,4
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	12,4
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	1,9
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	4,7
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	1,1

Zelená ("Green") Vein

The Zelená Vein is one of several veins in the southern part of the region that trend obliquely to the main, east–west oriented veins (Figure 3). Located between the Zlatá and Čierna veins, the Zelená Vein is 1 200 m long, and has been only partially investigated in the past. At dumps near the vein we found quartz, siderite, chalcopyrite, tetrahedrite, malachite, and azurite. Two samples were collected; their metal content is shown in Table 8. These samples yielded maximum values of 0.772% Cu, 14.3 ppm Ag, and 0.026 ppm Au. The Zelená Vein will be further sampled in 2012.

Zelená (Green) vein - vein samples

Table N. 8

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	As	Cd
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm
Slovinky - 58	120	Zelená vein	vein	quartz, strong weathered brown carbonates, siderite, ankerite, without sulphides	<0.001	<0.5	30		<5	<0.5
Slovinky - 60	122	Zelená vein	vein	grey white to milk white quartz, siderite, malachite, azurite, chalcopyrite, tetraedrite	0,026	14,3	7720	0,7200	407	<0.5

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Co	Mo	Ni	Pb	Zn
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm
Slovinky - 58	120	Zelená vein	vein	quartz, strong weathered brown carbonates, siderite, ankerite, without sulphides	<1	2	2	<2	11
Slovinky - 60	122	Zelená vein	vein	grey white to milk white quartz, siderite, malachite, azurite, chalcopyrite, tetraedrite	2	1	21	<2	115

Jakub ("Jacob") Vein

The Jakub Vein (Figure 3) is 1350 m long and contains quartz, siderite, tetrahedrite, chalcopyrite, magnetite, and titanite. It will be sampled in 2012.

Lazik Vein

The Lazik Vein lies south of the Jakub and Čierna veins and north of the Zlatá Vein (Figure 3). This vein has not been documented in the literature, although it does appear on old maps. Its continuation at depth is unknown and its length has not been checked in the field. Its eastern end is known to merge with the central part of the Zelená Vein. Its extension to the west is poorly constrained. Quartz-siderite-sulphide or siderite-quartz-sulfide mineralization is typical. Sulphide minerals include tetrahedrite, chalcopyrite, and coveline. Sampling results are shown in Table 9. These samples yielded the following maximum values: 1.645% Cu, 58.4 ppm Ag, 0.091 ppm Au, 825 ppm As, and 1 085 ppm Zn. Further sampling of the Lazik Vein is scheduled for 2012.

Lazík vein - vein samples

Table N. 9

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Au	Ag	Cu	Cu	As	Cd
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm
Slovinky - 53	119	Lazík vein	vein	quartz, siderite, tetraedrite (?), covellin, chalcopyrit, quartz crystals to 1 mm size	0,091	**58,4**	>10000	**1,6450**	875	11,5
Slovinky - 54	119	Lazík vein	vein	siderite, chalcopyrit,	0,044	13,9	>10000	**1,0150**	803	7,5
Slovinky - 55	119	Lazík vein	vein	quarz, few sulphides	<0.001	<0.5	33		<5	<0.5
Slovinky - 64	127	Lazík vein	vein	quartz, siderite	<0.001	<0.5	26		<5	<0.5
Slovinky - 66	128	Lazík vein	vein	quartz, siderite, few sulphides	0,051	**20,1**	1 500	0,1500	387	1,6
Slovinky - 67	129	Lazík vein	vein	siderite, quartz, chalcopyrite	<0.001	<0.5	16		8	<0.5
Slovinky - 76	138	Lazík vein	vein	grey white quartz with Fe infiltration, without sulphides	<0.001	0,6	88		<5	<0.5

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Co	Mo	Ni	Pb	Zn
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm
Slovinky - 53	119	Lazík vein	vein	quartz, siderite, tetraedrite (?), covellin, chalcopyrit, quartz crystals to 1 mm size	2	1	5	72	**1085**
Slovinky - 54	119	Lazík vein	vein	siderite, chalcopyrit,	8	1	13	42	533
Slovinky - 55	119	Lazík vein	vein	quarz, few sulphides	<1	1	2	<2	48
Slovinky - 64	127	Lazík vein	vein	quartz, siderite	<1	2	1	<2	5
Slovinky - 66	128	Lazík vein	vein	quartz, siderite, few sulphides	2	3	2	16	105
Slovinky - 67	129	Lazík vein	vein	siderite, quartz, chalcopyrite	<1	<1	<1	5	33
Slovinky - 76	138	Lazík vein	vein	grey white quartz with Fe infiltration, without sulphides	1	<1	<1	4	26

Biela ("White") Vein

The Biela Vein is a transverse vein that extends between the Zlatá and Lazik veins (Figure 3). It is about 1 000 meters long. Few details on the Biela Vein exist in the literature, although the vein does appear on old maps. Its full length and its continuation and depth are unknown.

We collected seven samples from two dumps located near the central part of the Biela Vein. Ankerite, siderite, chalcopyrite, tetrahedrite, and malachite were observed in the dump material. Metal content in the seven samples is shown in Table 10. The following maximum values were observed: 6.7% Cu, >100 ppm Ag, 0.8 ppm Au, 2 880 ppm As, and 1 180 ppm Zn. Further sampling of the Biela Vein is scheduled for 2012.

Biela (White) vein - vein samples

Table N. 10

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Au	Ag	Cu	Cu	As	Cd
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm
Slovinky - 78	140	Biela vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	0,195	**49,2**	>10000	**1,5250**	149	0,8
Slovinky - 81	144	Biela vein	vein	siderite, quartz, malachite, tetraedrite	0,8	**>100**	>10000	**6,7000**	2860	6,6

Name of	Type	Minerals and rocks description	Co	Mo	Ni	Pb	Zn
vein			ppm	ppm	ppm	ppm	ppm
Biela vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	58	5	13	200	106
Biela vein	vein	siderite, quartz, malachite, tetraedrite	17	3	3	13	**1180**

Abrahám Vein

The Abrahám Vein runs parallel to, and in between, the Abel and Jakub veins (Figure 3). It is approximately 500 m long. There is little information on the Abrahám Vein in the literature, although the vein appears on old maps. Its length and its continuation at depth are unknown.

We collected a single sample from a dump near the central part of the Abrahám Vein. Quartz and siderite without sulphides were observed in the dump material. Sampling results are shown in Table 17. The sample yielded anomalous concentrations of zinc (100 ppm). Further sampling is scheduled for 2012.

Abrahám vein - vein samples

Table N. 17

LAB SAMPLE	Flow sheet	Name of	Typy	Minerals description	Au	Ag	Cu	Cu	As	Cd	Co	Mo	Ni	Pb	Zn
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Gelnica - 49	112	Abrahám vein	vein	quartz, siderite	0,001	<0.5	19		<5	<0.5	21	<1	63	21	100

5.3 Gelnica Vein Belt

Gelnická Vein

In terms of mineral potential, we rank the Gelnická Vein second after the Slovinky Hrubá Vein. Its structure and geometry are complex relative to that of other veins. The vein generally trends northwest–southeast, with multiple local deviations (e.g., where it crosses the Slovinky Hrubá Vein, it trends north–south for 100–300 m and then bends to a bearing of 135° up to the central tectonic belt) (Figure 3). The vein is at least 3.6 km long and it dips 50–70° southwestwards. In its uppermost parts (Horizons 7 and 9, approx 700–800 m above sea level), dip is reversed to 50° north-northeastwards. Generally, a primary bending of the vein structure is assumed for this reversal in dip. However, it is not clear at which elevation this occurs. Its full lateral extent is unknown, but potentially could reach a length of 5 km. The vein is reported to rapidly taper with depth, but this fact has only been verified from the Slovinky side. The western part of the vein is 750 m deep. The depth of the eastern part of the vein is unknown. We think it has a maximum depth range being 800–1 000 m. The vein is 1–5 m thick (average 2.5 m). Mining is known to have extended to 350 m depth in selected areas (Figure 12).

Quartz is the main mineral in the vein. Mineralization is of the quartz-sulphide type. The ratio of siderite to quartz is 1:3. Chalcopyrite, pyrite and tetrahedrite are the most common sulphide minerals. Arsenopyrite, galenite, sphalerite, native Au, Ag, bornite, cobaltite and Bi sulpho-salts are rarely present. Increased content of Au, Ag, Ni, Co was ascertained in the eastsoutheastern part. Gold bound to pyrite reached values of 0.5–1.4 g/t.

Copper is the main exploitable component of the vein. Documents indicate that 18 kg of gold was also produced as a byproduct. In general, during later mining the gold content was ignored.

Eight samples were collected from dumps near the Gelnická Vein. These samples confirmed the content of Cu but also contained interesting contents of Au. Results are shown in Table 11. The following maximum values were observed: 2.66% Cu, 3.43 ppm Au, and 3.7 ppm Ag.

The Gelnická Vein is partially exhausted. Most blocks are not exhausted but in the past were calculated as Indicated Reserves . Reserves were calculated only for Cu.

Gelnická vein - vein samples

Table N. 11

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Au	Ag	Cu	Cu	As	Cd	Co	Mo	Ni	Pb
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Gelnica - 7	20	Gelnická vein	vein	siderite, quartz, chalcopyrite, coveline, malachite	**3,43**	3,7	**>10000**	**1,43**	<5	<0.5		2	18	<2
Gelnica - 8	20	Gelnická vein	vein	quartz, chalcopyrite, malachite	0,018	0,6	**>10000**	**2,66**	84	<0.5		2	4	5
Gelnica - 9	22	Gelnická vein	vein	siderite, quartz, chalcopyrite, malachite	**1,455**	1,4	7250	0,725	52	<0.5		2	30	11
Gelnica - 10	22	Gelnická vein	vein	quartz, chalcopyrite, malachite, coveline	**1,34**	2,9	**>10000**	**2,47**	9	<0.5		3	3	4
Gelnica - 11	24	Gelnická vein	vein	quartz, siderite, chalcopyrite, malachite, azurite	0,537	3,6	**>10000**	**2,42**	30	<0.5		2	9	18
Gelnica - 18	51	Gelnická vein	vein	quarz, pyrite, chalcopyrite, arsenopyrite (?)	0,008	<0.5	33	0,0033	8	<0.5	6	1	11	8
Gelnica - 19	51	Gelnická vein	vein	brown siderite, chalcopyrite	0,024	1,2	1275	0,1275	83	<0.5	80	2	41	10

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Zn	NOTE
DESCRIPTION	sample number	vein			ppm	
Gelnica - 7	20	Gelnická vein	vein	siderite, quartz, chalcopyrite, coveline, malachite	49	parallel vein ?
Gelnica - 8	20	Gelnická vein	vein	quartz, chalcopyrite, malachite	17	parallel vein ?
Gelnica - 9	22	Gelnická vein	vein	siderite, quartz, chalcopyrite, malachite	17	parallel vein ?
Gelnica - 10	22	Gelnická vein	vein	quartz, chalcopyrite, malachite, coveline	14	parallel vein ?
Gelnica - 11	24	Gelnická vein	vein	quartz, siderite, chalcopyrite, malachite, azurite	47	parallel vein ?
Gelnica - 18	51	Gelnická vein	vein	quarz, pyrite, chalcopyrite, arsenopyrite (?)	30	
Gelnica - 19	51	Gelnická vein	vein	brown siderite, chalcopyrite	93	

Križová ("Cross") Vein

The Križová Vein is a typical hydrothermal dike that locally attains the nature of a vein swarm. It is at least 2 500 m long, trends southeast–northwest, and dips 65–85° north-eastwards, but also southwestwards. Its average thickness is 2.5 m (0.3–6.0 m). Its continuation at depth is poorly constrained. Concetrations of Cu, Fe and SiO_2 are 0.1–3.5 %, 10 %, and 4–60%, respectively. Samples from old dumps near the south-eastern part of the vein yielded anamalous amounts of gold.

Mineralization in the Križová Vein is siderite-quartz-sulphidic and quartz-sulphidic. Based on knowledge gained during previous mining (Figure 13), siderite is present primarily in the upper parts of the vein, Cu concentration increases in the lower part of the vein, and quartz development devoid of Cu mineralization is present only in the lowest part of the vein. Quartz-siderite-sulphidic mineralization occurs in the eastern part of the vein. Quartz-sulphide and quartz mineralization on Horizon 3 has been uplifted in its western part.

The Križová Vein was observed to extend northwestwards along Horizon 3 for a distance of 360 m until it terminates against a cross-cutting structure. A similar theme is observed at mining levels above this, including Hereditary and Mokre horizons, where the Križová Vein also terminates against a cross-cutting structure at about the same position. We were unable to investigate the nature of this cross-cutting structure. However, we assume that the Križová Vein is displaced at least 400 m west at the cross-cutting structure to the area of the Blau Halde veins. This assumption is supported by the distribution of old dumps and adits mapped on the surface, and by the fact that similar shifts are observed in the Slovinky Hrubá Vein. No attention has been paid to the area between the Križová and Blau Halde veins. The Križová Vein was identified below Horizon 3 by two boreholes that intersected quartz–sulphidic mineralization with Cu contents of 0.20%.

Two samples were collected from dumps near the north of the vein (Mokre Pole adit - Wett Field adit). Results are shown in Table 12. The samples yielded maximum values of 2.21% Cu, 0.265 ppm Au, and 2.7 ppm Ag.

We recommend that the area between the Krížová, BlauHalde vein and Slovinky Hrubá veins be investigated further, possibly using geochemical and/or geophysical methods.

Križová vein - vein samples

Table N. 12

Flow sheet sample number	Name of vein	Type	Minerals description	Au ppm	Ag ppm	Cu ppm	Cu %	As ppm	Cd ppm
17	Križová vein	vein	milk white quartz, brown siderite, chalcopyrite, pyrite	0,265	2,7	>10000	**2,2100**	<5	<0.5
10A	Križová or Nová vein	vein	quartz, siderite, without sulphides	<0.001	<0.5	29		5	<0.5
131	Križová vein	vein	quartz, siderite	<0.001	0,6	3010		71	<0.5

Flow sheet sample number	Name of vein	Type	Minerals description	Co ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
17	Križová vein	vein	milk white quartz, brown siderite, chalcopyrite, pyrite	<1	2	8	8	44
10A	Križová or Nová vein	vein	quartz, siderite, without sulphides	2	2	5	7	16
131	Križová vein	vein	quartz, siderite	2	2	2	11	71

Nová ("New") Vein

The Nová Vein trends east-northeast–west-southwest between the Gelnica and Križová veins over a length of 1 460 m. It dips steeply in places to the north, and in places to the south, and has an average thickness of 1.2 m (0.2–4 m). The Nová Vein structure was verified by newer works (Figure 14). Indications of the vein on surface are rare. In the past the Nová Vein was opened by a shaft and adit at Christi Himmelfarth. Recently, it was opened by the Lydia Adit and mining works on Horizon 3. It has a form of a vein swarm in that it commonly splits into 3 veins spaced 30 m each from other. The vein exhibits a distinctive tectonic disturbance along most of its extent. Four drillholes attest to its development 180 m below level of Horizon 3 (Cu = 0.524 %). We observed the vein in Horizon 3 (about 330 m above sea level), in the Lydia Adit (approximately 500 m above sea level), and at ground surface.

The quality of mineralization in the Nová Vein is variable. Quartz-sulphidic mineralization with variable amounts of chalcopyrite predominates. Ankerite, pyrite, tetrahedrite, sphalerite, and galenite are also present. Copper content is 0.1–11%. Gold in pyrite was observed.

We mapped and sampled the whole course of the Nová Vein structure. Mineralization in dumps consists of gray-white quartz, siderite, chalcopyrite, coveline, malachite, and arsenopyrite. Nine samples were collected from dumps (Table 13). They yielded the following maximum values: 2.11% Cu, 1.64 ppm Au, 9.3 ppm Ag, 1 480 ppm Pb, 96.7 ppm Ce, 43.7 ppm La, 80 ppm Sm, 32.2 ppm Yb, and 234 ppm Ge. Notable are the anomalous values of REEs (Ce, La, Sm, Yb) and germanium. Given these results, we recommend that drilling be conducted to test the portion of the Nová Vein between the Horizon 3 and the surface.

Nová (New vein) - vein samples

Table N. 13

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	Sb	Ce	La
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite	0,075	7,3	>10000	**1,1150**			
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite	<0.001	0,7	80				
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	<0.005	<0.01	29,2		2,74	96,7	43,7
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration	0,001	<0.5	31				
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,	0,008	1,2	>10000	0,9960			
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite	0,105	2,8	8010	0,8010			
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite	**1,64**	9,3	>10000	**2,1100**			

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Dy	Er	Eu	Gd	Ho	Lu	Nd
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite							
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite							
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	0,26	12,2	10,85	680	3,75	0,09	0,04
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration							
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,							
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite							
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite							

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Pr	Sm	Tb	Tm	Yb	Bi	As
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite							741
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite							13
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	12,8	80	9,73	4,08	32,2	0,26	2,2
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration							11
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,							30
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite							199
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite							58

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Al	Ba	Be	Ca	Cd	Co	Co
DESCRIPTION	sample number	vein				ppm	ppm	%	ppm	ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite					1,7		2
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite					<0.5		13
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	0,086	3,73	56,8	0,95	305	0,33	1
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration					<0.5		12
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,					<0.5		5
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite					<0.5		100
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite					<0.5		4

Continue table N. 13

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Cr	Cs	Fe	Ga	Ge	Hf	In
DESCRIPTION	sample number	vein			ppm	ppm	%	ppm	ppm	ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite							
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite							
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	16,3	36,3	560	2,6	234	<0.002	0,01
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration							
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,							
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite							
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite							

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	K	Li	Mg	Mn	Mo	Mo	Na
DESCRIPTION	sample number	vein			%	ppm	%	ppm	ppm	ppm	%
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite					3		
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite					3		
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	17,3	2	4,4	51,3	1,3	0,05	21,8
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration					2		
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,					2		
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite					2		
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite					2		

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Nb	Ni	Ni	P	Pb	Pb	Rb
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite		7			1480		
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite		17			31		
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	0,453	1,18	3,2	109	2,1	7,6	80
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration		23			2		
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,		24			<2		
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite		81			16		
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite		9			<2		

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Re	Zn
DESCRIPTION	sample number	vein			ppm	ppm
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite		182
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite		70
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	62,5	
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration		76
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,		31
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite		40
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite		33

Nadložná ("Overlying") Vein

The Nadložná Vein trends east–west, is at least 770 m long, and dips 70° southwards. Its plan form suggests it is a splay off the Gelnica Vein. The Nadložná Vein is 1 to 5 m thick (average 2 m). It is suspected to merge westward into the "S" Vein (Figure 15). The vein is hosted exclusively in porphyroide and is considered to be a hydrothermal dike. Mineralization is quartz-sulphidic with minimum carbonate. The distribution of mineralization is iregular.

The continuation of the Nadložná Vein at depth has been verified previously by 3 boreholes. The eastern part of the Nadložná Vein was intersected 50 m below Horizon 3, where it exhibited quartz-sulphidic mineralization (0.27% Cu). The central part of the vein was intersected 200 m below Horizon 3, where it exhibited quartz-sulphide mineralization (0.18 to 0.34% Cu). The western part of the vein was intersected 100 m below level Horizon 3, where it exhibited quartz-sulphide mineralization (0.313% Cu). A sample from a 0.7 metre–thick stringer of the Nadložná Vein yielded 67.6 g/t Ag. Above Horizon 3, we observed the shallow subsubsurface parts of the Nadložná Vein in the Stefania Adit over a length of approximately 850 m.

Ten samples collected from dumps near the Nadložná Vein in 2011 yielded maximum values of 1.085% Cu, 0.017 ppm Au, 5.2 ppm Ag, and 15.15 ppm Mn. Mineralization in dumps consisted of gray-white quartz, siderite, chalcopyrite and carbonates. Details are provided in Table 14.

Nadložná (Overlein vein) - vein samples

Table N. 14

LAB SAMPLE	Flow sheet	Name of	Typy	Minerals description	Au	Ag	Cu	Cu	As	Cd	Co	Mo	Ni
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Gelnica - 30	65	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,017	0,6	3170		<5	<0.5	1	2	11
Gelnica - 31	66	Nadložná vein	vein	quartz, siderite, pyrite, chalcopyrite,	0,002	<0.5	1045		11	<0.5	6	2	10
Gelnica - 32	67	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,002	0,7	462		106	<0.5	1	1	11
Gelnica - 33	68	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,003	5,2	>10000	1,0850	38	<0.5	3	3	12
Gelnica - 34	69	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,009	1,3	8200	0,8200	28	<0.5	5	2	15
Gelnica - 40	100	Nadložná vein	vein	quartz, chalcopyrite, carbonates	0,005	1,4	687		15	<0.5	10	18	19
Gelnica - 48	110	Nadložná vein	vein	quartz, siderite	0,001	<0.5	15		<5	<0.5	6	1	5

LAB SAMPLE	Flow sheet	Name of	Typy	Minerals description	Pb	Zn
DESCRIPTION	sample number	vein			ppm	ppm
Gelnica - 30	65	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	2	14
Gelnica - 31	66	Nadložná vein	vein	quartz, siderite, pyrite, chalcopyrite,	5	20
Gelnica - 32	67	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	7	29
Gelnica - 33	68	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	474	33
Gelnica - 34	69	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	8	39
Gelnica - 40	100	Nadložná vein	vein	quartz, chalcopyrite, carbonates	15	13
Gelnica - 48	110	Nadložná vein	vein	quartz, siderite	<2	37

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Au	Ag	Cu	Cu	Sb	Ce	La	Bi	As
DESCRIPTION	sample number	vein			ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,009	0,5	4 310		56,8	23,6	9,9	0,33	775
210	210	Nadložná vein	vein	quartz, siderite	<0.005	0,03	21		1,52	0,59	<0.5	0,02	1,8
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	<0.005	0,11	263		20,9	5,87	3	0,17	5
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	<0.005	1,52	3 010		4,26	0,32	<0.5	0,09	13,2

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Al	Ba	Be	Ca	Cd	Co	Cr	Cs	Fe
DESCRIPTION	sample number	vein			%	ppm	ppm	%	ppm	ppm	ppm	ppm	%
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,49	20	0,46	0,31	0,09	5,5	17	0,5	8,44
210	210	Nadložná vein	vein	quartz, siderite	0,08	20	0,05	<0.01	0,02	3,4	34	0,13	6,15
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	1,85	80	1,04	0,02	0,04	1,8	72	0,84	3,91
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,03	10	<0.05	0,08	0,05	13,1	<1	0,08	36,1

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Ga	Ge	Hf	In	K	Li	Mg	Mn	Mo
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	1,7	0,18	0,1	0,475	0,2	3,4	3,85	3550	0,45
210	210	Nadložná vein	vein	quartz, siderite	0,55	0,08	<0.1	0,115	0,03	6,7	0,02	1660	1,71
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	3,44	0,06	0,2	0,194	0,73	8	0,47	1500	4,75
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	1,2	0,49	<0.1	3,09	0,01	1,2	5,99	15150	0,19

Continue table N. 14

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Na	Nb	Ni	P	Pb	Rb	Re	S	Sc
DESCRIPTION	sample number	vein			%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,03	0,2	19,2	70	2,1	10,7	0,002	0,45	10,6
210	210	Nadložná vein	vein	quartz, siderite	0,01	0,1	14,9	260	0,9	1,4	<0.002	<0.01	2,2
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,06	0,5	7,3	60	3,9	38,4	<0.002	0,03	2,7
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,01	0,4	56,9	30	20,5	0,7	<0.002	0,38	6

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	2	1,4	21,3	<0.05	<0.05	<0.2	0,008	0,04	0,5
210	210	Nadložná vein	vein	quartz, siderite	1	0,2	3,1	<0.05	<0.05	<0.2	<0.005	<0.02	0,1
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	1	1,3	11,2	0,06	<0.05	1,4	0,008	0,17	0,6
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	1	0,5	2,8	<0.05	0,06	<0.2	<0.005	<0.02	0,1

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	V	W	Y	Zn	Zr
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	10	0,3	6,8	19	2,6
210	210	Nadložná vein	vein	quartz, siderite	2	0,1	1	33	<0.5
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	9	0,3	1,9	13	6,6
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	16	0,1	4,5	32	<0.5

Blau Halde ("Blue Dump") Vein

The Blau Halde Vein has not been sampled yet (Figure 3). It was mapped and sampled at only 2 outcrops between Blau Halde and Krížová veins. No old dumps or adits were observed. Blau Halde dumps will be sought out and sampled in the spring of 2012. We recommend that the area between Slovinky Hrubá, Blau Halde and Križová veins be investigated further by geochemical and/or geophysical means.

