

**OBSERVATIONS AND EXPLORATION UPDATE ON THE  
GRALHEIRA GOLD DEPOSIT, NORTHERN PORTUGAL  
For  
St. Elias Mines Ltd**

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## SUMMARY

The 8.3 km<sup>2</sup> Jales/Gralheira gold (silver) property in northern Portugal is the subject of an option agreement between the owner, Kernow Resources and Developments Ltd, and St. Elias Mines Ltd. The property includes the Jales Mine, which produced about 830,000 ounces of gold in ore grading 12.9 g/t between 1933-1992, and the Gralheira Prospect, which has been explored by drilling (101 holes totaling 16,477 m) and underground sampling from a 350-meter-long adit and 7 crosscuts aggregating about 200 meters. At the request of Ms Lori McClenahan, president of St Elias Mines, the author was engaged to assess the economic potential of Gralheira based on a review of technical information and a site visit. The author was also asked to provide an update of exploration results since publication of an evaluation report dated August 2002 by A.C.A. Howe International Limited, which summarizes and compiles exploration activities on the property from Roman times up to early 2002. Senior companies who have been involved exploring the property, mainly in the 1990's, include BP, RTZ, BRGM and Cogema. Exploration since the Howe Report consists of a fifteen-hole drill program totaling 2102.5 meters on the Gralheira Deposit conducted by Kernow-St Elias in 2002-2003. All holes intersected multiple intervals grading >1.0 g/t Au, including narrow (~0.5 m) high-grade intercepts of up to 29.97 g/t Au and broader (up to 10m) lower-grade intercepts grading 1.0 to 7.49 g/t Au.

Gralheira consists of an anastomosing network of easterly trending quartz veinlets, generally much narrower than 30 cm, within a 20- to 30-m-wide shear zone in Late Paleozoic mica schist. Concentration of gold-bearing veinlets in the shear zone varies from trace to about 10%.

From an economic point of view, the most critical information reviewed on Gralheira involves the dichotomy between assays **and** dimensions derived from underground face samples versus drill-core samples. Underground face sampling in the adit and crosscuts has defined a 350-m-long zone that can be described as grading either 6.2 g/t Au equivalent across 1.5 meters (narrow-mining scenario) or as 3.6 g/t Au equivalent across 7.2 meters (bulk-tonnage scenario). Yet, in the 10 drill holes that pass within 25 meters of the adit, the aggregate true width of intervals grading >1.0 g/t ranges from 0.4 to 1.8 meters. In other words, the drilling gives no suggestion of the existence of a 7-m-wide multi-gram zone as defined by underground sampling. Furthermore, grade from drill samples is significantly less than grade from underground face samples.

Of crucial concern as well is the dichotomy between assay results from underground face samples and underground bulk samples. Calculations of grade from eight bulk samples (170-500 kg) taken at ~50-m intervals in the adit define a 350-m-long zone grading approximately 9.32 g/t Au equivalent across 1.5 meters. This is 50% higher than the grade calculated by assays from underground face samples.

The dichotomies discussed above can be explained by laboratory imprecision due to the fact that gold is often in very narrow (1-3 cm) and probably very high-grade veins. This is supported by crosscut maps that commonly indicate multi-gram gold assays across 1.2-m

intervals that include only one 1- to 3-cm-wide quartz veinlet. The mineralized part of the entire sample sent to the laboratory is so small that it will likely be missed or under-represented in the 200-gram split of the crushed rock that is typically collected by the laboratory for analysis. This conclusion is also supported by the large variances (typically >100%) in quarter-core check assays from drill core.

Because assay variance diminishes in proportion to the weight of the sample, the bulk-sample assays are considered to be the most reliable indication of the true grade of the deposit. It appears that the adage “drill for structure, drift for grade” is particularly true at Gralheira. Until a careful study is done to relate drill results to underground results, drill information can only be used to establish the location of mineralized structures, and not to calculate resources.

Gralheira has been defined by drilling for a strike length of more than 2000 meters and to a maximum depth of about 300 meters below surface, although most holes intersect the zone 50-150 meters below surface. However, it is reasonable to think that mineralization at Gralheira will extend to at least 600 meters below surface, since this is the depth to which Jales was mined and the two deposits are obviously affiliated. If it is assumed that bulk-sample assays are representative of the deposit as a whole, the speculative potential of Gralheira across a minimum mining width of 1.5 meters is about 1.5 million ounces Au equivalent. Using the face-sample assays (which are probably understated) to calculate a bulk-tonnage scenario across a mining width of 7.2 meters, the speculative potential of the deposit is 2.7 million ounces Au equivalent. Indicated resources calculated for the adit (350m by 1.5m by 50m) using face assays and bulk assays are given below (note: contribution of silver not considered).