Boží dar ("God's Gift") veins

The Boží Dar veins are interpreted to represent the eastern continuations of the Capistrani, Bartolomeus and Ivan veins (Figure 3). From north to south, they are termed the I, II, III, and IV veins. The lengths of the veins range from 800 m (III and IV) to 2 000 m (I). Vein II has not been identified at surface. The veins dip 50–60° southwards, and they continue to at least 300–500 m depth; its stike length decreases with depth. The Boží Dar veins are maximum 1.5 m thick and have irregular thicknesses. Vein fill consists of siderite and quartz with minor sulphides. Sulphides are represented by chalcopyrite and pyrite with minor tetrahedrite, native bismuth, sphalerite, cobaltite, and cinnabarite.

Content of exploitable components was as follows:

- Boží dar I – Cu – 0.1–4.1%, Fe – 14–35%, thickness 1.0–1.5 m
- Boží dar II – Cu – 0.03–2.5%, Fe – 0.8 – 15%, Hg – 0.01%
- Boží dar III - Cu – to 0.98%, Fe to 33%, thickness 0.20–1.60 m
- Boží dar IV – Cu – to 0.4%, Fe – 23–34%, Mn – 0.8–1.9%.

In 2011 we sampled only one vein (probably God's Gift II.). We collected 8 samples from the dump material. Minerals are quartz, siderite, chalcopyrite, pyrite, malachite, and tetrahedrite. The vein is rich in Cu, Ag and Au, Sb, Zn, Mn, and U. There are also anomalously high REE contents.

The contents of metals are shown in Table 15. The eight sampled collected yielded the following maximum values: 6.35% Cu, 43 ppm Au, 2.39 ppm Ag, >10 000 ppm Sb, 25.6 ppm Cd, 14 050 ppm Mn, 77.1 ppm Rb, 1 520 ppm Zn, 3.8 ppm U, 142 ppm Ce, and 73.9 ppm La.

Any connection between God Gifts veins and veins in Helcmanovce Township (Capistrani, Bartholomeus, etc.) will still need to be verified in the field. Other God Gits veins will be sampled in spring 2012.

Boží dar vein (God´s gift vein)- vein samples

Table N. 15

LAB SAMPLE	Name of	Type	Minerals and rocks description	Au	Ag	Cu	Cu	Sb	Ce	La	Bi
DESCRIPTION	vein			ppm	ppm	ppm	%	ppm	ppm	ppm	ppm
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	0,705	5,86	9340	0,934	491	142	73,9	6,78
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	0,575	**43**	**>10000**	**6,35**	**>10000**	0,65	1,8	8,24
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	0,026	0,21	2600		14	6,02	2,7	0,19
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	0,333	2,03	6480		62,3	29	13,9	0,6
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	0,008	0,67	449		20	2,28	1,1	0,26
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	0,844	6,13	**>10000**	**3,15**	111	3,2	1,7	4,59
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	**2,39**	7,11	**>10000**	**2,57**	87,4	3,84	1,9	69,2
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	0,104	16,65	6930		**2010**	11,65	6,4	548

LAB SAMPLE	Name of	Type	Minerals and rocks description	As	Al	Ba	Be	Ca	Cd	Co	Cr
DESCRIPTION	vein			ppm	%	ppm	ppm	%	ppm	ppm	ppm
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	99,5	3,54	170	1,48	0,29	1,57	11,1	44
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	2050	0,32	20	0,2	<0.01	25,6	5,5	12
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	13,6	0,52	30	0,28	0,15	0,09	6,3	7
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	1325	1,84	100	0,72	0,1	0,53	8,7	15
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	16,1	0,18	10	0,09	0,11	0,16	4	10
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	673	0,32	20	0,22	0,08	1,49	8,5	9
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	2610	0,7	40	0,41	0,09	2,25	7,3	16
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	248	0,81	20	0,61	<0.01	1,47	1,3	20

LAB SAMPLE	Name of	Type	Minerals and rocks description	Cs	Fe	Ga	Ge	Hf	In	K	Li
DESCRIPTION	vein			ppm	%	ppm	ppm	ppm	ppm	%	ppm
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	2,69	6,5	14,2	0,34	0,7	0,485	1,53	4,6
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	0,37	6,45	1,44	0,12	<0.1	0,225	0,14	2,5
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	0,49	28,2	2,61	0,38	0,2	1,995	0,24	1,8
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	1,38	15,35	7,28	0,25	0,4	1,455	0,85	2,9
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	0,16	22,2	1,17	0,29	<0.1	1,47	0,05	25,7
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	0,41	13,5	1,3	0,22	0,1	2,99	0,13	1,4
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	0,72	18,65	2,72	0,28	0,1	1,155	0,33	3
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	0,81	3,49	2,29	0,18	0,1	0,164	0,4	8,3

Continue table N. 15.

LAB SAMPLE	Name of	Type	Minerals and rocks description	Mg	Mn	Mo	Na	Nb	Ni	P	Pb
DESCRIPTION	vein			%	ppm	ppm	%	ppm	ppm	ppm	ppm
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	1,12	2060	1,44	0,27	3	27	390	37,7
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	0,09	271	3,06	0,01	0,1	34,5	20	19,7
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	4,54	**14050**	0,58	0,02	0,8	14,2	30	1,3
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	2,99	6350	0,88	0,04	2	24	150	2,1
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	3,02	**11550**	0,68	0,01	0,3	7	20	5,4
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	1,91	4020	0,81	0,03	0,3	36,4	210	117
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	4,35	7200	1,34	0,02	0,5	24,2	30	63,4
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	0,05	165	0,45	0,03	0,2	3,1	30	171,5

LAB SAMPLE	Name of	Type	Minerals and rocks description	Rb	Re	S	Sc	Se	Sn	Sr	Ta
DESCRIPTION	vein			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	77,1	<0.002	1,29	8,4	2	5,3	30,3	0,2
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	7,9	<0.002	5,39	0,3	3	72,8	2	<0.05
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	12,9	0,002	0,29	1,7	2	1,3	6,6	0,05
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	50,1	<0.002	1,2	4,5	2	3,8	8,5	0,14
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	2,6	<0.002	0,18	1,6	1	0,3	3	<0.05
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	7,6	<0.002	3,83	1,7	5	5,8	8	<0.05
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	17,8	<0.002	2,64	14,7	4	9,9	5,3	<0.05
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	20,6	<0.002	0,59	3	10	2,4	3,4	<0.05

LAB SAMPLE	Name of	Type	Minerals and rocks description	Te	Th	Ti	Tl	U	V	W	Y
DESCRIPTION	vein			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	<0.05	5,7	0,112	0,38	3,8	35	1,2	5,1
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	<0.05	<0.2	<0.005	0,13	0,1	1	0,1	0,3
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	<0.05	0,6	0,017	0,06	0,8	8	0,4	18
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	<0.05	2,6	0,059	0,2	2,5	14	1,2	8,1
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	0,05	0,2	0,005	<0.02	0,1	2	0,1	4,5
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	0,05	0,3	0,006	0,15	0,5	3	0,2	3,3
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	0,07	0,5	0,01	0,1	2	17	0,5	6,4
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	<0.05	1,2	<0.005	0,12	0,9	3	0,1	4,8

			Continue table N. 15		
LAB SAMPLE	**Name of**	**Type**	**Minerals and rocks description**	**Zn**	**Zr**
DESCRIPTION	**vein**			**ppm**	**ppm**
217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	118	20,9
218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	1520	0,9
219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	48	4,1
221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	44	11,6
222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	53	0,9
223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	196	1,7
224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	181	2,2
229A	Boží dar veins	vein	quartz, carbonates, chalcopyrite, tetraedrite	288	3

5.4 Zahura and Klipberg–Zakarovce vein swarms

The Galmus–Farske luky area is underlain by rocks of the Krompachy Group and by Lower Triassic strata of the Stratena Group. Little vein-related Cu ore mineralization is present in this area.

The **Zahura Stockwork** is irregularly developed. It consists of a few more or less parallel veinlets that pinch and swell irregularly. The vein swarm trends east–west and dips variably from 40° northwards to 85° southwards, of which the southern dip predominates. It is approximately 5 km long and 300–700 m wide. The thrust fault at the base of older, overlying rocks of the Krompachy Group manifests itself as a 50 m thick mylonitized belt that forms the main structure. From viewpoint of ore mineralization, parallel structures are more significant, despite being discontinuous, short (<300 m), and interlaced by a system of diagonal disturbancies of the same age. Vein thickness does not exceed 1.5 m. Vein fills consist primarily of siderite, ankerite, specularite and barite.

Farther south is the east–west trending **Klippberg –Zakarovce Vein Swarm**, which has a total length of 15 km. Economically important ore mineralization was extracted from the eastern part of the vein (Klippberk Mountain and Zakarovce village). Only minor indications of mineralization with economic grades were observed in the western part and Slovinky surroundings (the Uorecha Adit, Porac valley adits, Scoby–Ladislav Adit and others). The most important mineralization was on the western slope of the Klippberg Mountain from the Peter–Pavol mining field to the Kalman field, northwestwards from Maria Huta. Here, the vein swarm is 40 to 50 m wide and composed of up to 5 parallel veins of variable length. The length of the swarm reaches 5 km, and veins dip 60 – 85° southwards. The continuation of the vein swarm at depth is poorly constrained, although it has been reported that the veins extend only to 250 m depth, below which they wedge out. The vein swarm is developed in rocks of the Rakovec Group. Vein fill consists primarily of siderite and, in the upper parts of the veins, barite and specularite, with minor chalcopyrite, tetrahedrite, cinnabarite, and, less commonly, galenite and sphalerite. Other ore occurences can be found in surrounding the Klippberg–Zakarovce Vein Swarm. The most significant veins in the swarm are the **Maria Vein**, which is situated in the underlier of the Klippberg-Zakarovce Hrubá Vein, and the **Rumanay Vein**, which is situated 700 m north of the Zakarovce Hrubá Vein. There are also some less significant veins in the overlier, such as the Actri and Ray veins.

We collected one sample from an old dump near the Zahura Vein Swarm (Table 16). Copper, gold and silver values in the sample were not anomalous. By contrast, REE values were high, including values of 88.7 ppm Ce, 42.5 ppm La, 49 ppm Nd, 13.65 Dy, 14.8 ppm Gd, 10.8 ppm Pr, 12.75 ppm Sm, and 5.25 ppm Yb.

Of particular note is the anomalously high content of REE in rock outcrops around the Žakarovský Stream. Samples of violet graphitic phylites yielded maximum values of 186.5 ppm Ce, 83 ppm La, 82.6 ppm Nd, and 22.2 ppm Pr. Greening chloritic phylites yielded maximum values of 216 ppm Ce, 105 ppm La, 89.4 ppm Nd, 25.9 ppm Pr, 14.95 ppm Ga, 6.91 ppm Yb, and 16.4 ppm Sm. Given these results, the REE content of veins should be further investigated in this area; at a minimum, old dumps and other types of rock should be sampled.

Žakarovce stockwork - vein samples

Table N. 16

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Au	Ag	Cu	Cu	Ce	La	Dy	Er	Eu	Gd
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	<0.001	<0.5	3	<5	10,4	4,7	6,49	3,7	1,29	5,18

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Ho	Lu	Nd	Pr	Sm	Tb	Tm	Yb	As	Ba
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	1,31	0,53	6,8	1,4	2,38	1	0,53	3,49	<5	471

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Cd	Co	Co	Cr	Cs	Ga	Hf	Mo	Nb	Ni
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	<0.5	3,6	3	10	8,31	28,2	5	<1	12,1	20

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Ni	Pb	Pb	Rb	Sn	Sr	Ta	Th	Tl	U
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	18	<2	<5	234	2	22,4	0,6	3,36	0,6	1,54

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	V	W	Y	Zn	Zn	Zr	Al2O3	Fe2O3	CaO	MgO
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	316	5	37,5	18	39	185	21,9	8,77	0,09	0,38

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	Na2O	K2O	Cr2O3	TiO2	MnO	P2O5	SrO	BaO	LOI	Total
DESCRIPTION	sample number	vein			%	%	%	%	%	%	%	%	%	%
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	0,34	6,24	<0.01	2,22	0,22	0,18	<0.01	0,05	5,71	97,8

LAB SAMPLE	Flow sheet	Name of	Type	Minerals and rocks description	SiO2
DESCRIPTION	sample number	vein			%
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	51,7

6. ROCK DESCRIPTIONS

In this section we describe each type of rock on each dump or outcrops or floats observed during the 2011 sampling campaign. For detailed descriptions of rock in this report we used the 1983 petrographic report of K. Piovarcsy, Z. Komoňová from Slovinky – západ (West). In the report were described rocks from 29 horizons and rocks from diamond drilling holes SLz - 9,10,11,12/83.

6.1. Felsic volcanic rocks

6.1.1 Quartz porphyry/rhyolites

Macroscopic description

The samples are medium to coarse grained and light green-gray to gray-green in color.

Microscopic description

Major minerals are quartz, feldspar, and sericite. Minor minerals include carbonates, leucoxens, and chlorite. Accessory minerals are zircon, apatite, pyrite, and rutile.

Mineral composition

Major minerals: Quartz 20%, albite 60%, sericite + muscovite 10%

Minor minerals: Carbonates 7%, rutile 2%, chlorite 0.5%

Accessory minerals: Content to 0.5% apatite, pyrite, zircon,

Typical content of various elements (ppm)

g/t	
Li - 5	W – st
As - st	Cr – 15
Sb - st	B – 30
Bi - st	Zr – 101
Cu - 9	Ba – 150
Pb - 5	Sn – 6

Zn - 22	Ag - 0,2
Ni - 8	Co – 2
Mo - st	

6.1.2 Porphyroides and tuffaceous porphyroides

a) Rhyolitic porphyroides and tuffaceous porphyroides

Macroscopic description

Most samples are fine grained, rarely medium to coarse grained, and light green to grey in color. Quartz grains are very small, up to 1 mm.

Microscopic description:

Major minerals: Quartz, sericite, albite, K- feldspar, carbonates

Minor minerals: Leucoxene, rutile, chlorite, pyrite

Accessory minerals: Tourmaline, apatite, zircon.

b) Dacitic porpyhroids and tuffaceous porphyroids

Macroscopical description

Samples from Horizon 29 are mostly medium to coarse grained. Quartz grains are on average 2-3 mm, 5 mm rarely. Color varies from dark green (predominant) to light green.

Microscopical description

Major minerals: Quartz, sericite, albite, carbonates

Minor minerals: Leucoxene, rutile, chlorite, pyrite

Accessory minerals: Tourmaline, zircon, apatite, xenotime, epidote, hematite

Mineral composition

Slz – 10/37 – bore hole

Major minerals: Sericite up to muscovite 25%, albite 30%, quartz 30%, chlorite 10%

Minor minerals: Carbonates 1%, rutile 3%, leucoxene 0.5%

Accessory minerals: Zircon and apatite 0.5%.

SZP/35 – Horizon 29

Major minerals: Quartz 50%, sericite up to muscovite 35%, chlorite 10%

Minor minerals: Leucoxene + rutile 2%, carbonates 3%

Accessory minerals: Zircon

SZP/36 – Horizon 29

Major minerals: Sericite up to muscovite 30%, quartz 20%, albite 28%, carbonates 10%

Minor minerals: Rutile + leucoxene 5%

Accessory minerals: Apatite, zircon, monazite, pyrite 2%.

SZP/45 – Horizon 29

Major minerals: Sericite 30%, quartz 67%

Minor minerals: Rutile 1%, carbonates 2%

Accessory minerals: Zircon + apatite

Typical content of various elements (ppm)

g/t	Slz - 10/37	SZP/35	SZP/36	SZP/45
	surface rig	29.hor.	29.hor.	29.hor.
Cu	3	6	4	84
Pb	St	st	st	st
Zn	67	8	14	10
Ni	7	3	5	4
Co	5	3	1	1
Mo	St	st	st	st
W	St	st	st	st
Cr	15	15	25	20
B	10	30	35	45
Zr	145	161	159	117
Ba	210	290	210	180
Sn	4	4	4	4

Ag	0,2	0,1	0,1	0,2
Li	29	38	19	17
As	St	st	st	St
Sb	St	st	st	St
Bi	St	st	st	St

6.1.3 Tuffs and tuffites

a) Felsic tuffs and tuffites

Macroscopic description

Fine grained up to pelitic light green, finely foliated rocks with fine quartz-carbonate and chloritic veins.

Microscopical description

Major minerals: Sericite, quartz, carbonate, chlorite

Minor minerals: Leucoxene, rutile

Accessory minerals: Tourmaline, apatite, zircon

b) Intermediate tuffs and tuffites

Macroscopic description

Rock samples are dark grey to dark green in color. All are finely foliated. Some types contain layers with different colors. All are fine grained up to coherent with smaller quantities of quartz-carbonate veins.

Microscopic description

Major minerals: Quartz, sericite, chlorite, carbonates, albite

Minor minerals: Leucoxene, rutile, hematite

Accessory minerals: Tourmalin, zircon, apatite, monazite

6.2. Mafic Volcanic Rocks

1. Mafic volcanic rocks
2. Metabasalts
3. Mafic tuffaceous rock
4. Intermediate tuffaceous porphyroides

Macroscopic description

Samples are fine to medium grained and darker green in color.

Mafic volcanic rocks and diabases can be found in boreholes and in Horizon 29. They are darker green in color. They are found in association with their tuffaceous and metamorphic forms.

Ti-minerals forming small grains are common in mafic rocks. They are converted to leucoxene.

Other metamorphic minerals are represented by sericite, chlorite, and rarely epidote. Mafic tuffaceous rocks have a striped texture.

Pyroclastic material contains the same minerals as mafic rocks, namely feldspar, chlorite and carbonate minerals.

The mafic rocks are characterized by low SiO_2 (as low as 45%), which corresponds to the average SiO_2 content of diabase, and relatively high concentrations of Al_2O_3. They also have relatively low concentrations of Fe_2O_3 (0.9%) compared with mafic rocks reported in the literature (2-5%). Also characteristic is the elevated content of MgO (10-15%) compared to acidic volcanic rocks, which tend to have MgO concentrations of 1-3%.

High concentrations of the trace element Cr and, to a lesser extent, Ni, Co, Zn and W (10 to 20 g/t) and Ag (3 to 4 g/t) are observed. Concentrations of B, Ba, Zr, and Pb are low.

Typical content of various elements (ppm)

g/t				
Li	130	17	124	120

Zr	148	114	70	110
Ba	st	290	st	90
B	st	40	st	10
Cu	20	4	31	35
Pb	st	St	6	11
Zn	142	17	120	146
Ni	102	65	352	116
Co	47	19	42	47
Cr	320	340	990	360
Mo	st	St	st	St
W	20	10	st	St
As	st	St	st	St
Sb	st	St	st	St
Bi	st	St	st	St
Ag	0.3	0.4	-	-

6.3. Epithermally metamorphosed sedimentary rocks

6.3.1 Phyllites

Phyllites are fine grained pelitic epimetamorphic rocks of sedimentary origin. They are divided on the basis of the predominant minerals.

a) Sericitic phyllites

Macroscopic description

Rocks are lighter in color to darker and gray-green and are fine to medium grained (sand sized) with very fine grained foliation. Carbonate–quartz and pyrite veins are common in almost all the samples.

Microscopic description

Major minerals: Sericite, quartz

Minor minerals: Rutile, pyrite, leucoxene, carbonates, chlorite

Accessory minerals: Apatite, tourmaline, limonite.

b) Chloritic-sericitic up to sericitic-chloritic phyllites

Macroscopic description

Mostly pelitic rocks, which are darker green and gray-green to olive-green in color. Light green phyllites appear to change to violet sericitic-chloritic phyllites when hematite is introduced.

Microscopic description

Major minerals: Sericite, chlorite, quartz

Minor minerals: Rutile, carbonates

Accessory minerals: Tourmaline, apatite, zircon, pyrite

Mineral composition of some samples – Slz-9/15 – 185.2 m:

Major minerals: sericite 45%, chlorite 20%, quartz in vein 23%,

Minor minerals: carbonates 5%, feldspare 3%, graphite 1%, rutile 2%

Accessory minerals: apatite, tourmaline, zircon 1%

Typical content of various elements (ppm)

g/t	**Slz - 9/15**	**Slz - 9/16**	**Slz - 9/17**	**Slz - 11/15**	**Slz - 11/16**	**Slz - 11/17**	**Slz - 10/20**
Cu	31	89	10	4	3	7	3
Pb	7	st	7	St	st	St	5
Zn	121	142	91	85	129	74	50
Ni	50	57	49	46	51	42	7

Co	18	21	40	13	16	18	5
Mo	st	st	St	St	st	St	st
W	st	st	St	St	st	St	st
Cr	130	150	105	110	130	100	15
B	150	135	115	150	150	110	40
Zr	234	145	125	172	171	157	122
Ba	660	540	520	700	520	620	550
Sn	8	11	6	7	9	6	3
Li	87	93	70	50	65	40	43
As	st	st	St	st	st	St	st
Sb	st	st	St	st	st	St	st
Bi	st	st	St	st	st	St	st
Ag	0.1	0.1	0.3	0.1	0.1	0.1	0.1

g/t	**Slz - 10/22**	**Slz - 10/23**	**Slz - 10/33**	**Slz - 10/34**	**Slz - 12/1**
Cu	9	3	2	2	8
Pb	st	5	5	7	6
Zn	78	74	45	63	93
Ni	54	90	41	27	47
Co	16	27	16	8	16
Mo	st	st	st	st	st
W	st	st	st	st	st
Cr	100	225	130	130	110
B	110	35	190	420	110
Zr	135	112	119	122	118
Ba	640	390	620	500	700
Sn	6	5	9	8	8

Ag	0.1	0.2	0.1	0.1	0.3
Li	49	42	28	40	60
As	st	st	st	st	st
Sb	st	st	st	st	st
Bi	st	st	st	st	st

c) Graphitic-sericitic to sericitic-graphitic phylites

Macroscopic description

Dark gray to black pelitic rocks with fine foliation. Penetrated by very irregular carbonate-siliceous veins.

Microscopic description

Major minerals: Sericite, quartz, chlorite

Minor minerals: Albite, pyrite, rutile, graphite, carbonates

Accessory minerals: Tourmaline, zircon

d) Felsic tuffaceous phyllites

Macroscopical description

Color of individual samples varies considerably from pale green to dark green, commonly with different colored layers. All exhibit fine foliation on the surface.

Microscopic description

Major minerals: Sericite, quartz, carbonates

Minor minerals: Rutile, leucoxen, chlorite,

Accessory minerals: Tourmaline, apatite, zircon, pyrite

Typical content of various elements (ppm)

g/t	**Slz - 12/29**	**Slz - 10/17**
Cu	38	4
Pb	5	St
Zn	12	24
Ni	7	12
Co	2	6
Mo	st	st
W	st	st
Cr	15	25
B	25	45
Zr	48	63
Ba	240	300
Li	44	15
As	st	st
Sb	st	st
Bi	st	st
Sn		5
Ag		0.1

e) Intermediate tuffaceous phyllites

Macroscopic description

They represent the pelitic rocks with fine foliation. Coloured from gray-green to dark colors. Almost all samples have carboniferous-quartz veins and different layers of colours.

Microscopic description

Major minerals: Sericite, chlorite, quartz, albite

Minor minerals: Carbonates, rutile, leucoxene

Accessory minerals: Tourmaline, apatite, zircon, graphite

6.3.2 Lydites (jasper)

Lydite samples are black and very hard.

Microscopic description

Major minerals: Quartz

Minor minerals: Carbonates, graphite, sericite,

Accessory minerals: Pyrite

6.4 Quartzites

Macroscopic description

Quartzite samples are compact, fine grained, and hard. They vary in colour from gray-green to dark grey to black.

Microscopic description:

Major minerals: quartz, carbonates (mostly secondary), sericite,

Minor minerals:, graphite, pyrite, chlorite, albite

Accessory minerals: tourmaline, zircon, rutile

6.5 Hydrothermal alteration surrounding veins

Both macroscopic and microscopic effects of hydrothermal alteration are commonly observed in samples of wall rock bordering veins. Alteration can be pronounced within 1 to 5 m of veins and can extend up to 30 m.

Hydrothermal transformation is reflected by silicification adjacent to veins, which affects all rock types examined. Besides silica, Fe_2O_3 can also be enhanced in the vicinity of veins. In chloritic phyllites, Li, Zr, B, Ba, and Cr are enhanced, and in rhyolitic rock Cr is enhanced.

7. DISTRIBUTION OF Au, Ag, Cu AND REEs IN ORE FIELD

No attention has been paid in the past (1950–1973) to gold and silver during mining of the Slovinky and Gelnica deposits and the Žakarovce Stockwork. Exploration for these metals did not start until the 1980s. We know little about the REEs because, in the past, only the mineral xenotime was described.

7.1 Gold

Throughout the region, gold tends to occur in upper parts of the ore structures and decrease in concentration with depth.

Native gold existed in the upper parts of the **Slovinky Hrubá Vein,** which has been mined completely from its eastern extremity to the Dorota Shaft. In deeper parts of the vein, gold is bound to pyrite (0.32–0.38 ppm) and chalcopyrite (0.30–0.31 g/t). Microscopic native gold (grains to size of 5 μm) was also observed. The native gold exhibited low concentrations of associated silver (3.8–4.9%). Gold content is unknown below the deepest mine works (Horizon 37).

West of the Dorota Shaft in Horizons 17, 21 and 23, gold was observed in concentrations above 0.1 g/t. Similarly, gold exceeded 0.1 g/t in deeper parts of the deposit (down to Horizon 37) near the Trinkel Shaft.

Interesting results were obtained on Horizon 29 west of the Dorota Shaft by channel sampling. Here, gold content reached a maximum of 3.56 g/t, and was on average 0.70 g/t. The gold was bound to pyrite and chalcopyrite.

In the westernmost part of the deposit (Lacemberk Valley) gold was observed in samples from borehole Slz – 12/84 at a depth of 500 m below surface. In deeper, unmined horizons, gold was observed at grades below 0.1 g/t. However, it should be noted that most analyses were completed after aqua regia sample digestion, which commonly leads to underestimation of gold content.

One hundred and ten kilograms of gold was produced as a secondary product of copper extraction from the Slovinky deposit between 1973 and 1985. In 1985, there was 1.55 g/t of gold in concentrate and 10.14 kg of gold was produced.

Occurrence of gold in the **Gelnica Vein** is similar to the Hrubá Vein. However, it is more irregularly distributed. Like Hrubá, it is suspected to also occur primarily in the upper parts of the deposit.

Between the Leopold and Siroka shafts in Horizons 7, 9, 13, 17, gold was observed at grades exceeding 0.1 g/t. Gold has not been observed in the Gelnica Vein southeastward of the Nová Gelnica Shaft. Again, digestion of samples by aqua regia may have led to underestimation of values.

The **Križová Vein** is mined out in the shallow subsurface and there are no data on gold occurrence. However, gold probably formed part of copper ores, because gold was present in samples from old dumps in the Slovenske Cechy area (part of the town of Gelnica). However, no attention has been paid to this occurrence in the past.

The **Zlatá Vein** has never been mined for gold, only iron. No geological exploration work on this vein or on accompanying veins has been conducted since 1950.

The distribution of gold in others veins had never been tested. Table 17 details Au contents in the sampled veins.

Gold in vein samples

Table N. 17

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Au ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	0,047
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	0,037
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	<0.005
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,007
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,042
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	0,079
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	0,01
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	0,028
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	0,023
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	0,02
Slovinky - 63	125	"S" vein	vein	quartz, siderite (ankerite)	<0.001
Slovinky - 76	138	"S" vein	vein	grey white quartz with Fe infiltration, without sulphides	<0.001
Slovinky - 78	140	"S" vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	0,195
Slovinky - 81	144	"S" vein	vein	siderite, quartz, malachite, tetraedrite	0,8
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	0,075
1035	1035	S vein	vein	white quartz, chalcopyrite	0,154
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,008
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	0,024
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	0,391
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	0,143
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	0,006
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	0,015
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	0,051
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	0,07
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,036
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	0,006
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	0,087
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	0,476
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	0,38
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	0,066

				Continue - Table N. 17	
Gelnica - 49	112	Abrahám vein	vein	quartz, siderite	0,001
1069A	1069A	Čierna (Black) vein	vein	quartz, limonite	<0.005
1070	1070	Čierna (Black) vein	vein	quartz, limonite	<0.005
1071A	1071A	Čierna (Black) vein	vein	limonite with pyrite and chalcopyrite impregnations	0,079
1071B	1071B	Čierna (Black) vein	vein	quartz with pieces of rock and pyrites	0,327
1075	1075	Čierna (Black) vein	vein	quartz, carbonates	0,01
1079	1079	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	0,015
1080A	1080A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	0,028
1081	1081	Čierna (Black) vein	vein	quartz, siderite, malachite	0,043
1088A	1088A	Čierna (Black) vein	vein	siderite, quarz, ankerite	0,007
1092A	1092A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite	0,021
1093A	1093A	Čierna (Black) vein	vein	quartz, siderite, pyrite	0,242
Slovinky - 62	124	Čierna (Black) vein	vein	siderite, limonite, chalcopyrite, coveline, few quartz	0,021
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	0,021
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	0,06
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	0,007
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	0,081
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	0,234
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	0,018
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	0,116
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	0,005
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	0,025
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	0,054
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	0,03
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,006
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,055
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	0,006
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,041
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	<0.005
Helcmanovce - 2	53	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite,	0,139
Helcmanovce - 2	54	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite,	0,111
Helcmanovce - 2	55	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite,	0,147
Helcmanovce - 2	57	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite	**1,965**
Helcmanovce - 2	58	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, chalcopyrite	0,017
Helcmanovce - 2	59	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,256

				Continue - Table N. 17	
Helcmanovce - 2	61	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,122
Helcmanovce - 2	62	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	0,058
Helcmanovce - 2	63	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	**2,88**
Helcmanovce - 3	72	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, malachite, chalcopyrite	0,012
Helcmanovce - 3	74	Zlatá (Gold) vein	Vein	milk-white quartz, limonite, mouldered carbonates	**1,4**
Helcmanovce - 3	80	Zlatá (Gold) vein	Vein	sometimes quartz, mouldered carbonates, chalcopyrite, pyrite	**1,03**
Slovinky - 99	147	Zlatá (Gold) vein	Vein	siderite, chalcopyrite	0,005
Slovinky - 101	151	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,049
Slovinky - 102	156	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,708
Slovinky - 104	158	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, calcopyrite, limonite (?)	<0.001
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	0,025
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	0,014
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	<0.005
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,028
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	0,025
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	0,043
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	0,546
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	**1,09**
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,044
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	0,005
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	0,045
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,055
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	<0.005
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	0,019
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	**0,864**
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	<0.005
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	<0.005
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,035
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,07
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,202
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,012
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,054
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	**1,2**
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,006
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,078

				Continue - Table N. 17	
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	0,17
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,041
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	**8,76**
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	0,494
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	0,06
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,014
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,022
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,136
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	0,051
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	0,018
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,087
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,035
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,22
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	0,243
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,233
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	0,031
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	**1,645**
Slovinky - 58	120	Zelená (Green) vein	vein	quartz, strong weathered brown carbonates, siderite, ankerite, without sulphides	<0.001
Slovinky - 60	122	Zelená (Green) vein	vein	grey white to milk white quartz, siderite, malachite, azurite, chalcopyrite, tetraedrite	0,026
174	174	Capistrani vein	vein	quartz, siderite, limonite,	0,546
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	**1,09**
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,044
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	0,005
179	179	Capistrani vein	vein	quartz, siderite, malachite	0,045
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,055
Slovinky - 53	119	Lazík vein	vein	quartz, siderite, tetraedrite (?), covellin, chalcopyrit, quartz crystals to 1 mm size	0,091
Slovinky - 54	119	Lazík vein	vein	siderite, chalcopyrit,	0,044
Slovinky - 55	119	Lazík vein	vein	quarz, few sulphides	<0.001
Slovinky - 64	127	Lazík vein	vein	quartz, siderite	<0.001
Slovinky - 66	128	Lazík vein	vein	quartz, siderite, few sulphides	0,051
Slovinky - 67	129	Lazík vein	vein	siderite, quartz, chalcopyrite	<0.001
Slovinky - 76	138	Lazík vein	vein	grey white quartz with Fe infiltration, without sulphides	<0.001
Slovinky - 78	140	Biela vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	0,195
Slovinky - 81	144	Biela vein	vein	siderite, quartz, malachite, tetraedrite	0,8

Gold in vein samples

Table N. 17

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Au ppm
Gelnica - 7	20	Gelnická vein	vein	siderite, quartz, chalcopyrite, coveline, malachite	**3,43**
Gelnica - 8	20	Gelnická vein	vein	quartz, chalcopyrite, malachite	0,018
Gelnica - 9	22	Gelnická vein	vein	siderite, quartz, chalcopyrite, malachite	**1,455**
Gelnica - 10	22	Gelnická vein	vein	quartz, chalcopyrite, malachite, coveline	**1,34**
Gelnica - 11	24	Gelnická vein	vein	quartz, siderite, chalcopyrite, malachite, azurite	0,537
Gelnica - 18	51	Gelnická vein	vein	quarz, pyrite, chalcopyrite, arsenopyrite (?)	0,008
Gelnica - 19	51	Gelnická vein	vein	brown siderite, chalcopyrite	0,024
Gelnica - 4	17	Krížová vein	vein	milk white quartz, brown siderite, chalcopyrite, pyrite	0,265
Gelnica - 2	10A	Krížová or Nová	vein	quartz, siderite, without sulphides	<0.001
Slovinky - 68	131	Krížová vein	vein	quartz, siderite	<0.001
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite	0,075
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite	<0.001
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	<0.005
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration	0,001
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,	0,008
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite	0,105
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite	**1,64**
Gelnica - 30	65	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,017
Gelnica - 31	66	Nadložná vein	vein	quartz, siderite, pyrite, chalcopyrite,	0,002
Gelnica - 32	67	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,002
Gelnica - 33	68	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,003
Gelnica - 34	69	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,009
Gelnica - 40	100	Nadložná vein	vein	quartz, chalcopyrite, carbonates	0,005
Gelnica - 48	110	Nadložná vein	vein	quartz, siderite	0,001
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,009
210	210	Nadložná vein	vein	quartz, siderite	<0.005
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	<0.005
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	<0.005

7.2 Silver

Silver, like gold, is present in upper parts of ore structures and decreases in concentration with depth.

Eight thousand six hundred and ninety six kilograms (279 582 oz) of silver was produced as a secondary product of copper extraction from the Slovinky deposit between 1973 and 1985. In 1985 there was 117 g/t of silver in concentrate and 763.1 kg (24 534 oz) of silver was produced.

Silver is bound primarily to tetrahedrite (250–1 200 g/t Ag), with lesser amounts associated with pyrite (11.2–13.6 g/t Ag) and chalcopyrite (5–270 g/t Ag).

The upper parts of the **Slovinky Hrubá Vein** contained silver-bearing tetrahedrite in its vein fill. The western end of the vein has been partially mined (from the Dorota Shaft westward). Tetrahedrite was only sporadically observed in Horizon 29 and no silver was present in samples. Silver mineralization above Horizon 29 has not been investigated. However, one can assume that the ore structure probably contains silver-bearing tetrahedrite above Horizon 29.

The **Gelnická Vein** displays elevated silver content along its entire length from the Nová Gelnica Shaft up to the Siroka Shaft and from the surface down to Horizon 37. Silver content exceeds 5 g/t.

The **Strieborná Vein** is the eastern continuation of the Čierna Vein. We have no data on development of this vein, since no exploration has been conducted here since 1950.

Silver is bound mostly to tetraedrite, but only in Slovinky part of the licence. In the Gelnica part of the licence the content of Ag appears to be low.

Good contents of silver are present in most veins sampled (Table 18). For example, maximum silver contents in various veins are as follows: 42.5 ppm in Slovinky Hrubá Vein; >100 ppm in "S" Vein; 6 samples >40.9 ppm in Čierna Vein with a maximum of 39.5 ppm; 43.9 ppm in the Joseph Vein; 61.9 ppm in Zlatá Vein; 59.4 ppm in Lazik Vein; and >100 ppm in Biela Vein.

Silver in vein samples

Table N. 18

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Ag ppm
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	**42,5**
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	4,46
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	0,79
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,8
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	0,81
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	**33,1**
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	1,77
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	0,44
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	2,55
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	8,64
Slovinky - 63	125	"S" vein	vein	quartz, siderite (ankerite)	<0.5
Slovinky - 76	138	"S" vein	vein	grey white quartz with Fe infiltration, without sulphides	0,6
Slovinky - 78	140	"S" vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	**49,2**
Slovinky - 81	144	"S" vein	vein	siderite, quartz, malachite, tetraedrite	**>100**
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	1,9
1035	1035	S vein	vein	white quartz, chalcopyrite	11,55
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	1,12
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	0,32
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	**>100**
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	0,2
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	5,27
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	**32,7**
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	**94,8**
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	15,2
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	0,46
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	4,33
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	24,3
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	**54,3**
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	**40,9**
Gelnica - 49	112	Abrahám vein	vein	quartz, siderite	<0.5

				Continue table N. 18	
1069A	1069A	Čierna (Black) vein	vein	quartz, limonite	0,02
1070	1070	Čierna (Black) vein	vein	quartz, limonite	<0.01
1071A	1071A	Čierna (Black) vein	vein	limonite with pyrite and chalcopyrite impregnations	0,84
1071B	1071B	Čierna (Black) vein	vein	quartz with pieces of rock and pyrites	0,91
1075	1075	Čierna (Black) vein	vein	quartz, carbonates	0,04
1079	1079	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	2,23
1080A	1080A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	1,47
1081	1081	Čierna (Black) vein	vein	quartz, siderite, malachite	**39,5**
1088A	1088A	Čierna (Black) vein	vein	siderite, quarz, ankerite	0,18
1092A	1092A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite	7,73
1093A	1093A	Čierna (Black) vein	vein	quartz, siderite, pyrite	8,46
Slovinky - 62	124	Čierna (Black) vein	vein	siderite, limonite, chalcopyrite, coveline, few quartz	4,6
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	4,48
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	**84,1**
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	20,2
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	0,42
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	4,52
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	7,95
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	6,9
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	8,33
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	0,41
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	15,1
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	**43,9**
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	1,64
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	0,64
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	6,7
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	10,25
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	29,9
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	0,36
Helcmanovce - 21	53	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite,	1,7
Helcmanovce - 22	54	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite,	1,5
Helcmanovce - 23	55	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite,	12
Helcmanovce - 24	57	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite	3,2
Helcmanovce - 25	58	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, chalcopyrite	**40**
Helcmanovce - 26	59	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,5
Helcmanovce - 27	61	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,2
Helcmanovce - 28	62	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	<0.5

				Continue table N. 18	
Helcmanovce - 29	63	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	1,9
Helcmanovce - 35	72	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, malachite, chalcopyrite	1,9
Helcmanovce - 36	74	Zlatá (Gold) vein	Vein	milk-white quartz, limonite, mouldered carbonates	0,5
Helcmanovce - 37	80	Zlatá (Gold) vein	Vein	sometimes quartz, mouldered carbonates, chalcopyrite, pyrite	1,5
Slovinky - 99	147	Zlatá (Gold) vein	Vein	siderite, chalcopyrite	1,4
Slovinky - 101	151	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,8
Slovinky - 102	156	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,9
Slovinky - 104	158	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, calcopyrite, limonite (?)	1
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	0,68
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	0,5
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	0,1
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,43
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	1,6
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	1,13
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	0,98
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	6,23
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	9,3
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	4,57
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	3,1
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,92
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	0,44
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	15,95
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	2,5
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	0,64
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	0,07
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,71
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	5,47
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	1,03
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,42
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,91
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	1,02
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	0,46
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	10,25
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	3,47
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,11
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	14,85
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	1,43

				Continue table N. 18	
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	4,02
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	1,68
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	2,21
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	4,73
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	21,3
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	1,6
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	9,13
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,41
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	**33,4**
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	16,9
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	3,61
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	3,03
262A	262A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	**61,9**
Slovinky - 58	120	Zelená (Green) vein	vein	quartz, strong weathered brown carbonates, siderite, ankerite, without sulphides	<0.5
Slovinky - 60	122	Zelená (Green) vein	vein	grey white to milk white quartz, siderite, malachite, azurite, chalcopyrite, tetraedrite	14,3
174	174	Capistrani vein	vein	quartz, siderite, limonite,	0,98
175A	175A	Capistrani vein	vein	quartz, siderite, ankerite, malachite, limonite	6,23
178	178	Capistrani vein	vein	quartz, siderite, malachite, azurite,	9,3
178A	178A	Capistrani vein	vein	quartz, siderite, malachite, azurite,	4,57
179	179	Capistrani vein	vein	quartz, siderite, malachite	3,1
180	180	Capistrani vein	vein	quartz, siderite, limonite?, chalkopyrite, malachite	0,92
Slovinky - 53	119	Lazík vein	vein	quartz, siderite, tetraedrite (?), covellin, chalcopyrit, quartz crystals to 1 mm size	**58,4**
Slovinky - 54	119	Lazík vein	vein	siderite, chalcopyrit,	13,9
Slovinky - 55	119	Lazík vein	vein	quarz, few sulphides	<0.5
Slovinky - 64	127	Lazík vein	vein	quartz, siderite	<0.5
Slovinky - 66	128	Lazík vein	vein	quartz, siderite, few sulphides	20,1
Slovinky - 67	129	Lazík vein	vein	siderite, quartz, chalcopyrite	<0.5
Slovinky - 76	138	Lazík vein	vein	grey white quartz with Fe infiltration, without sulphides	0,6
Slovinky - 78	140	Biela vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	**49,2**
Slovinky - 81	144	Biela vein	vein	siderite, quartz, malachite, tetraedrite	**>100**

				Silver in vein samples	
				Continue table N. 18	
LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals and rocks description	Ag ppm
Gelnica - 7	20	Gelnická vein	vein	siderite, quartz, chalcopyrite, coveline, malachite	3,7
Gelnica - 8	20	Gelnická vein	vein	quartz, chalcopyrite, malachite	0,6
Gelnica - 9	22	Gelnická vein	vein	siderite, quartz, chalcopyrite, malachite	1,4
Gelnica - 10	22	Gelnická vein	vein	quartz, chalcopyrite, malachite, coveline	2,9
Gelnica - 11	24	Gelnická vein	vein	quartz, siderite, chalcopyrite, malachite, azurite	3,6
Gelnica - 18	51	Gelnická vein	vein	quarz, pyrite, chalcopyrite, arsenopyrite (?)	<0.5
Gelnica - 19	51	Gelnická vein	vein	brown siderite, chalcopyrite	1,2
Gelnica - 4	17	Krížová vein	vein	milk white quartz, brown siderite, chalcopyrite, pyrite	2,7
Gelnica - 2	10A	Krížová or Nová	vein	quartz, siderite, without sulphides	<0.5
Slovinky - 68	131	Krížová vein	vein	quartz, siderite	0,6
Gelnica - 30	65	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,6
Gelnica - 31	66	Nadložná vein	vein	quartz, siderite, pyrite, chalcopyrite,	<0.5
Gelnica - 32	67	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	0,7
Gelnica - 33	68	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	5,2
Gelnica - 34	69	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	1,3
Gelnica - 40	100	Nadložná vein	vein	quartz, chalcopyrite, carbonates	1,4
Gelnica - 48	110	Nadložná vein	vein	quartz, siderite	<0.5
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,5
210	210	Nadložná vein	vein	quartz, siderite	0,03
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,11
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	1,52
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite	7,3
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite	0,7
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	<0.01
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration	<0.5
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,	1,2
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite	2,8
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite	9,3

7.3 Copper

Copper has been the primary metal mined in the region. It occurs primarily in chalcopyrite and tetrahedrite. Secondary copper minerals are also present, including malachite, azurite and coveline (Table 19).

Very good copper results were obtained from some of the shorter, unexplored veins, including maximum values of 6.21% and 8.92% Cu from the Jozef Vein, 6.7% Cu from the Biela Vein, and 4.20% Cu from the Capistrani Vein. The "S" Vein also has elevated copper content, with a maximum value of 6.7% Cu and 6 samples yielding >1.345 % Cu.

Copper in vein samples

Table N. 19

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Cu ppm	Cu %
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	**>10000**	**1,7700**
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	130,5	
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	724	
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	152,5	
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	7540	0,7540
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	5990	0,5990
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	**>10000**	**1,2050**
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	308	
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	2590	0,2590
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	7560	0,756
Slovinky - 63	125	"S" vein	vein	quartz, siderite (ankerite)	22	
Slovinky - 76	138	"S" vein	vein	grey white quartz with Fe infiltration, without sulphides	88	
Slovinky - 78	140	"S" vein	vein	weathered ankerite, siderite, chalcopyrite, malachite, tetraedrite	>10000	**1,5250**
Slovinky - 81	144	"S" vein	vein	siderite, quartz, malachite, tetraedrite	>10000	**6,7000**
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	4 270	0,427
1035	1035	S vein	vein	white quartz, chalcopyrite	**>10000**	**2,64**
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	**>10000**	**1,35**
1035D	1035D	S vein	vein	grey white quartz, chalcopyrite, black graphite	6 720	0,672
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	2 160	0,216
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	**>10000**	**2,65**
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	1 245	0,1245
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	7 470	0,747
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azurite	7 270	0,727
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	**>10000**	**1,68**
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	6 910	0,691
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	6 850	0,685
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	6 310	0,631
1047A	1047A	S vein	vein	quartz, siderite, chalcopyrite	**>10000**	**1,345**
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	8 310	0,831
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	6 270	0,627
Gelnica - 49	112	Abrahám vein	vein	quartz, siderite	19	0,0019
1069A	1069A	Čierna (Black) vein	vein	quartz, limonite	11,9	
1070	1070	Čierna (Black) vein	vein	quartz, limonite	2,8	
1071A	1071A	Čierna (Black) vein	vein	limonite with pyrite and chalcopyrite impregnations	38,1	
1071B	1071B	Čierna (Black) vein	vein	quartz with pieces of rock and pyrites	10,6	

				Continue table N. 19		
1075	1075	Čierna (Black) vein	vein	quartz, carbonates	33,6	
1079	1079	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	7760	0,7660
1080A	1080A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	1430	0,1430
1081	1081	Čierna (Black) vein	vein	quartz, siderite, malachite	**9630**	0,9630
1088A	1088A	Čierna (Black) vein	vein	siderite, quarz, ankerite	338	
1092A	1092A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite	**>10000**	**1,5650**
1093A	1093A	Čierna (Black) vein	vein	quartz, siderite, pyrite	**9660**	0,9660
Slovinky - 62	124	Čierna (Black) vein	vein	siderite, limonite, chalcopyrite, coveline, few quartz	**>10000**	**1,8150**
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	**>10000**	**1,1400**
1000D	1000D	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	**>10000**	**2,1200**
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	**>10000**	**1,0900**
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	1925	0,1920
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	3480	0,3480
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	**>10000**	**2,2700**
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	**>10000**	**6,2100**
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	2260	0,2260
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	6030	0,6300
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	**>10000**	**8,9200**
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	6960	0,6960
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	606	0,0606
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	7 030	0,703
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	**>10000**	**1,58**
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	3 780	0,378
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	4 060	0,406
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	2 900	0,29
Helcmanovce - 21	53	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite,	**>10000**	**1,0250**
Helcmanovce - 22	54	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite,	9400	0,9400
Helcmanovce - 23	55	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite,	9310	0,9310
Helcmanovce - 24	57	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite	9060	0,9060
Helcmanovce - 25	58	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, chalcopyrite	>10000	**1,0750**
Helcmanovce - 26	59	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	2040	0,2040
Helcmanovce - 27	61	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	3200	0,3200
Helcmanovce - 28	62	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	2140	0,2140
Helcmanovce - 29	63	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite	6560	0,6560
Helcmanovce - 35	72	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, malachite, chalcopyrite	**>10000**	**1,1500**
Helcmanovce - 36	74	Zlatá (Gold) vein	Vein	milk-white quartz, limonite, mouldered carbonates	8100	0,8100
Helcmanovce - 37	80	Zlatá (Gold) vein	Vein	sometimes quartz, mouldered carbonates, chalcopyrite, pyrite	5280	0,5280
Slovinky - 99	147	Zlatá (Gold) vein	Vein	siderite, chalcopyrite	3360	0,3360

				Continue table N. 19		
Slovinky - 101	151	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1595	0,1595
Slovinky - 102	156	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	8160	0,8160
Slovinky - 104	158	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, calcopyrite, limonite (?)	5610	0,5610
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	3 710	0,371
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	2 080	0,208
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	417	0,0417
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	993	0,0993
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	2 490	0,249
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	600	0,06
174	174	Zlatá (Gold) vein	Vein	quartz, siderite, limonite,	1 845	0,1845
175A	175A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, malachite, limonite	**>10000**	**1,56**
178	178	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	**>10000**	**1,825**
178A	178A	Zlatá (Gold) vein	Vein	quartz, siderite, malachite, azurite,	**>10000**	**4,2**
179	179	Zlatá (Gold) vein	Vein	quartz, siderite, malachite	5 210	0,521
180	180	Zlatá (Gold) vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	6 690	0,669
182A	182A	Zlatá (Gold) vein	Vein	quartz, siderite, chlcopyrite, pyrite, limonite	5 620	0,562
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	**>10000**	**3,58**
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	5320	0,5230
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	25,1	0,0025
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	82,1	0,0082
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	6980	0,6980
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	**>10000**	**2,7900**
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	**>10000**	**2,6900**
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	1780	0,1780
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	**>10000**	**1,0100**
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	2090	0,2090
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	1110	0,1110
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	**>10000**	**2,19**
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	**>10000**	**1,71**
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	**>10000**	**1,995**
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	**>10000**	**7,05**
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	5 030	0,503
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	2 130	0,213
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	6 450	0,645
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	5 080	0,508
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	**>10000**	**2,49**
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	**>10000**	**2,5**
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	**>10000**	**1,88**

Copper in vein samples

Continue table N. 19

LAB SAMPLE DESCRIPTION	Flow sheet sample number	Name of vein	Type	Minerals description	Cu ppm	Cu ppm
Gelnica - 7	20	Gelnická vein	vein	siderite, quartz, chalcopyrite, coveline, malachite	>10000	**1,43**
Gelnica - 8	20	Gelnická vein	vein	quartz, chalcopyrite, malachite	>10000	**2,66**
Gelnica - 9	22	Gelnická vein	vein	siderite, quartz, chalcopyrite, malachite	7250	0,725
Gelnica - 10	22	Gelnická vein	vein	quartz, chalcopyrite, malachite, coveline	>10000	**2,47**
Gelnica - 11	24	Gelnická vein	vein	quartz, siderite, chalcopyrite, malachite, azurite	>10000	**2,42**
Gelnica - 18	51	Gelnická vein	vein	quarz, pyrite, chalcopyrite, arsenopyrite (?)	33	0,0033
Gelnica - 19	51	Gelnická vein	vein	brown siderite, chalcopyrite	1275	0,1275
Gelnica - 4	17	Krížová vein	vein	milk white quartz, brown siderite, chalcopyrite, pyrite	>10000	**2,2100**
Gelnica - 2	10A	Krížová or Nová	vein	quartz, siderite, without sulphides	29	0,0029
Slovinky - 68	131	Krížová vein	vein	quartz, siderite	3010	0,3010
Gelnica - 1	8	Nová vein	vein	quartz, siderite, chalkopyrite	>10000	**1,1150**
Gelnica - 3	13	Nová vein	vein	Mouldered brown siderite, quartz, arsenopyrite	80	0,0800
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	29,2	0,0292
Gelnica - 13	30	Nová vein	vein	grey white quartz with carbonate inflitration	31	0,0310
Gelnica - 14	31	Nová vein	vein	grey white quartz, siderite, chalcopyrite, coveline, malachite,	>10000	0,9960
Gelnica - 15	33	Nová vein	vein	quartz, carbonate, pyrite, chalcopyrite, malachite	8010	0,8010
Gelnica - 16	44	Nová vein	vein	quartz, siderite, chalcopyrite, pyrite	>10000	**2,1100**
Gelnica - 30	65	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	3170	0,3170
Gelnica - 31	66	Nadložná vein	vein	quartz, siderite, pyrite, chalcopyrite,	1045	0,1045
Gelnica - 32	67	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	462	
Gelnica - 33	68	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	**>10000**	**1,0850**
Gelnica - 34	69	Nadložná vein	vein	quartz, siderite, chalcopyrite, pyrite	8200	0,8200
Gelnica - 40	100	Nadložná vein	vein	quartz, chalcopyrite, carbonates	687	0,0687
Gelnica - 48	110	Nadložná vein	vein	quartz, siderite	15	0,0015
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	4 310	0,431
210	210	Nadložná vein	vein	quartz, siderite	21	0,0021
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	263	0,0263
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	3 010	0,301

7.4 REEs

There has been no previous exploration for REEs in the region. Anomalously high REE concentrations were observed in samples from the Capistrani Vein (Ce – 148 ppm and La – 73.6 ppm) and the Boží dar Vein (Ce – 142 ppm, La – 73.9 ppm). We also found anomalous concentrations of REE in each type of rock except lydites and limestones. Anomalously high concentrations of REE occur primarily, but not exclusively, in the Žakarovce area (Table 20).

Table N. 20

LAB SAMPLE	Flow sheet	Name of vein	Type	Minerals description	Ce	La	Dy	Er
DESCRIPTION	sample number				ppm	ppm	ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	64	30	3,5	2,3
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	10,4	4,7	6,49	3,7

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Eu	Gd	Ho	Lu
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	0,88	3,8	0,80	0,32
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	1,29	5,18	1,31	0,53

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Nd	Pr	Sm	Tb
DESCRIPTION	sample number	vein			ppm	ppm	ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	26	7,1	24,5	0,64
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	6,8	1,4	2,38	1

LAB SAMPLE	Flow sheet	Name of	Type	Minerals description	Tm	Yb
DESCRIPTION	sample number	vein			ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	0,33	2,2
ŽŽ - 84	ŽŽ - 84	Žakarovce stockwork	vein	quartz and weathered carbonates	0,53	3,49

Continue table N. 20

LAB SAMPLE	Flow sheet	Name of vein	Type	Minerals description	Ce	La
DESCRIPTION	sample number				ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	64	30
Gelnica 12	28	Nová vein	vein	grey white quartz, carbonate infiltration, chalcopyrite, pyrite, arsenopyrite?	96,7	43,7
208A	208A	Nadložná vein	vein	quartz, siderite, chalcopyrite	23,6	9,9
210	210	Nadložná vein	vein	quartz, siderite	0,59	<0.5
212A	212A	Nadložná vein	vein	quartz, siderite, chalcopyrite	5,87	3
213A	213A	Nadložná vein	vein	quartz, siderite, chalcopyrite	0,32	<0.5
217A	217A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	142	73,9
218	218	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite, malachite, tetraedrite	0,65	1,8
219A	219A	Boží dar veins	vein	quartz, siderite, chalcopyrite, coveline	6,02	2,7
221A	221A	Boží dar veins	vein	quartz, siderite, chalcopyrite, pyrite	29	13,9
222A	222A	Boží dar veins	vein	quartz, siderite, chalcopyrite	2,28	1,1
223A	223A	Boží dar veins	vein	quartz, siderite, chalcopyrite, tetraedrite	3,2	1,7
224A	224A	Boží dar veins	vein	quartz, siderite, chalcopyrite	3,84	1,9
Slovinky - 62	124	Zelená vein	vein	siderite, limonite, chalcopyrite, coveline, few quartz	0,6	4
262A	262A	Zelená vein	vein	quartz, siderite, chalcopyrite, malachite, azurite, limonite	1,51	1,1
Slovinky - 63	125	Čierna (Black) vein ??	vein	quartz, siderite (ankerite)	<0.5	3
1069A	1069A	Čierna (Black) vein	vein	quartz, limonite	1,29	0,5
1070	1070	Čierna (Black) vein	vein	quartz, limonite	73,3	34,4
1071A	1071A	Čierna (Black) vein	vein	limonite with pyrite and chalcopyrite impregnations	4,36	2,1
1071B	1071B	Čierna (Black) vein	vein	quartz with pieces of rock and pyrites	15,95	6,7
1075	1075	Čierna (Black) vein	vein	quartz, carbonates	5,85	2,9
1079	1079	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	0,83	<0.5
1080A	1080A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite, pyrite	9,82	4,9
1081	1081	Čierna (Black) vein	vein	quartz, siderite, malachite	13,95	8,3
1088A	1088A	Čierna (Black) vein	vein	siderite, quarz, ankerite	1,32	0,5
1092A	1092A	Čierna (Black) vein	vein	quartz, siderite, chalcopyrite	23,9	12,1
1093A	1093A	Čierna (Black) vein	vein	quartz, siderite, pyrite	0,95	0,5
1000	1000	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite, arsenopyrite	19,9	9,8
1002	1002	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite,tetraedrite, arsenopyrite (?)	9,12	3,9
1003	1003	Jozef vein	vein	quartz, siderite, ankerite, limonite	8,56	3,6
1004	1004	Jozef vein	vein	quartz, ankerite, pyrite, chalcopyrite	5,81	3
1005	1005	Jozef vein	vein	quartz, weathered siderite, ankerite, pyrite, chalcopyrite, malachite	33	16,9
1010	1010	Jozef vein	vein	quartz, siderite, ankerite, chalcopyrite, pyrite	24,3	12,9
1011	1011	Jozef vein	vein	siderite, quartz, chalcopyrite, arsenopyrite	0,41	<0.5
1017	1017	Jozef vein	vein	quartz, carbonates, chalcopyrite, pyrite	71	35,6
1019	1019	Jozef vein	vein	quartz with pieces of graphit.phylites and chalcopyrite, malachite	11,55	5,2
1023	1023	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrit, coveline, malachite	10,75	5,7
1026	1026	Jozef vein	vein	quartz, few carbonates, chalcopyrite, pyrite	8,1	3,4
182A	182A	Jozef vein	vein	quartz, siderite, chlcopyrite, pyrite, limonite	30,7	15
183A	183A	Jozef vein	vein	quartz, siderite, chalcopyrite	30,8	16,7
187A	187A	Jozef vein	vein	quartz, siderite, chalcopyrite	6,92	3,7

				Continue table N. 20		
LAB SAMPLE	Flow sheet	Name of vein	Type	Minerals description	Ce	La
DESCRIPTION	sample number				ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	64	30
189A	189A	Jozef vein	vein	quartz, siderite, chalcopyrite, tetraedrite	13,65	7,4
190A	190A	Jozef vein	vein	quartz, siderite, chalcopyrite	13,7	7,6
193A	193A	Jozef vein	vein	quartz, siderite, chalcopyrite, pyrite	1,75	0,9
160	160	Zlatá (Gold) vein	Vein	siderite, chalcopyrite, quartz,	2,81	1,4
161	161	Zlatá (Gold) vein	Vein	crystals of siderite-size to 1 mm, quartz-siderite,	2,13	1
170A	170A	Zlatá (Gold) vein	Vein	quartz, siderite	2,38	1,2
171	171	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2,46	1,1
172	172	Zlatá (Gold) vein	Vein	quartz, siderite, chalkopyrite, pyrite,	0,28	<0.5
173	173	Zlatá (Gold) vein	Vein	siderite, limonite, quartz, malachite, azurite,	10,8	5,9
194A	194A	Zlatá (Gold) vein	Vein	quartz, carbonate, chalcopyrite	4,07	2,2
196A	196A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, limonite	1,21	0,6
197A	197A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,	14,8	7,6
198A	198A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite	33,7	17,9
200A	200A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,33	<0.5
201A	201A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	19,6	10,4
202A	202A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	2,49	1,4
203A	203A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	0,4	<0.5
204A	204A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachite	1,97	0,9
205A	205A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, tetraedrite, pyrite	1,21	0,5
207A	207A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite,pyrite	9,12	3,9
229A	229A	Zlatá (Gold) vein	vein	quartz, carbonates, chalcopyrite, tetraedrite	11,65	6,4
230A	230A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	5,45	2,7
232A	232A	Zlatá (Gold) vein	Vein	quartz, siderite, pyrite, chalcopyrite, ankerite, malachite, azurite	0,46	<0.5
233A	233A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	1,75	0,7
234B	234B	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, malachit	2,07	1
236	236	Zlatá (Gold) vein	Vein	limonite, ankerite, chalcopyrite, malachite	6,56	2
238A	238A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, red-orange mineral - realgar(?)	0,46	<0.5
239A	239A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,75	<0.5
244A	244A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite	0,33	<0.5
247A	247A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	0,69	<0.5
248A	248A	Zlatá (Gold) vein	Vein	quartz, siderite, ankerite, chalcopyrite, limonite, malachite, coveline	1,32	0,5
249A	249A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, coveline	0,74	<0.5
251A	251A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	8,59	4,2
252A	252A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	12,1	6,5
253A	253A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	2,86	1,3
256A	256A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite, pyrite	1,89	0,9
258A	258A	Zlatá (Gold) vein	Vein	quartz, siderite, chalcopyrite	12,35	5,8
261A	261A	Zlatá (Gold) vein	Vein	quartz-carbonates veins, partly bleached	4,42	1,9
174	174	Capistrani vein	Vein	quartz, siderite, limonite,	35,6	19,1
175A	175A	Capistrani vein	Vein	quartz, siderite, ankerite, malachite, limonite	2,31	1,1

Continue table N. 20

LAB SAMPLE	Flow sheet	Name of vein	Type	Minerals description	Ce	La
DESCRIPTION	sample number				ppm	ppm
				Upper Crust Abundance - Taylor and McClennan, 1985	64	30
176	176	Capistrani vein	Vein	quartz, siderite, malachite		
178	178	Capistrani vein	Vein	quartz, siderite, malachite, azurite,	21,3	11,2
179	179	Capistrani vein	Vein	quartz, siderite, malachite	148	73,6
180	180	Capistrani vein	Vein	quartz, siderite, limonite?, chalkopyrite, malachite	8,83	3,9
1032	1032	S vein	vein	grey white quartz, light brown siderite, chalcopyrite, malachite	0,66	<0.5
1035	1035	S vein	vein	white quartz, chalcopyrite	2,83	1,4
1035A	1035A	S vein	vein	grey white quartz, chalcopyrite, black graphite	1,86	0,8
1036	1036	S vein	vein	quartz , light brown ankerite, dark brown weathered siderite, chalcopyrite, pyrite	3,97	1,6
1038	1038	S vein	vein	quartz,siderite, chalcopyrite, tetraedrite (lot)	0,4	1,8
1039	1039	S vein	vein	quartz,siderite, few chalcopyrite	2,54	1,2
1040	1040	S vein	vein	quartz, siderite, chalcopyrite, pyrite, tetraedrite, coveline, limonite	0,77	<0.5
1042	1042	S vein	vein	quartz, siderit, limonite, chalcopyrite, pyrite, tetraedrite, coveline malachite, azu	3,07	1,7
1042A	1042A	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite (lot)	1,34	1,8
1043	1043	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite	1,71	0,8
1044	1044	S vein	vein	quartz, siderite, chalcopyrite, tetraedrite, specularite	3,64	1
1047	1047	S vein	vein	quartz, siderite, chalcopyrite	32,4	8,6
1048	1048	S vein	vein	ankerite, siderite, tetraedrite, chalcopyrite	4,32	2,1
1049	1049	S vein	vein	siderite, quartz, chalcopyrite, pyrite, malachite	0,23	0,5
1051	1051	S. Hrubá vein	vein	quartz, siderite, chalcopyrite, pyrite, malachite, azurite, coveline	13,1	5,4
1052	1052	S. Hrubá vein	vein	quartz, siderite, few pyrite	13,85	5,7
1053	1053	S. Hrubá vein	vein	siderite, few quartz and pyrite	9,89	3,9
1054	1054	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	4,05	1,6
1056	1056	S. Hrubá vein	vein	quartz, siderite, chalcopyrite	20,3	9,5
1057	1057	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, tetraedrite	4,66	2,1
1059	1059	S. Hrubá vein	vein	siderite, few quartz, chalcopyrite, malachit	5,11	2,5
1060	1060	S. Hrubá vein	vein	siderite, quartz, chalcopyrite	16,3	8
1060A	1060A	S. Hrubá vein	vein	quartz, carbonates, pyrite, chalcopyrite (?)	29	14,4
1063	1063	S. Hrubá vein	vein	siderite, quartz, chalcopyrite, malachite	13,3	6,5

8. RECOMMENDATIONS

Considering the new exploration performed in 2010 and 2011 and the insights we obtained from the literature, we recommend the following work.

8.1 Sampling

We recommend that sampling be completed over all vein structures in the Slovinky and Gelnica exploration areas. This should include sampling of all dumps, outcrops, adits, shafts and pits marked on maps; any mineralized and altered rock encountered; and all the different rock types observed in the field. In the exploration area there are lots of parallel and transverse veins that are sometimes difficult to identify in the bush, but which require investigation.

8 2 Geophysical work (Fig. 17)

The collection of geophysical and geochemical data in selected "blue sky" areas would help prioritize subsequent trenching. Geophysics and geochemical surveys are recommended (1) between Krížova Vein–Blau Halde and Slovinky Hrubá Vein; (2) between "S" Vein and Nadložna Vein; (3) between Boží Dar Vein and Capistrani Vein; and (4) in the area between Zlatá, Čierna, and Jakub veins.

We recommend that the following methods be used:

- Resistivity and IP tomography – max. depth range 50 to 70 m (step measuring 5 m) - ARES instrument of GF company - Instruments Brno, Czeck Republic, 330 W power supply
- Resistivity and IP tomography – max. depth range 200–300 m (step measuring 25 m) – instrument EDA IP-2 , company Scintrex, Canada, 3600 W power supply
- magnetometry – step measuring 1 m
- gammaspectrometry – magnetometer Overhauser , company GEM, Canada
- Hg – spectrometry – mercury meter LUMEX, Russia , sensitivity 0.2 ng/m^3

These methods were successfully applied in a survey of the Strieborná Vein in Rožňava last year.

8.3 Drilling (Fig. 16)

We recommend that surface drilling be performed to investigate the nature and grade of the Slovinky Hrubá Vein between the Dorota Shaft and drill hole N - 12/84 (approximate length 1 800 m). In this area the vein structure is adequately identified at Horizon 29 (about 250 m) and surface (500–700 m) of mining works (of approximately 2 000 m).

Note that prior to the start of drilling, work will be required to address access to forest land, including excavation and preparation of forest roads and platforms for drilling rigs. This process will take at least 2-3 months including preparing roads and platforms.

8.4 Trenching

We do not propose any trenching at this stage, but may possibly after the completion of mapping, sampling, geochemical surveying, geophysical surveying.

8.5 Recommended work on individual veins

We recommend the following work.

8.5.1 Slovinská Hrubá Vein

1. The Slovinská Hrubá Vein is the most extensive, most intensely explored, and most intensely mined vein structure in the exploration area. West of the Dorota Shaft (based on Horizon 29 and surface drill holes) the known length is about 2 000 meters. Continuation of the vein west of this is not known as of yet. As mentioned above, we strongly recommend surface drilling be implemented to investigate the vein between Horizon 29 and the surface, and to test the continuation of the vein at depth below Horizon 29 (Figs. 8A to 8G).

2. The most prospective parts of the Slovinská Hrubá vVin have previously been estimated (Soviet system) to contain 5.73 million t of Z1 reserves at 0.855% Cu, 6.25 million t of Z2+Z3 reserves at 0.493% Cu, and 11.98 million t of prognostic resources at 0.666% Cu. However, it appears that ore modeling included lower grade ore causing excessive dilution.

3. The upper parts of the vein were also mined for Ag contained in tetrahedrite at Horizons 15, 17 and 19 (400–449 m above sea level). Vein development between these horizons and Horizon 29 is unknown and has to be verified. Content of Ag in these upper horizons exceeded 1 g/t

4. The presence of the Slovinská Hrubá vein west of the Dorota Shaft was confirmed by diamond drill holes (Slz-9, Slz-10, Slz-11, Slz-12/84). Gold was present locally in the drill core. Drill hole Slz-12/84 intercepted 0.9 m of mineralization (3.34% Cu, 2 g/t Au, 11.6 g/t Ag) at a depth of approximately 500 m below the surface (about 120 m below the Horizon 29; see Fig. 9).

5. Surface drilling to verify the Slovinky Hrubá Vein

We recommend drilling eight transects from the surface across the vein at a 250 m spacing with three drill holes per transect. These would help ascertain the nature of the mineralization at depths of 80 m, 150–200 m, and 300–400 m. In addition, an additional drill hole is recommended at three of the transects to test the continuation of the vein below Horizon 29. This would bring the total number of drill holes to 27.

8.5.2 Zlatá Vein

The Zlatá Vein is the second longest vein structure in the exploration area. In the past, it has been partially mined for copper and iron. The most recent (1955) reserves calculation is 285 kt with 1.36% Cu, 17% Fe, and a thickness of 0.71 m.

The Zlatá Vein was mined primarily from the Matiaska Adit (northwards from the village of Helcmanovce). The Capistrani and Bartolomeus veins were also "mined" from the Matiaska Adit. In spite of their lengths, the Gold, Capistrani and Bartolomeus vein structures have not been sufficiently investigated, primarily in their central and eastern parts, as well as at depth. It is also unclear, but intriguing, how the Zlatá (Gold) vein obtained its name, given that the literature suggests it has only been mined for copper and iron. We suspect that in the distant past that gold (?) may also have been mined here.

Because the geometry and dimensions of the three veins has only been ascertained in their central parts, we recommend that geophysics be conducted to delineate their extremities, and that any targets identified in the geophysical data be trenched to test for mineralization.

8.5.3 Čierna Vein

The Čierna Vein is one of the longest vein structures in the whole area. Its eastern part is known as the Strieborná Vein. Surface outcrops have provided the primary window of insight into its geology; no detailed information is available on its depth extent or its mineralization. Previous workings are all shallow, within 10–20 m of the ground surface. Samples have yielded the following maximum values: 1.565% Cu, 39.5 ppm Ag, 2680 ppm Sb, 73.3 ppm Ce, 34.4 ppm La, 1.53 ppm In, and 12 950 ppm Mn. We assume that the presence of tetrahedrite accounts for the elevated Ag and Au content, as observed in the Slovinky Hrubá Vein.

Given the paucity of data, we propose that the Čierna Vein be sampled throughout its entire known length and that geophysical lines be run at 100 m spacing to test its continuation at depth.

8.5.4 Jozef Vein

The Jozef Vein structure has been intensively studied in the past. However, its continuation at depth is not known. All previous work verified the vein to a maximum depth of 10–20 m. Samples yielded maximum values of 8.92% Cu, 84.1 ppm Ag, 0.234 ppm Au, 6 070 ppm Sb, 3.53 ppm In, 2 620 ppm Bi, 9 580 ppm Mn, 562 ppm As, and 18.2 ppm U.

We propose that the Jozef Vein be sampled along its entire known length and that geophysics spaced at 100 m intervals be collected to test its continuation at depth.

8.5.5 Jakub Vein

The Jakub Vein is known to exceed 2 km in length. It has not been sampled. We expect it to exhibit a similar trend as the Čierna Vein. It is recommended that the Jakub Vein be sampled along its entire length and that geophysics be run to test its continuation at depth.

8.5.6 Zelená Vein

The Zelená Vein is a cross vein between the Zlatá and Čierna veins. It is known to extend for at least 1 250 m. So far we have only sampled two dumps. We recommend that the Zelená vein be sampled along its entire length and that geophysics be collected to test its continuation at depth.

8.5.7 Biela Vein

The Biela Vein is a cross vein between the Zlatá and Lazík veins. The vein is known to be at least 900 m long. Only two dumps have been sampled. We recommend that the Biela Vein be sampled along its entire length and that geophysics be collected to test its continuation at depth.

8.5.8 Lazík Vein

The Lazik Vein runs parallel to and in between the Zlatá and Čierna veins over a known distance of 1.3 km. We recommend that it be sampled along its entire length and that geophysics be collected to test its continuation at depth**.**

8.5.9 Križová Vein

The northwest continuation of the Križová Vein is unknown. In Horizon 3, it terminates against a fault. One of the theories is that the vein is offset across this fault, and that it continues westward as the BlauHalde Vein.

Sampling of Mokré Pole adit (the last adit in NW part) was positive. Content of Cu max. 2.21%, Ag max. 2.7 ppm Au max. 0.265 ppm.

The last reserves calculation (soviets system) verified 856 363 t of Cu ore reserves in Z1, Z2 category.

The Križová Vein was then cut by a cross disturbance for more than 400 m.

It is recommended to verify the possibility of continuation of the Krížová Vein by collecting geophysical and geochemical data between the Krížová Vein, the BlauHalde Vein and the Slovinky Hrubá Vein.

8.5.10 Gelnická Vein

The north-western part of the Gelnická Vein deposit from its crossing with the Slovinky Hrubá Vein up to the Leopold Shaft, has been determined from the surface.

The last reserves calculation estimated 65 237 t of Cu ore reserves in Z2 category, 629 026 t of prognostic resources P1, and 1 166 929 t of uneconomic reserves in Z2 category.

We suggest that potentially significant Au concentrations are only likely present in the shallow subsurface parts of the Gelnica Vein, and only in the area between the old Terezia and

Katarina shafts. This part of the vein has not been investigated by any technical works (boreholes, mining works).

At this phase we propose that additional old dumps near the Gelnická Vein be sampled to test for the presence of Au.

8.5.11 Nová Vein

The Nová Vein is a cross vein between the Križová and Gelnica veins. It was observed in Horizon 3 (331 m above sea level) over a length of approximately of 1 300 m, and it was also observed in the Lydia Adit (500 m above sea level). The vein was verified below Horizon 3 to a depth of approximately 150 m above sea level with a content of 0.52% Cu.

The last reserves calculation (Soviet system) estimated 1 147 612 t of Cu ore reserves in Z2 category and 1 095 566 t of prognostic resources P1.

Samples from old dumps contain maximum concentrations of 2.11% Cu, 1.64 ppm Au, and 9.3 ppm Ag. REE concentrations were also anomalous, with maximum values of 96.7 ppm Ce, 43.7 ppm La, 680 ppm Gd, and 32.2 ppm Yb.

Vein structure of the Nová Vein has been determined in the subsurface near the old adits (about 600 m above sea level) and Horizon 3 (about 330 m above sea level) and underground wells below Horizon 3.

We suggest drilling thirteen cross-sectional transects, each spaced 300 m apart, and each with two holes to verify the Nová Vein at a depth of 200 m and 300 m, for a total of 26 drill holes. We suggest that at each 3rd profile an additional, deep (400 m long) borehole be drilled to verify the continuation of the vein below Horizon 3. In sum, we therefore recommend 29 wells be drilled.

8.5.12 Gelnická Nadložná and "S" veins

The Gelnica Nadložná Vein is probably one vein structure together with the “S” vein. It was intensively mined from the Slovinky side.

The Gelnica Nadložná Vein has been observed in Horizon 3 (331 m above sea level) and in the Stefania Adit (684 m above sea level).

Development of the vein structure between the Stefania Adit and ground surface is not sufficiently verified.

We assume the most prospective development in subsurface parts of the vein structure where we expect also increased content of Au and Ag. Similarly, the area between the “S” and Nová veins has not been examined, despite also being very prospective.

The results of chemical analyses of old dumps to show content of Ag - 40, 9 ppm, 54.3 ppm, 94.8 ppm, 140 ppm., Au max. 0.38 ppm, Cu max. 2.64%.

A "blue sky" area exists between the "S" and Nadložná veins. We recommend that geophysical work be conducted here to test whether these veins extend and possibly connect. We also recommend that the western part of the "S" Vein be sampled (west of samples N. 1030).

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Mineralia Slovaca 20, 1988-3, s. 239-248.

APPENDIX 1

Longitudinal profiles and cross sections

List of figures

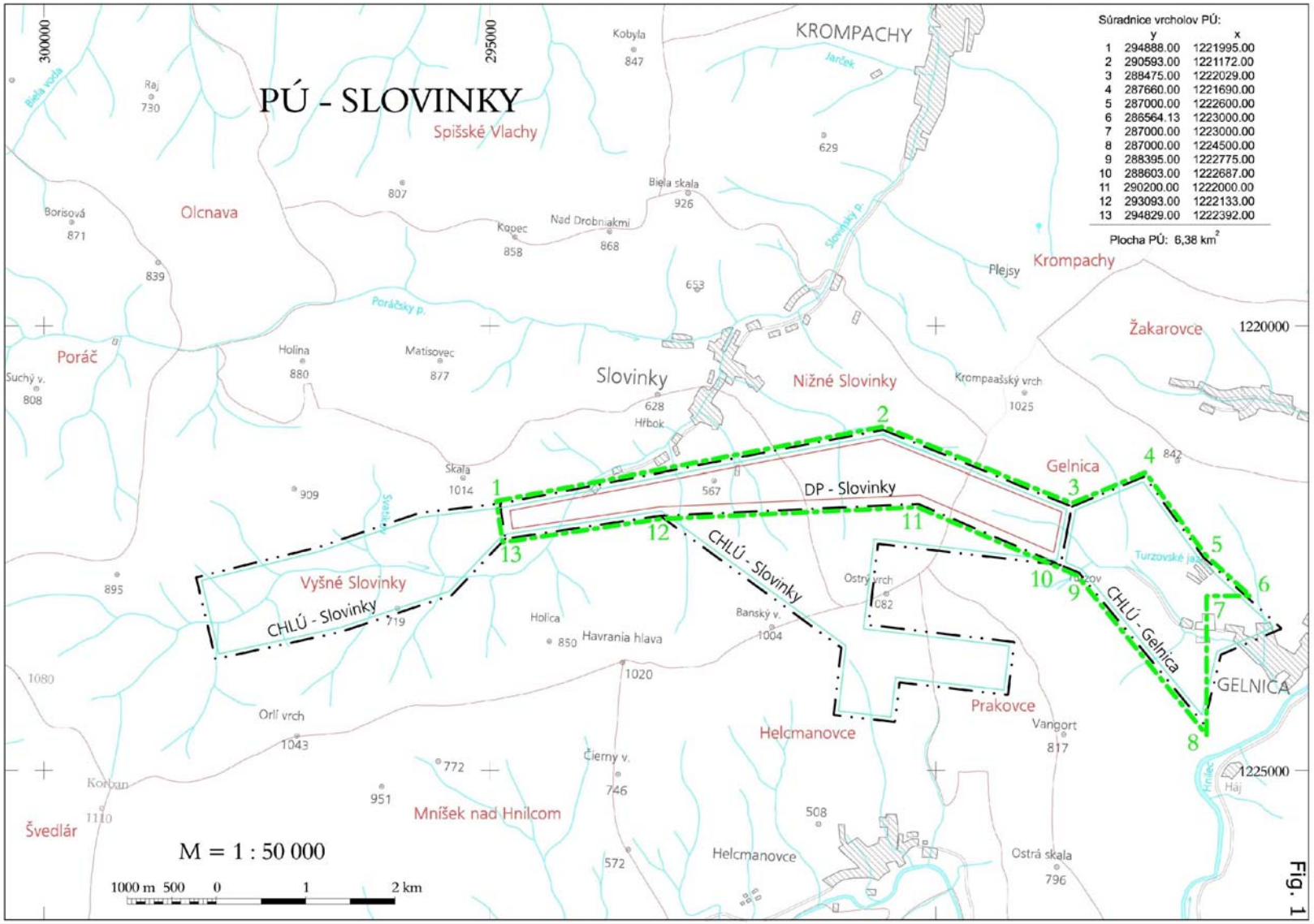

Figure 1 The Slovinky Exploration Area (EA), Slovakia. Scale is 1:50 000.

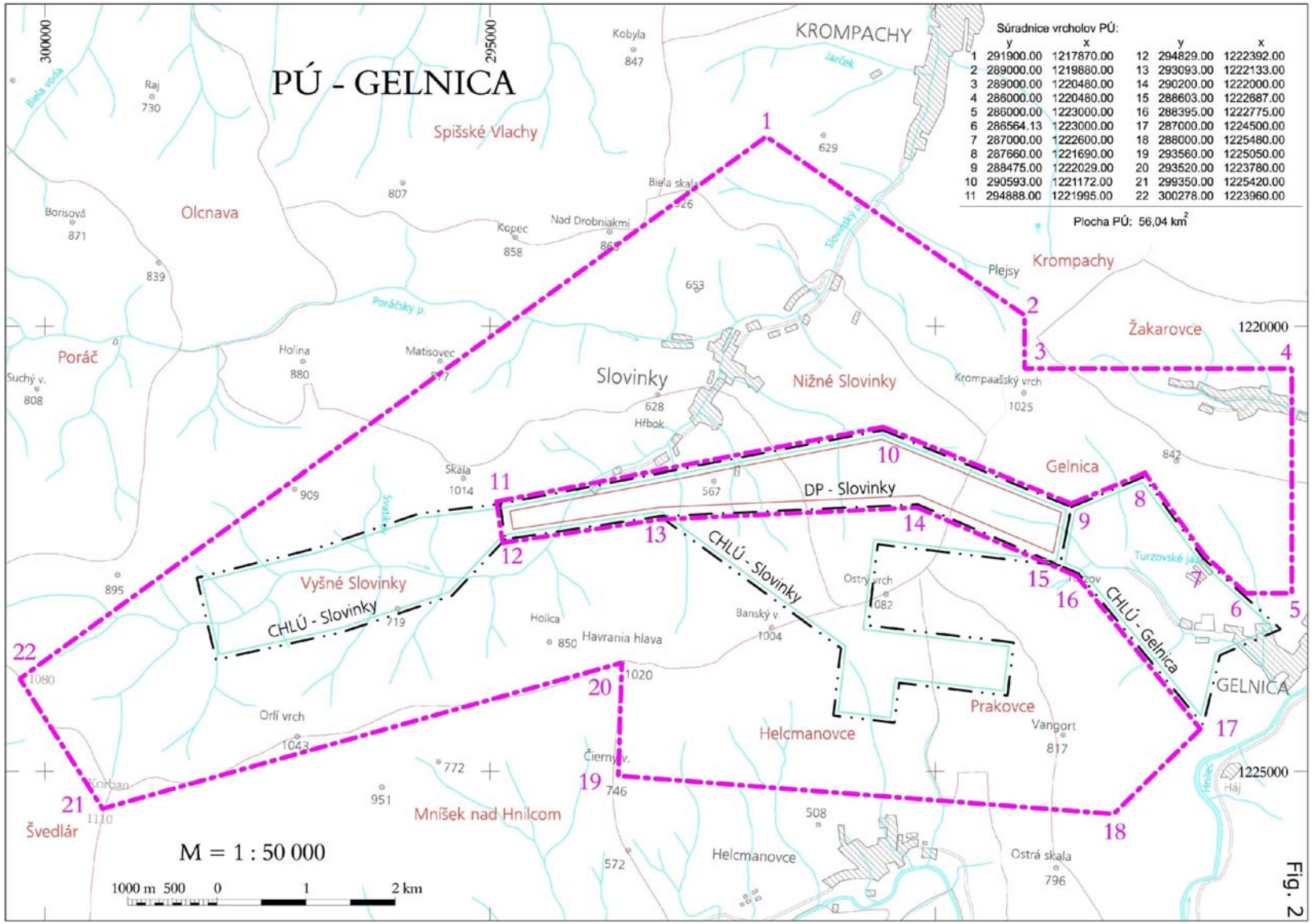

Figure 2 The Gelnica Exploration Area (EA), Slovakia. Scale is 1:50 000.

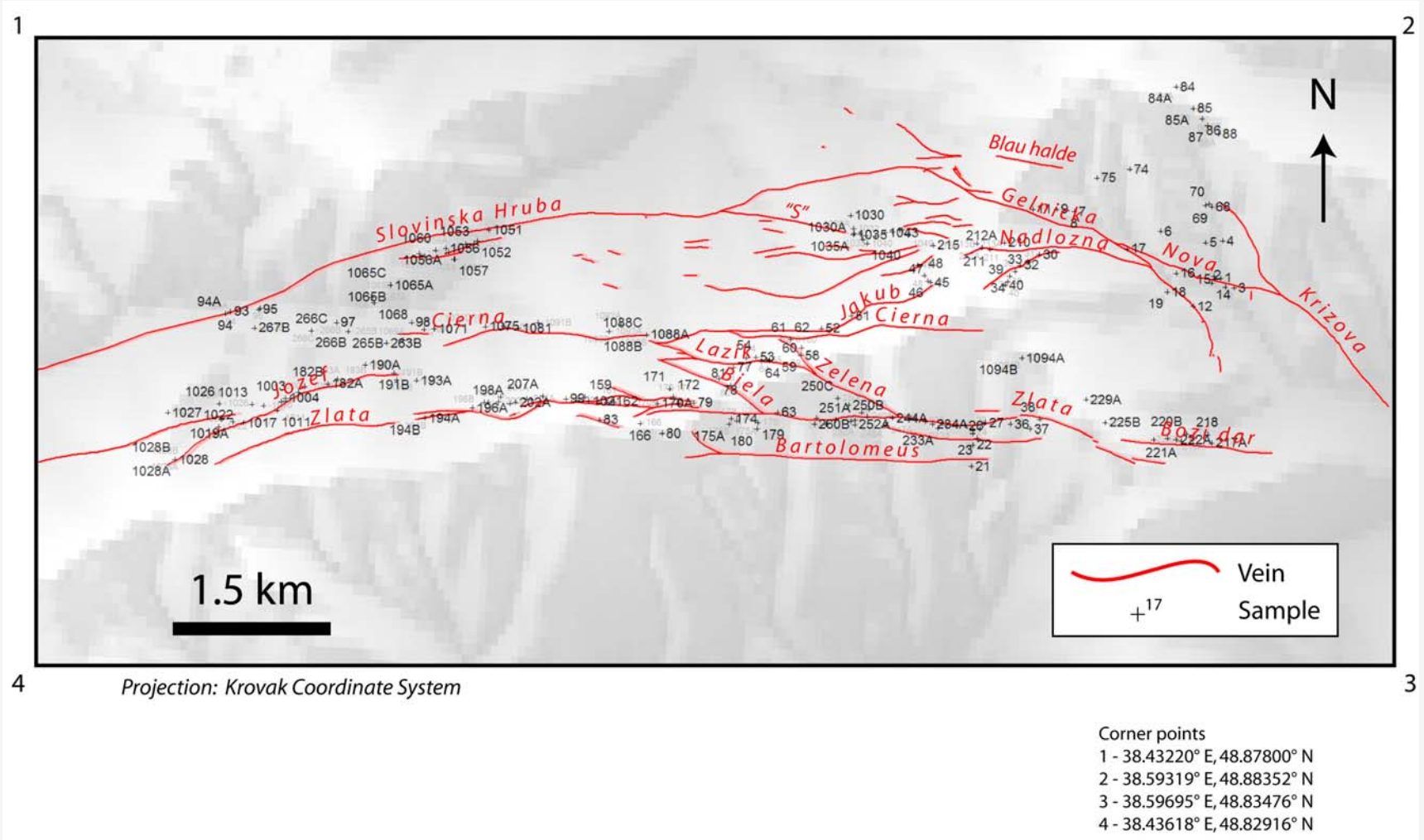

Figure 3 Rock samples collected during 2011 plotted over digital elevation model. Data points plotted by Tyrell Sutherland, Auropean Resources.

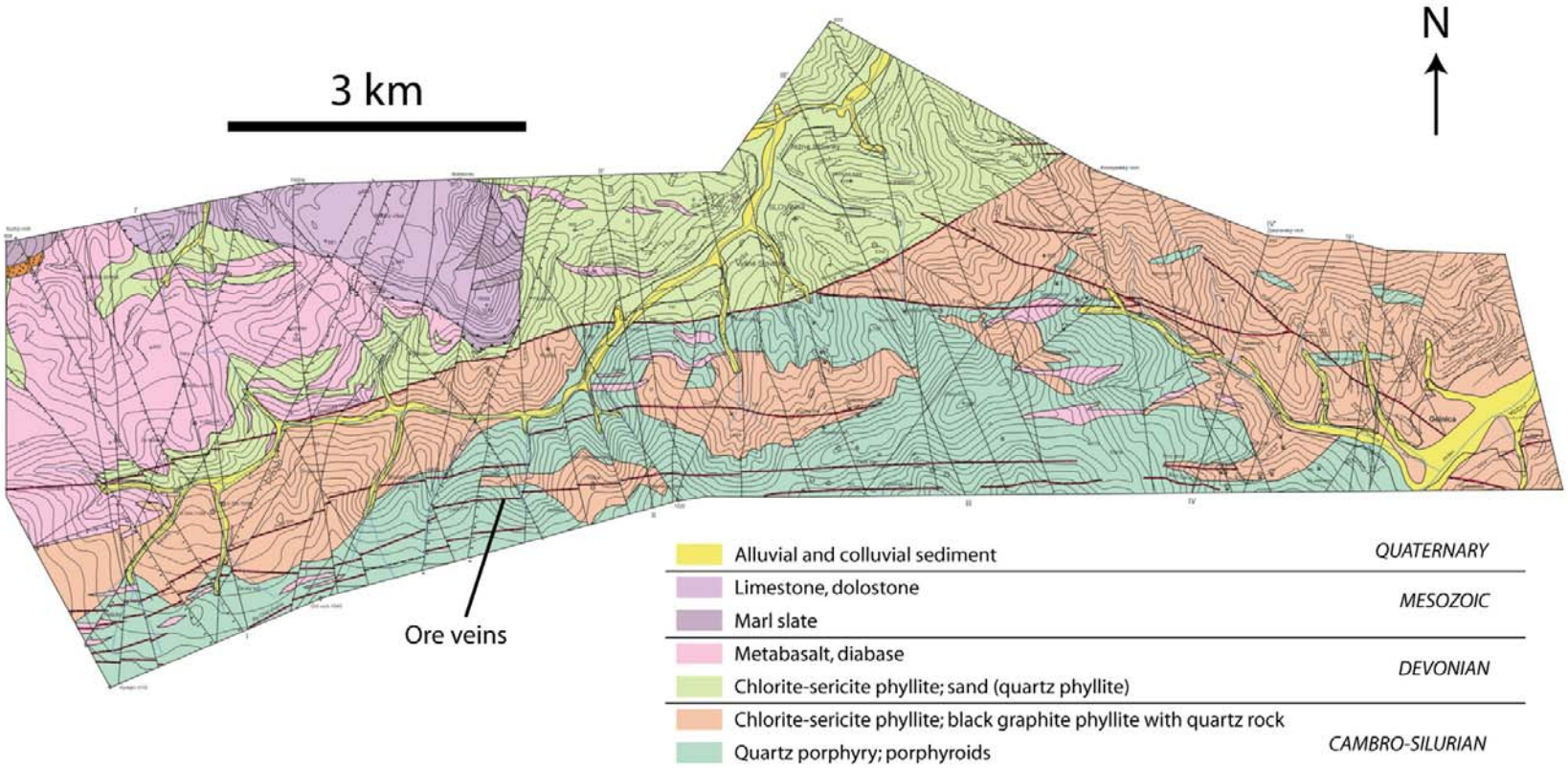

Figure 4 Bedrock geology map of Slovinky–Gelnica Ore Field (Piovarcsy and Husar, 1998).

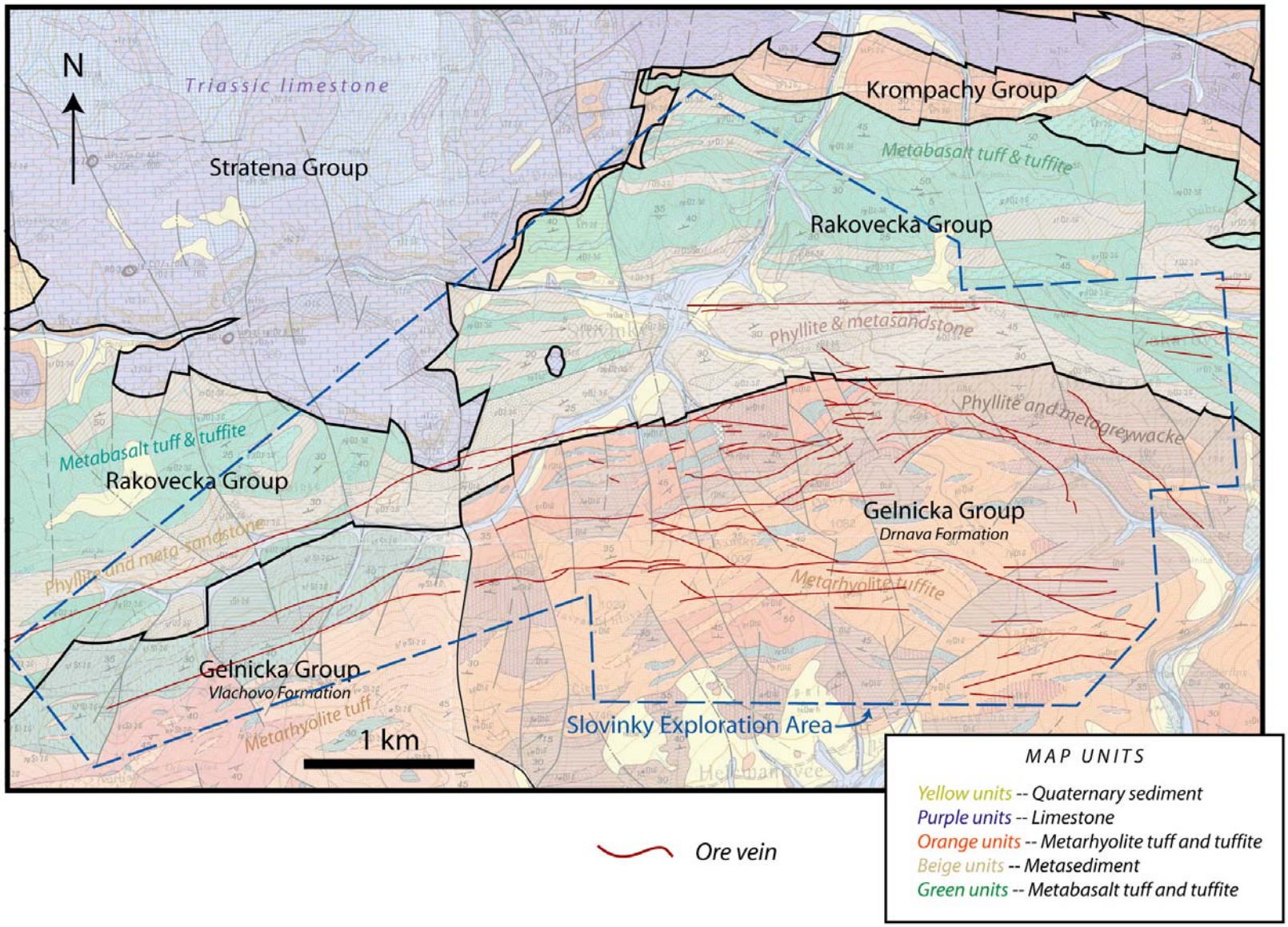

Figure 5 Bedrock geology map of Slovinky–Gelnica Ore Field (Bajanik et al., 1984).

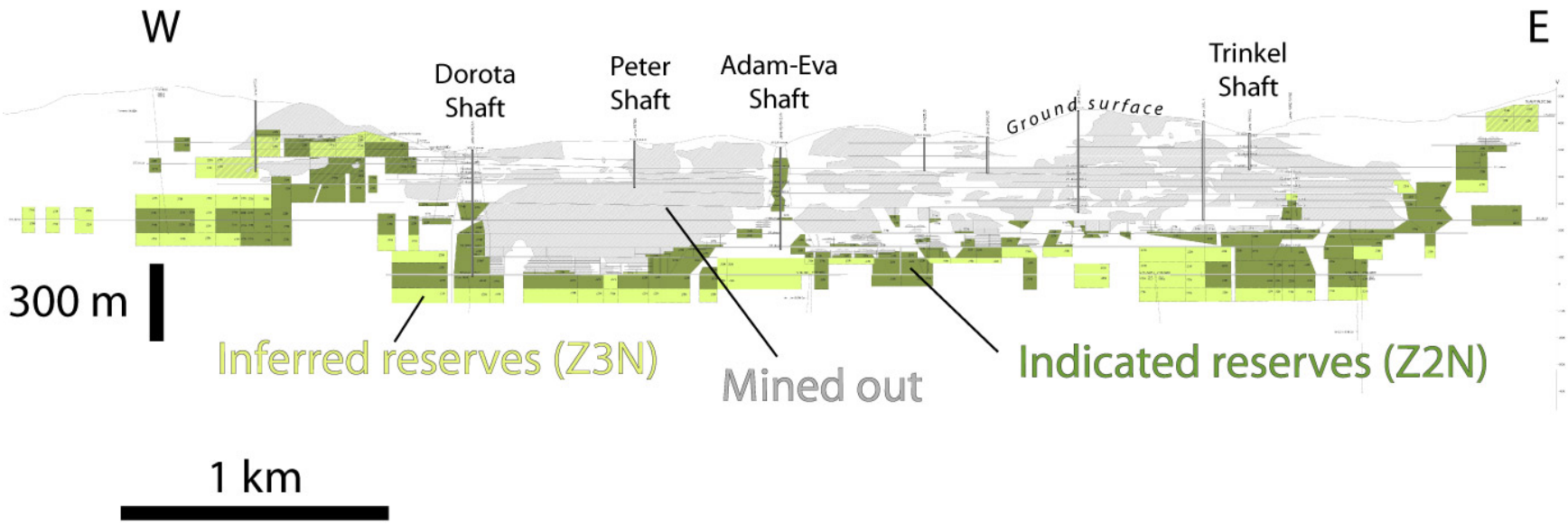

Figure 6 Longitudinal profile of the Slovinská Hrubá Vein showing indicated (Z2N) and inferred (Z3N) reserves (Piovarcsy and Rachela, 1998). Several of the shafts mentioned in the text are also shown.

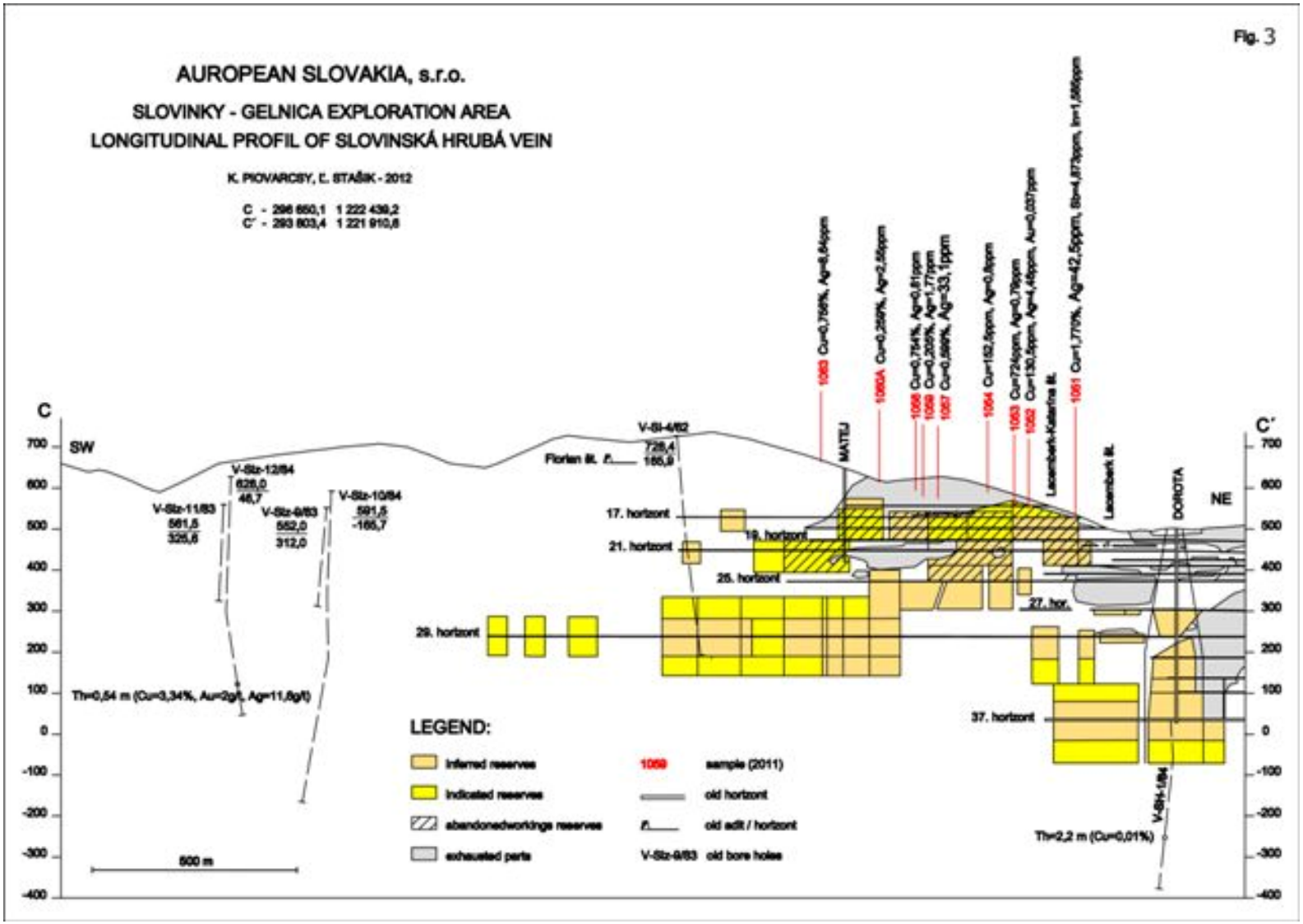

Figure 7 Longitudinal profile of the Slovinská Hrubá Vein west of the Dorota Shaft showing indicated (Z2N) and inferred (Z3N) reserves (Piovarcsy and Stasik, 2002).

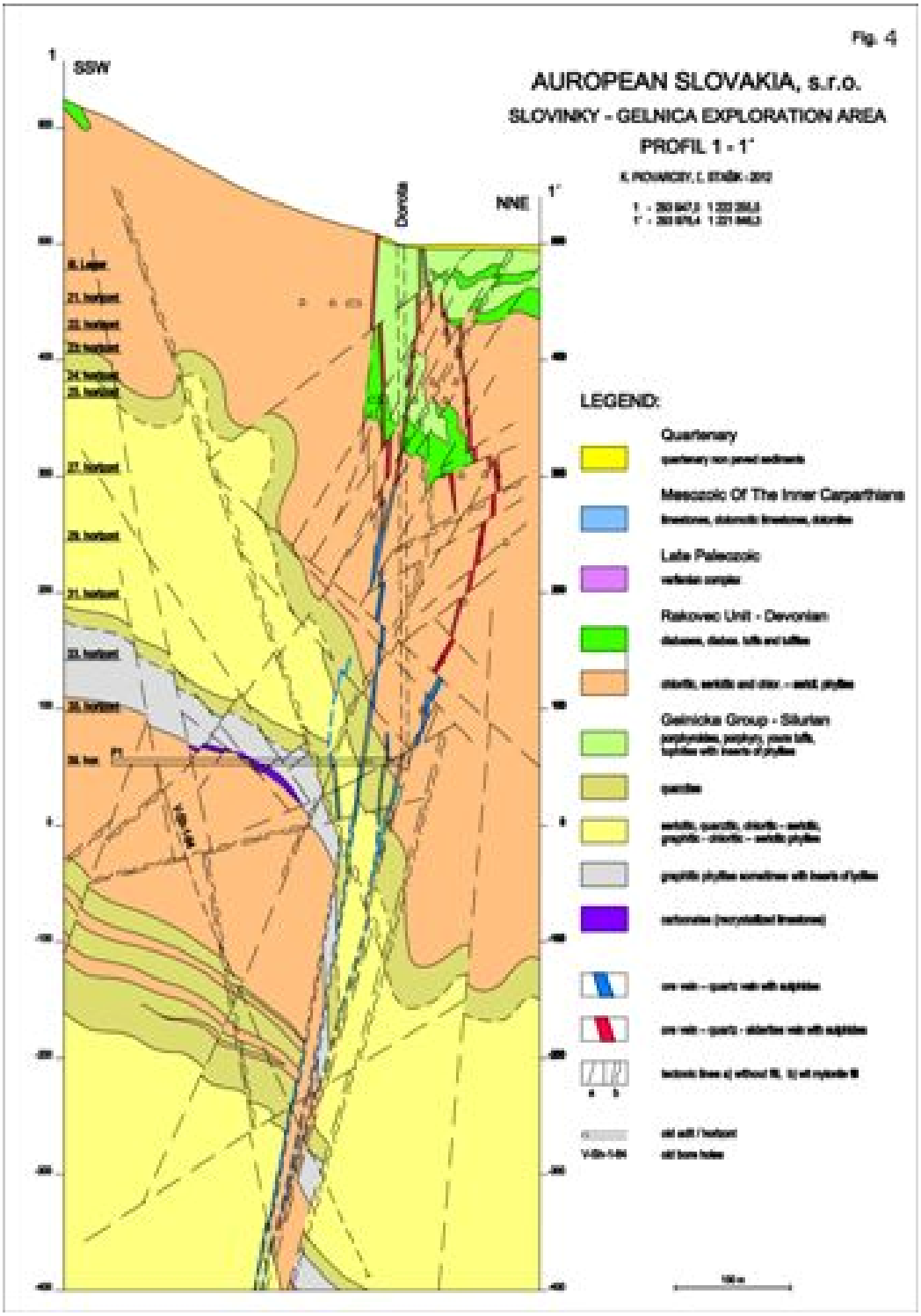

Figure 8A Cross-section 1–1' of Slovinská Hrubá Vein (Piovarcsy and and Stasik, 2002)

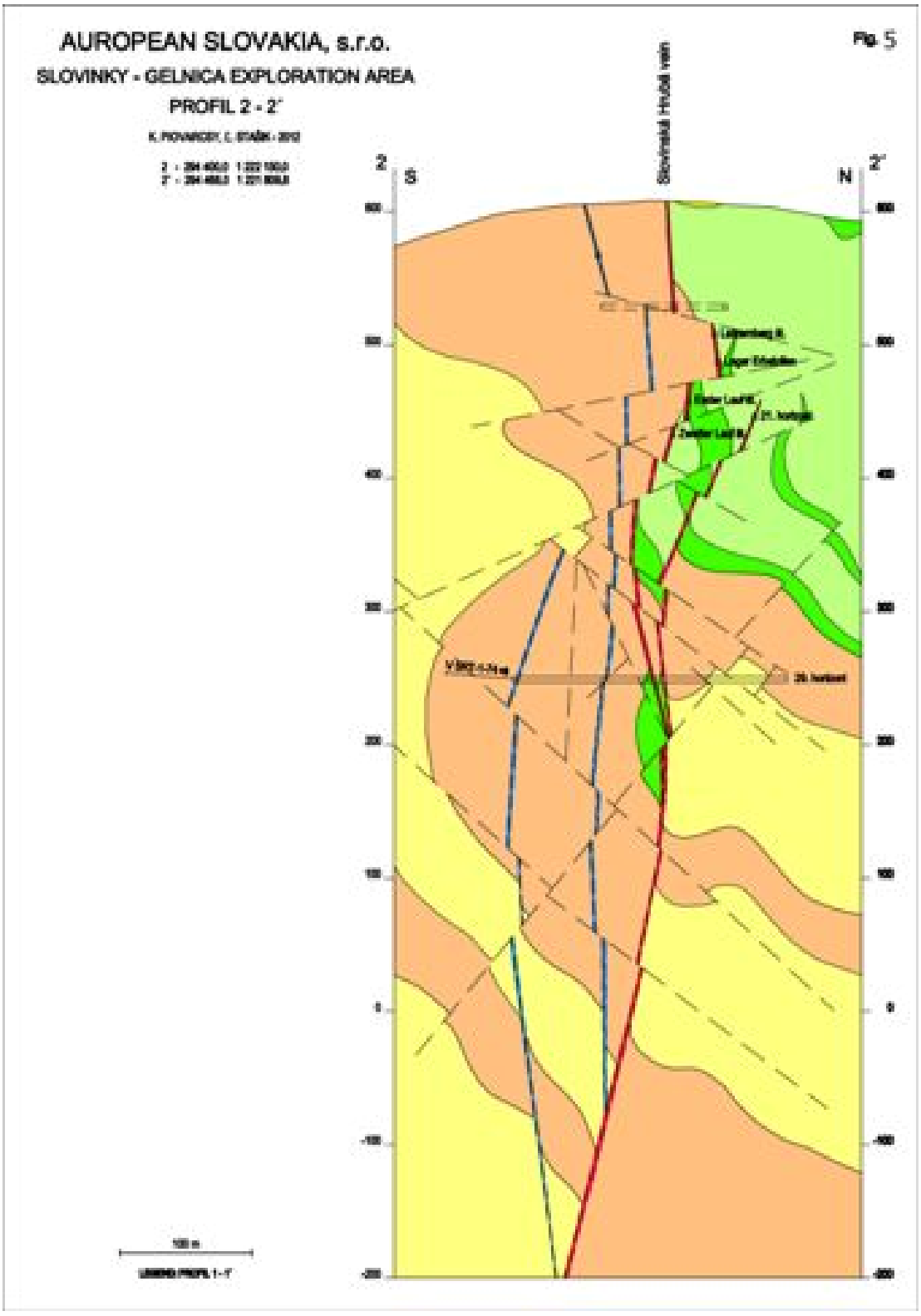

Figure 8B Cross-section 2–2' of Slovinská Hrubá Vein (Piovarcsy and and Stasik, 2002)

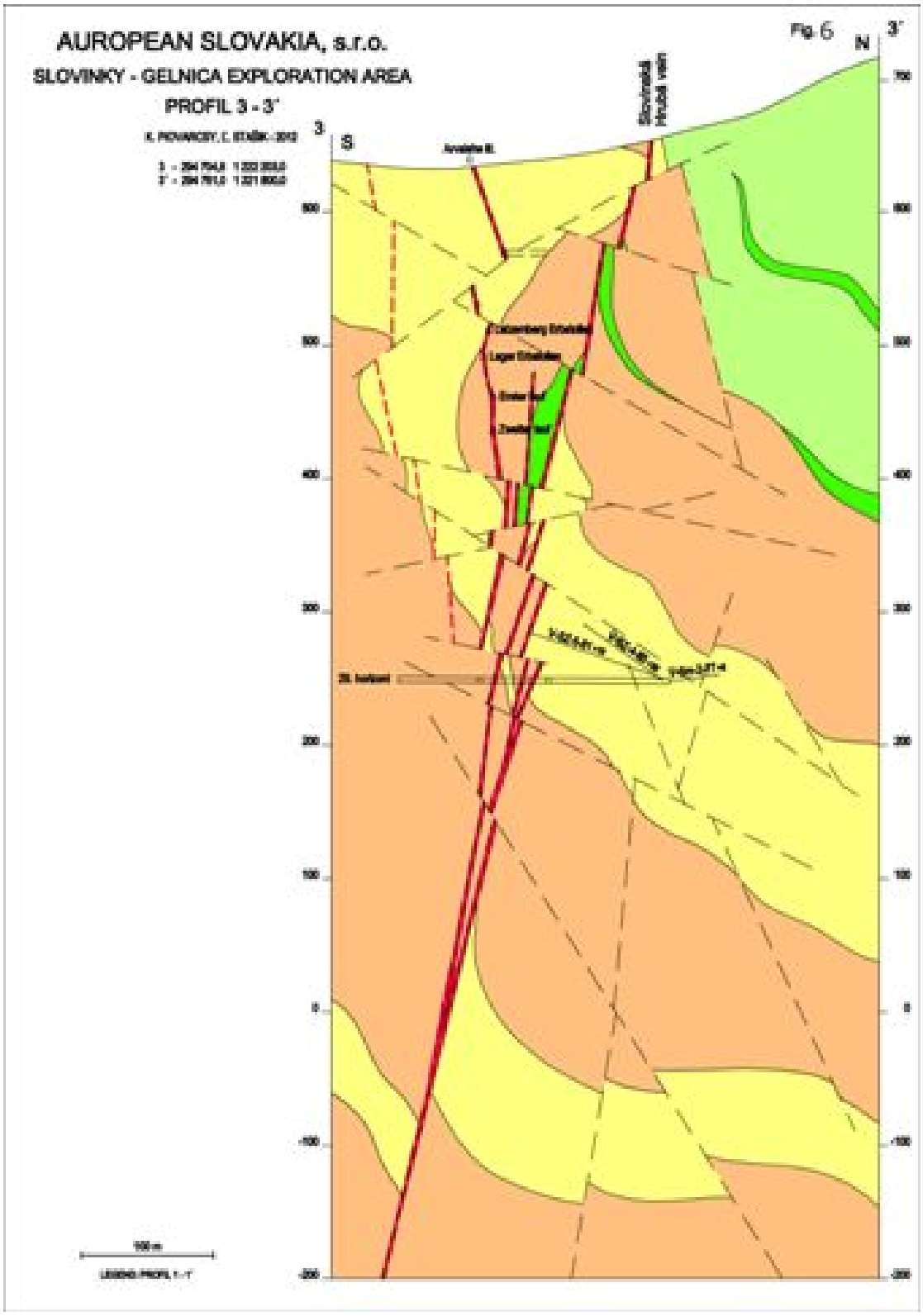

Figure 8C Cross-section 3–3' of Slovinská Hrubá Vein (Piovarcsy and and Stasik, 2002)

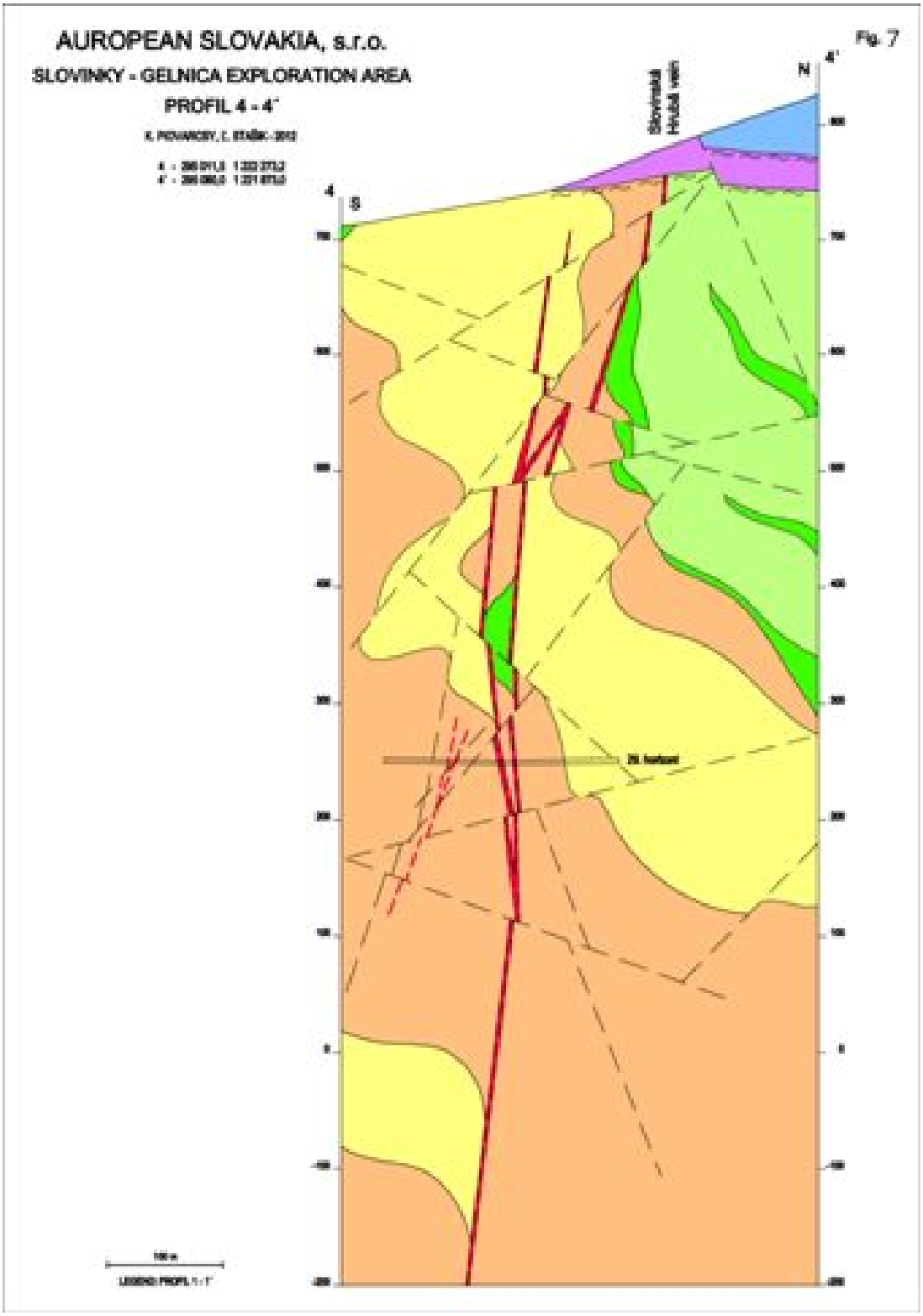

Figure 8D Cross-section 4–4' of Slovinská Hrubá Vein (Piovarcsy and and Stasik, 2002)

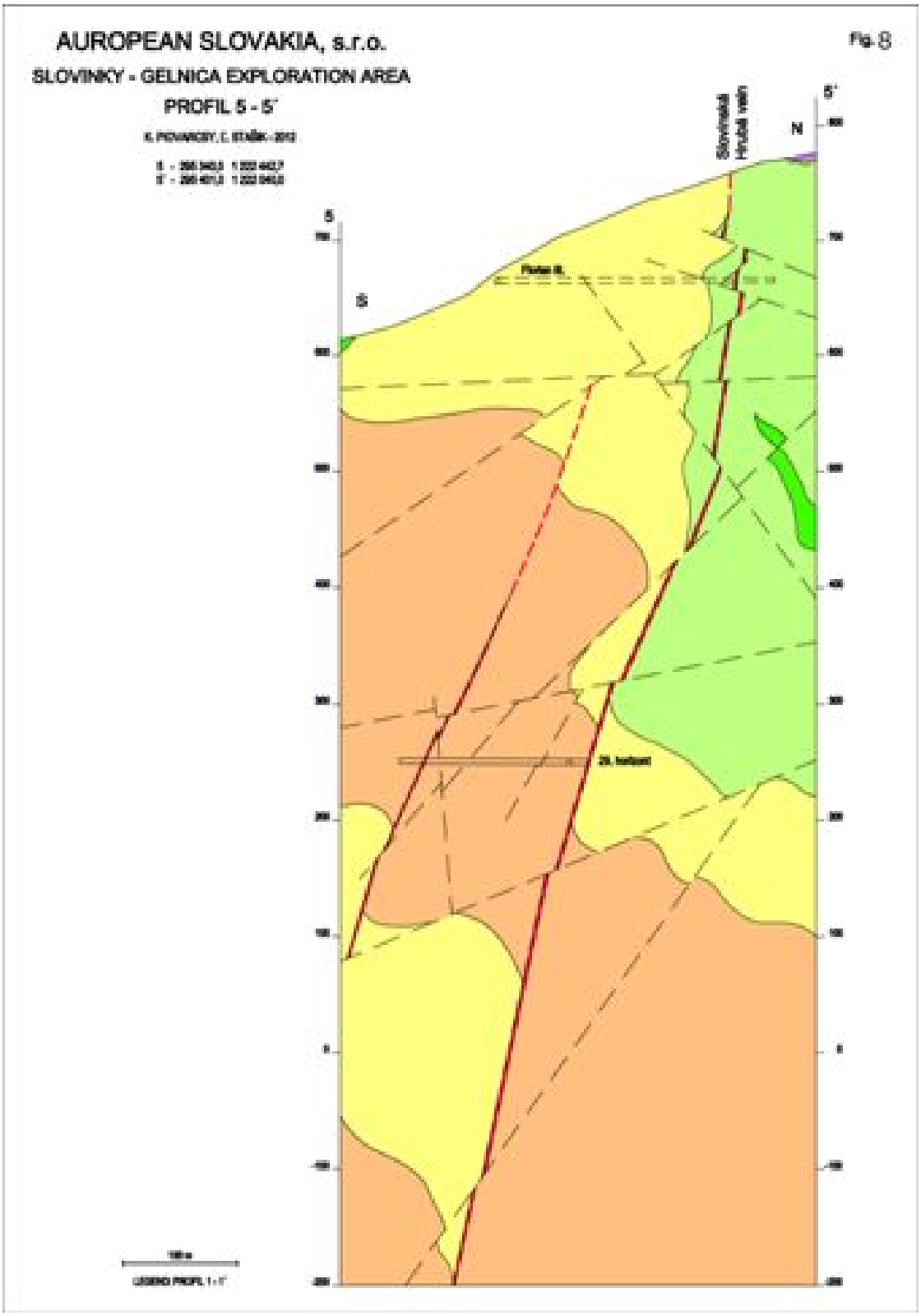

Figure 8E Cross-section 5–5' of Slovinská Hrubá Vein (Piovarcsy and and Stasik, 2002)

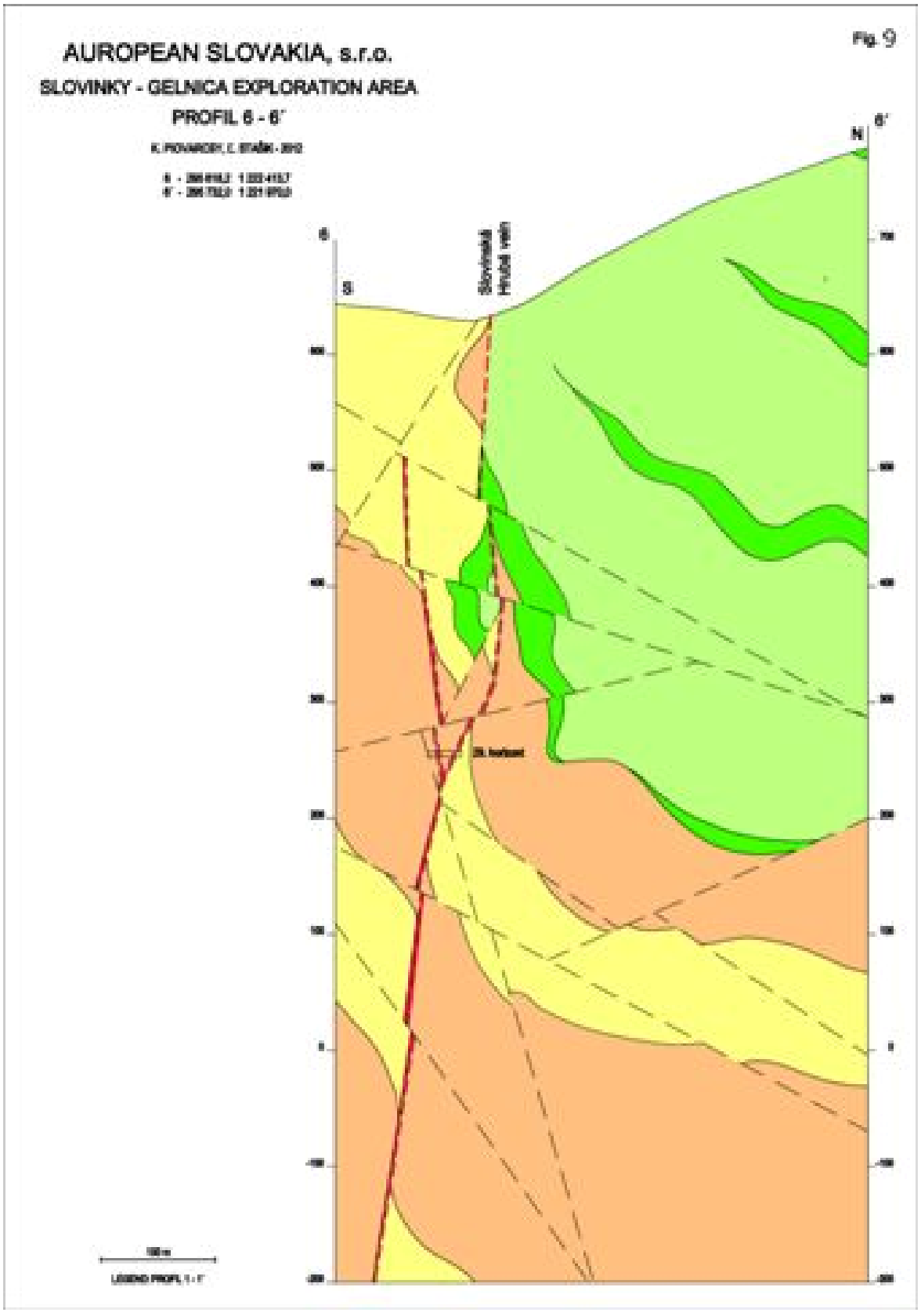

Figure 8F Cross-section 6–6' of Slovinská Hrubá Vein (Piovarcsy and and Stasik, 2002)

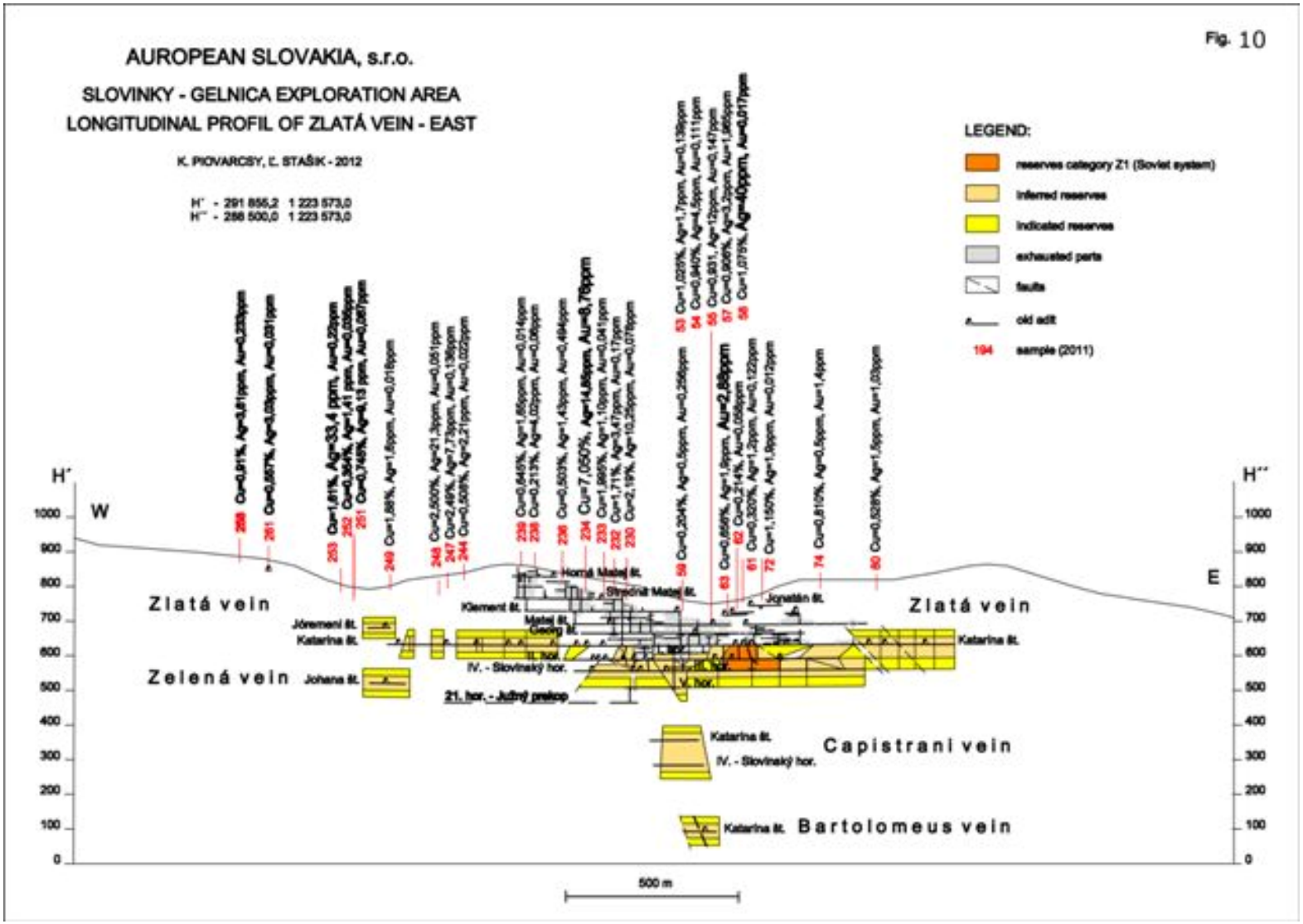

Figure 9A Longitidinal profile of the eastern Zlatá Vein (Piovarcsy and Stasik, 2012).

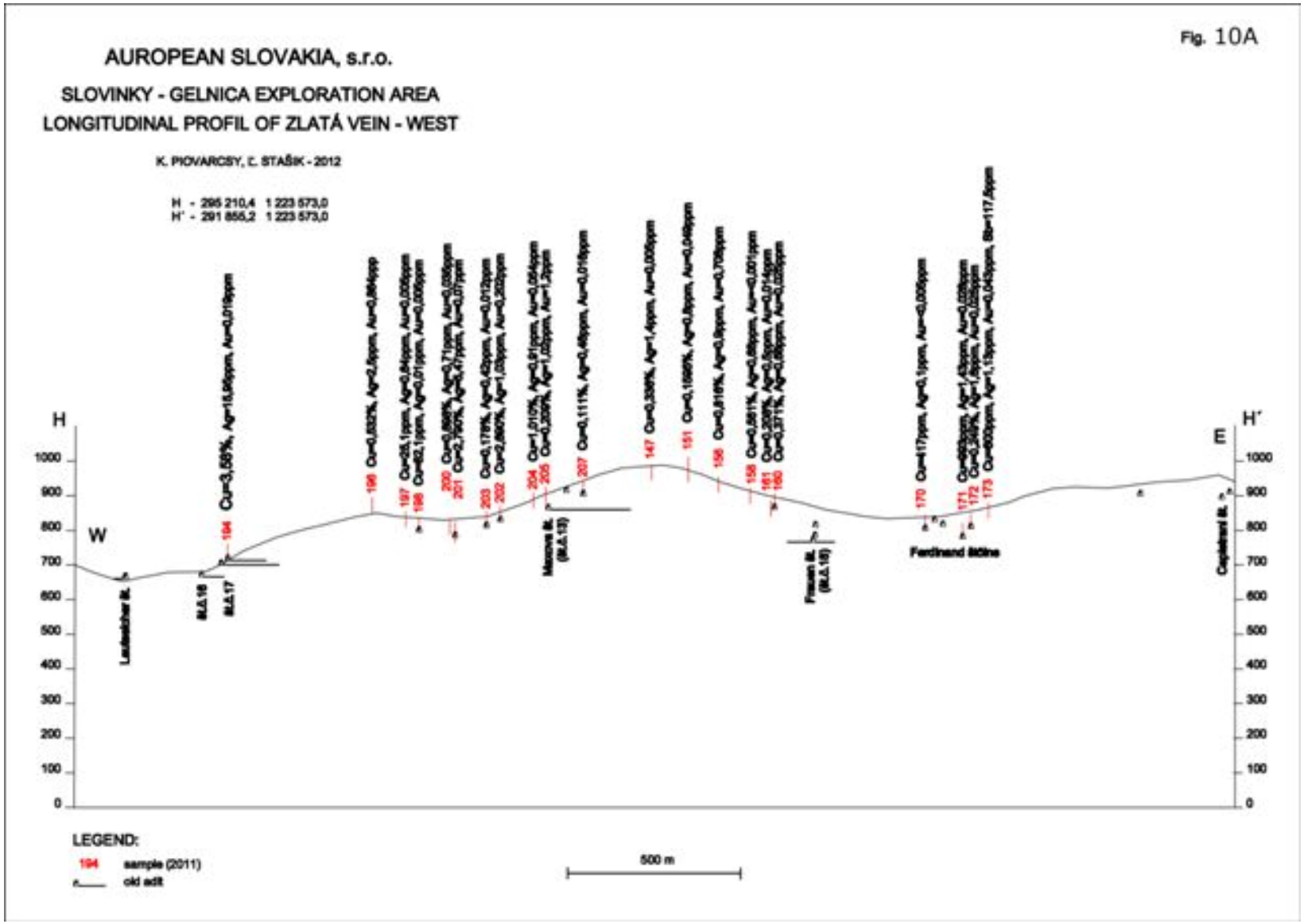

Figure 9B Longitidinal profile of the western Zlatá Vein (Piovarcsy and Stasik, 2012).

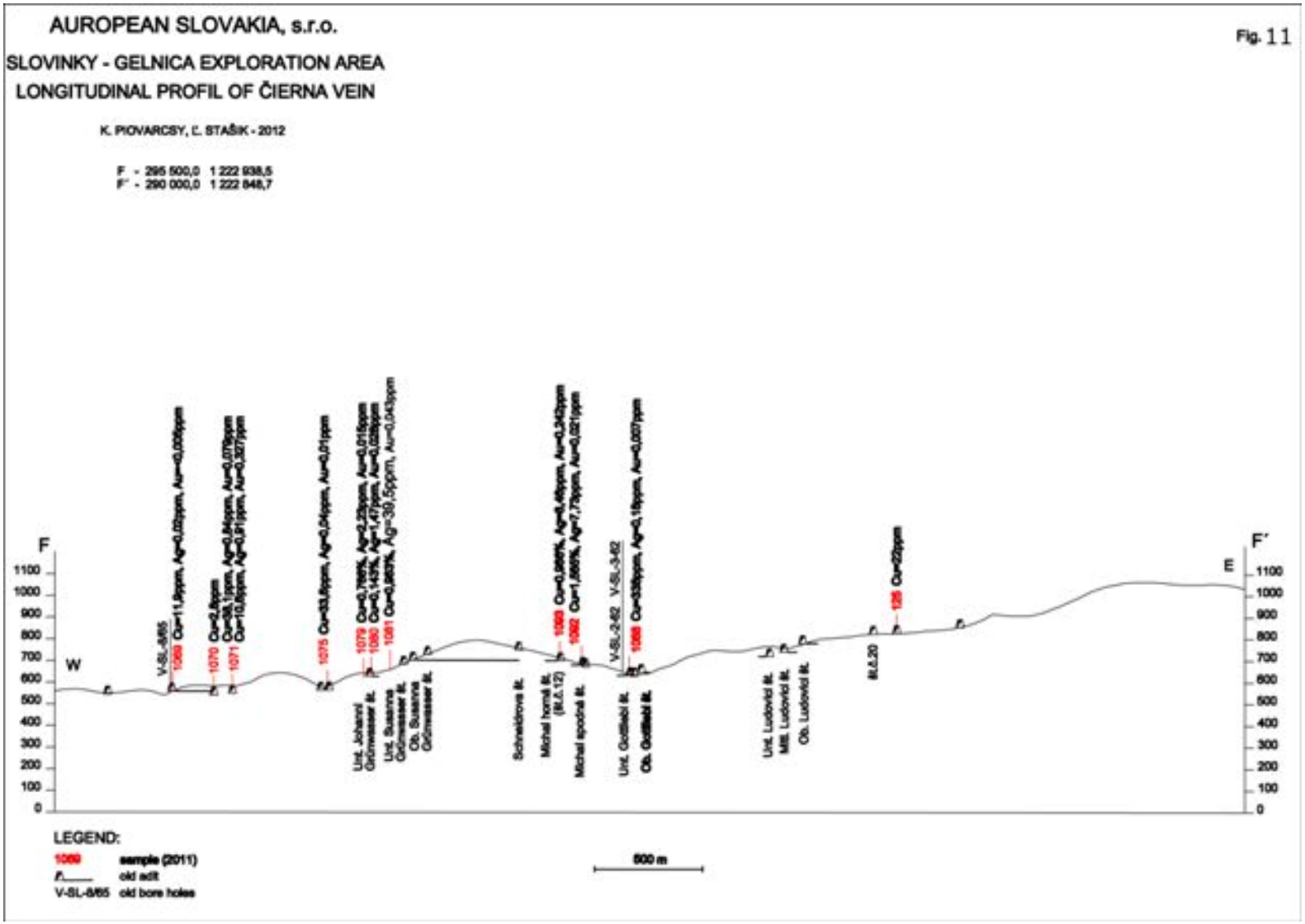

Figure 10 Longitudinal profile of the Čierna Vein (Piovarcsy and Stasik, 2012)

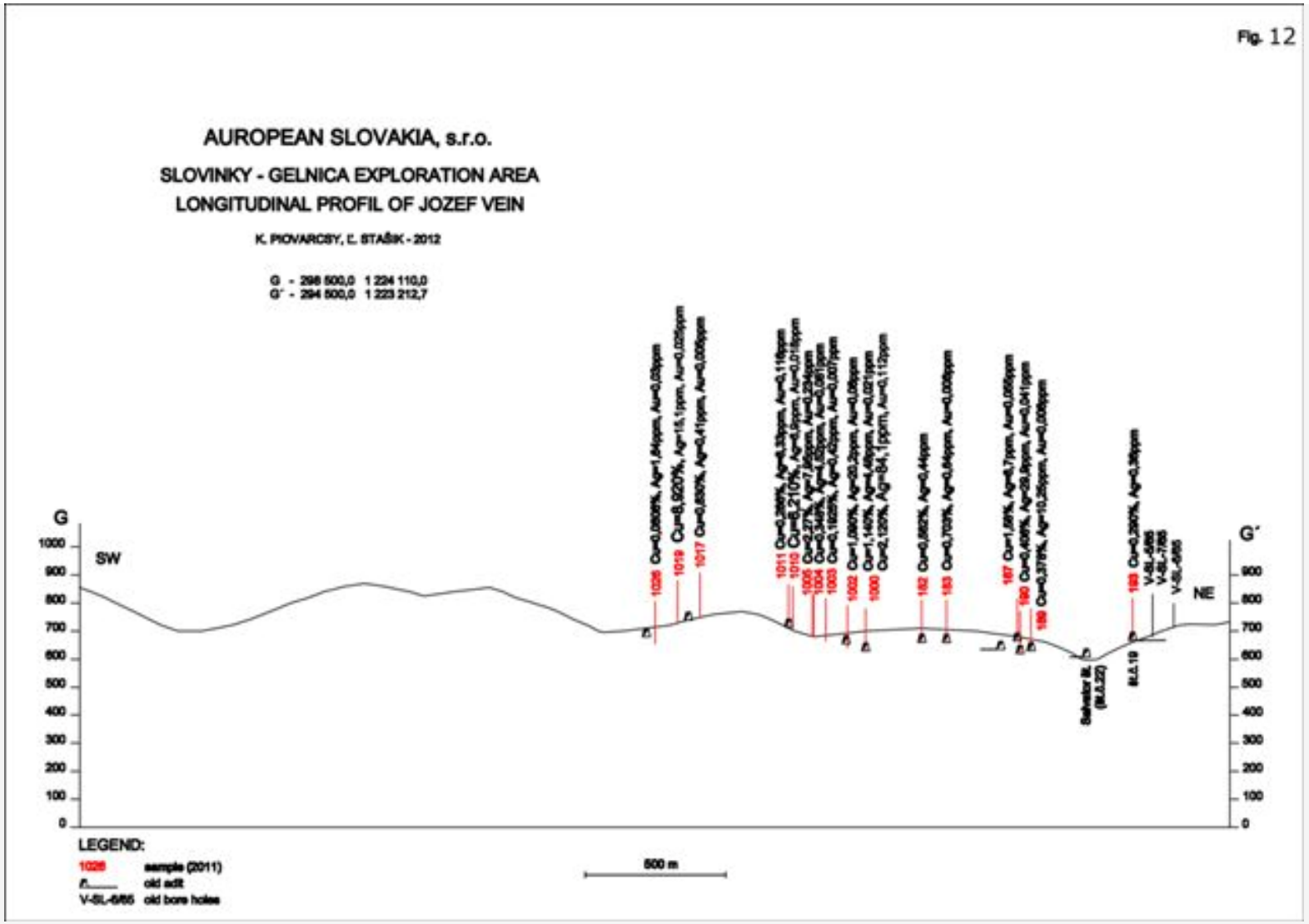

Figure 11 Longitudinal profile of Jozef Vein (Piovarcsy and Stasik, 2012).

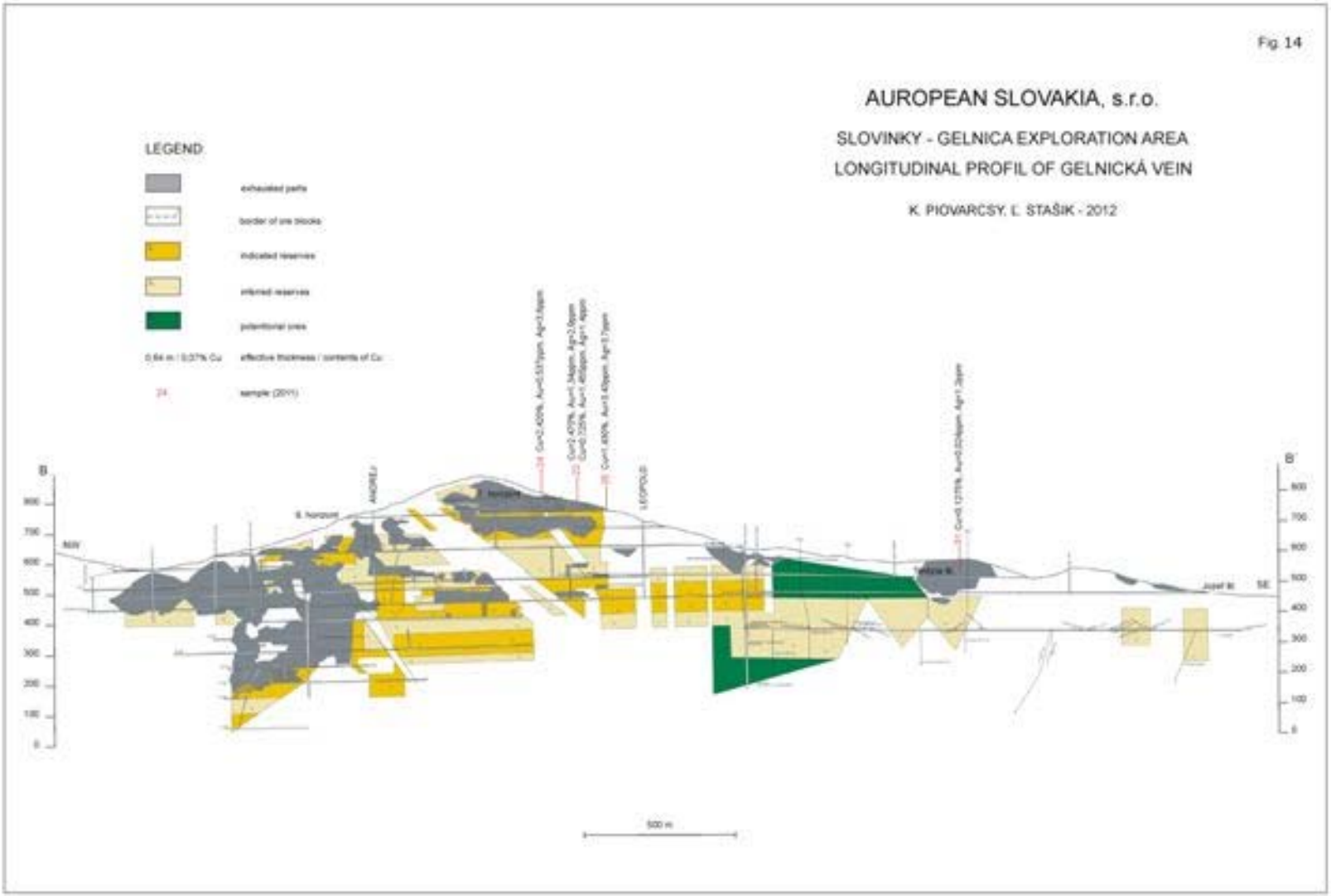

Figure 12 Longitudinal profile of the Gelnická Vein (Piovarcsy and Stasik, 2012)

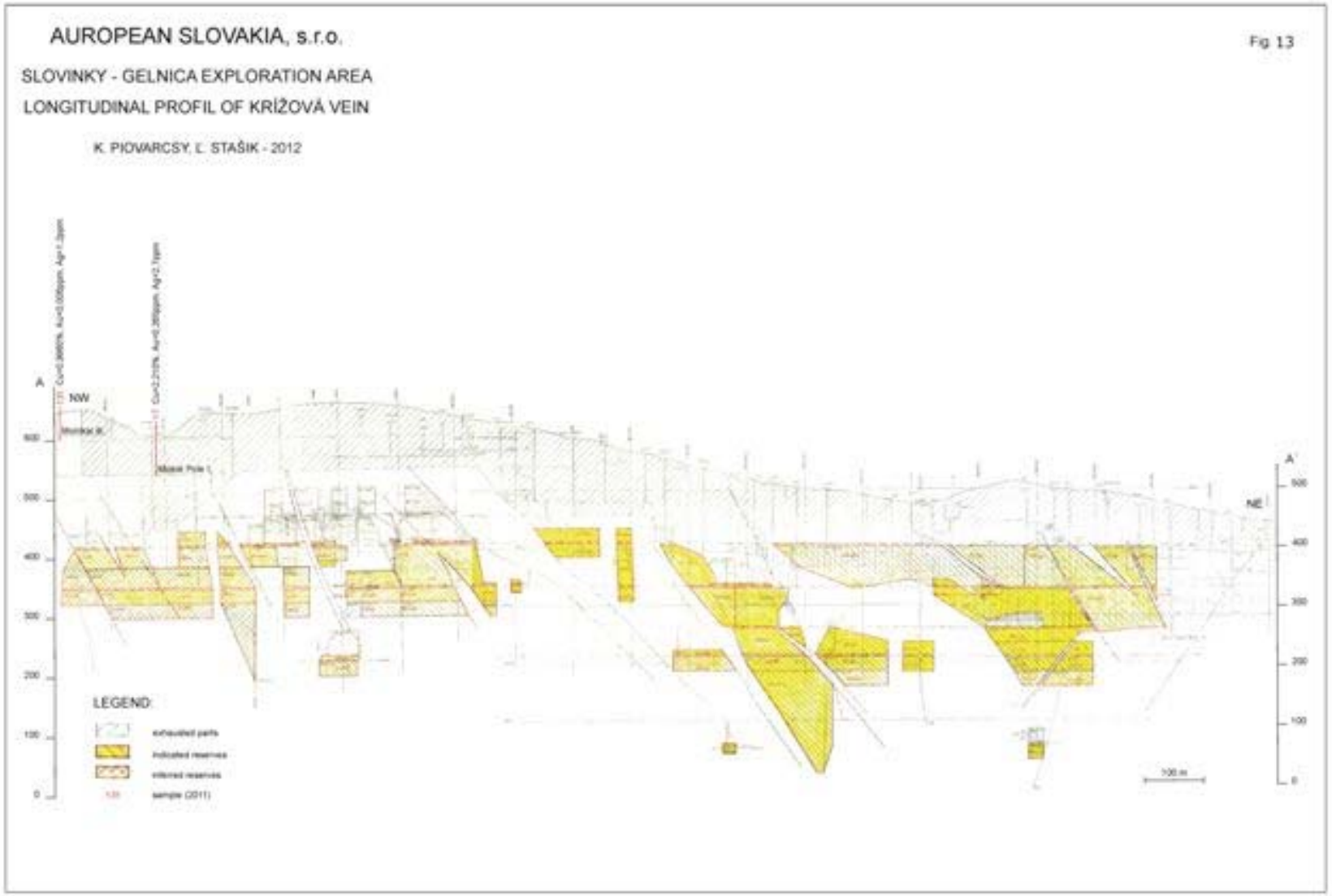

Figure 13 Longitudinal profile of the Križová Vein (Piovarcsy and Stasik, 2012).

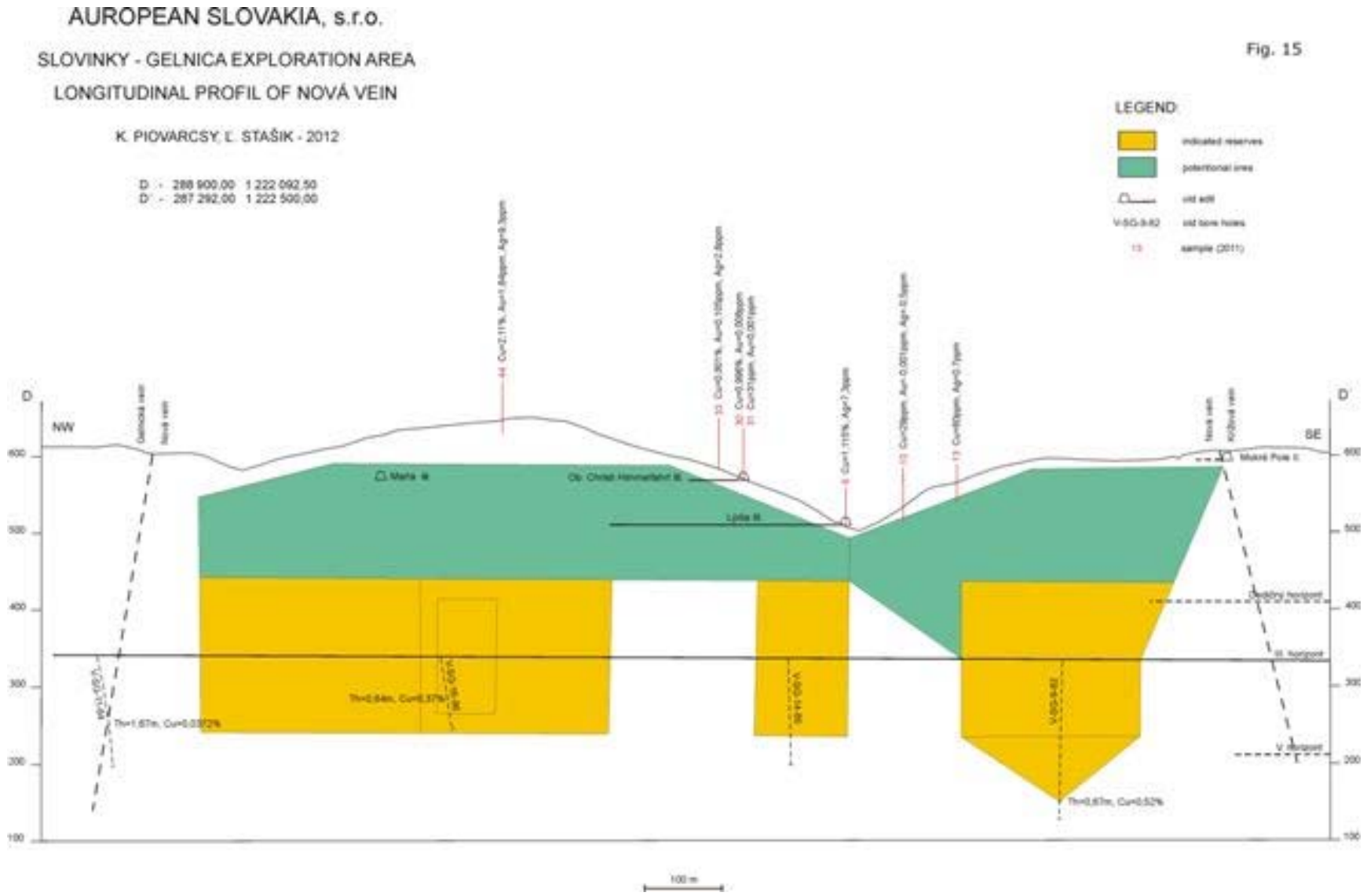

Figure 14 Longitudinal profile of the Nová Vein (Piovarcsy and Stasik, 2012).

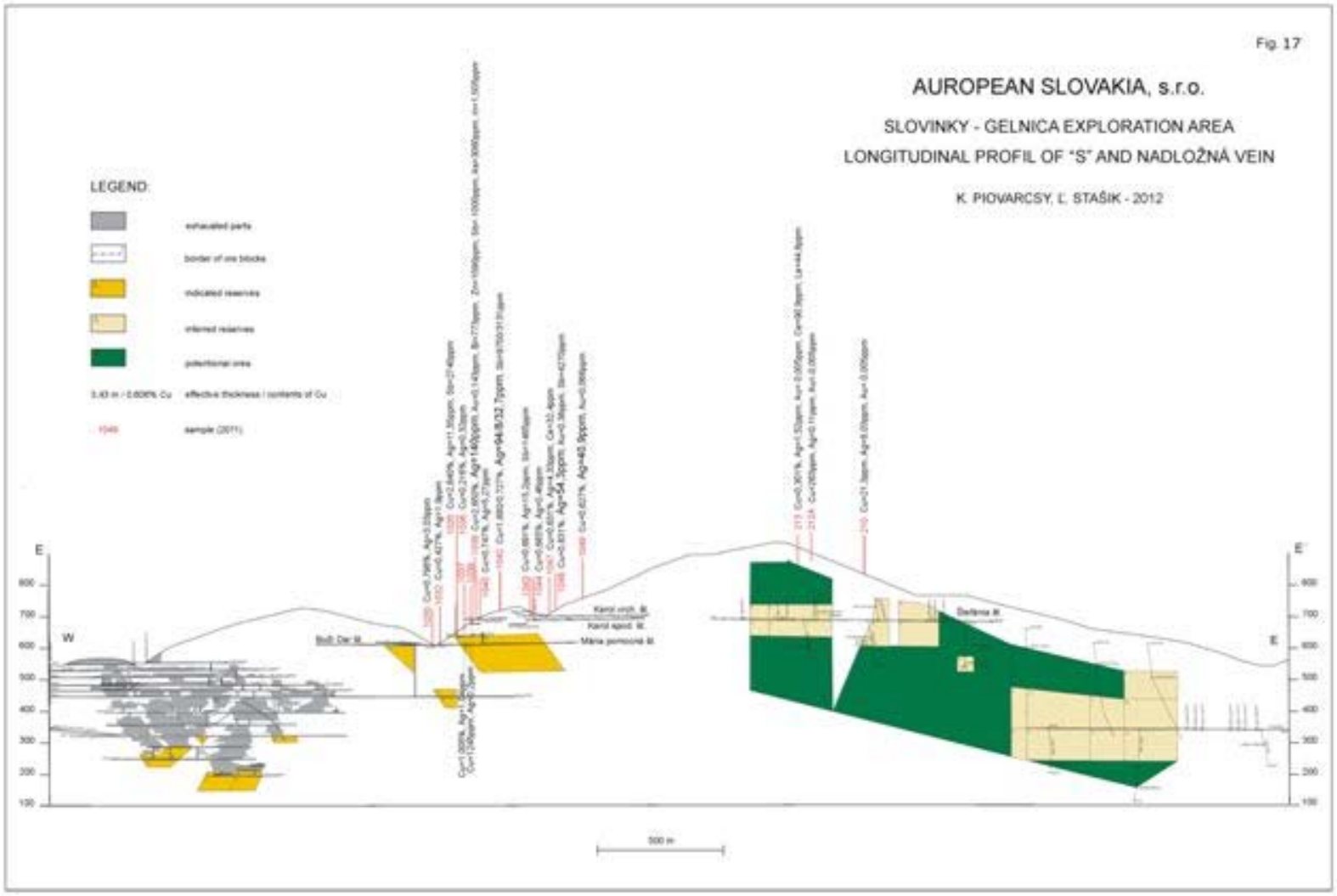

Figure 15 Longitudinal profile of the "S" Vein and the Nadložná Vein (Piovarcsy and Stasik, 2012)

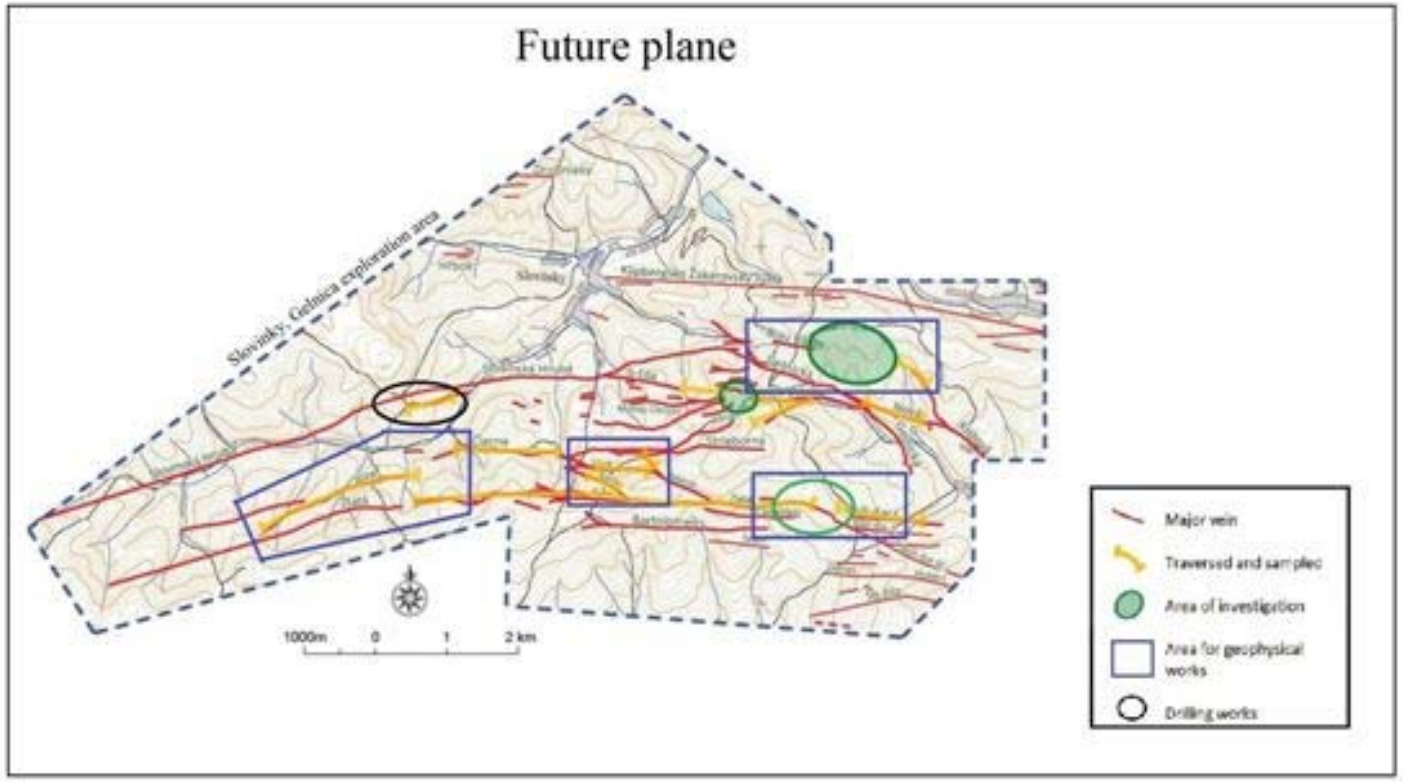

Figure 16 Recommended work in the Slovinky and Gelnica exploration areas.