INDICATED RESOURCE, ADIT

	TONNAGE	GRADE	GRAMS Au	OUNCES Au
FACE DATA	70454	5.80 g/t	408,879	13,861
BULK DATA	70875	8.71 g/t	617,625	19,857

Additional underground and surface exploration is recommended at Gralheira as listed below. The cost of the recommended program will be about one million dollars.

1. The rejects from at least thirty drill-hole intervals should be selected for further laboratory test work. The intervals should represent a broad range of original assay values, but lower-grade intervals should be carefully selected to include favourable alteration (i.e.: veining with sulphides). All of the rejects should be completely and finely pulverized. The lab should be instructed to homogenize the pulverized material particularly carefully, and to do a coarse metallic screen assay, taking three 50-gm subsamples of the fines for analysis. Pulverizing the entire sample essentially skips the routine laboratory step of taking a small split from the crushed portion. It is suspected that the resulting assays will generally be higher than the assays obtained by standard methods, and if the analyses from the three pulps have only small variances, complete pulverization of key samples from future drill-core or

channel samples might minimize assay problems due to excessive wall-rock dilution.

2. The crosscuts should be remapped and resampled (samples will have to be taken from the back or floor of the adit) with a view towards assessing both the narrow, high-grade model and the wider, bulk-tonnage model, and also as an orientation exercise to see if the methodology recommended below results in higher grades and better definition of the width of the mineralized zone. The sampling will have to be painstaking to maximize quartz to wall-rock ratio. Where there are individual narrow isolated veins, these should be channel-sampled vertically using a rock saw to cut through the wall-rock on either side of the vein and as close to the vein as is practicable. Where the concentration of veins is greater than about 5%, channel samples should be taken horizontally. These samples should be large (5 kg) and never more than 0.5 meters long. All samples of material suspected to be mineralized should be completely pulverized and carefully homogenized at the laboratory. Two or three 30-gm subsamples should be split from the pulverized rock for assay in order to monitor variance. (If the variance is acceptable, this practice can be discontinued after awhile. If the variance is high, the strategy recommended herein will have to be reconsidered) At least every third sample of material suspected to be mineralized should be screened for coarse metallics. Intervals of unveined wall-rock need not be sampled in such detail. At the end of this exercise, the new data should be compared to previous sampling data in the adit to see if the “painstaking” work has substantively improved the grade and/or width of the mineralized zone (i.e.: are results now closer to bulk-sampling results?) If not, another sampling strategy (probably bulk sampling) will have to be considered.
3. Whether viewed as a narrow high-grade prospect or a bulk-tonnage prospect, the most reliable information on the grade and width of the mineralized zone has come from the existing adit, and the best way to demonstrate the continuity and potential of Gralheira is to extend the adit. An extension of at least 350 m towards the west is recommended, with crosscuts extending 12 meters into the footwall and 12 meters into the hanging wall at 50-m intervals (Figure 12). The adit extension and new crosscuts should be mapped and sampled as described in recommendation 2. At least 16 bulk samples should be collected for metallurgical testwork
4. A fence of 3 drill holes should be laid out at ~100-m intervals with the intent of intersecting the proposed adit extension as close as possible to the planned crosscuts. The purpose of this exercise is to relate drill hole assay data to the assay and mapping data that will be collected from the adit. This will be of incalculable value in helping to interpret assay results from deep holes that eventually will have to be drilled to define the envelope of the mineralized system at Gralheira. Very careful spatial survey control will be required for the drill holes, the existing adit, and the extension. Logging of the core should be meticulous, and assay intervals should be as short as is required for sufficient assay material.
5. A fence of five holes at 100-m intervals should be drilled at the west end of the Gralheira Shear Zone to intersect mineralization at a depth of about 200 meters

below surface. Currently, the deepest hole in this area intersects the zone at about 100 m below surface.

6. Several short holes should be spotted to test gold-in-soil anomalies between the Jales Vein and the Gralheira deposit. This should be done after systematic review of historical data available from trenches, ground truthing, and a review of the soil-geochemical data summarized in Figures 6, 7 and 8.
7. Core from holes drilled at the west end of the deposit, where Roman trenching suggests the presence of multiple echelon veins across 50 meters, should be assayed with a view towards determining if open-pit operations might be feasible in this area. The entire segment of core that passes through this zone should be resampled. (Figure 13)
8. All of the historical and modern information from drill holes, adit sampling, crosscut sampling, soil sampling etc should be unified into a geological database program.
9. The core inspection facility is cramped and poorly lit. Core is stacked rather than racked. A new core shack should be constructed or leased.
10. At the end of the project, a consultant should be hired to do a prefeasibility study considering both bulk-mining and narrow-width-mining scenarios.

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# **1: INTRODUCTION**

## **1.1 General**

The Jales/Gralheira gold project in northern Portugal (Figure 1) is the subject of an option agreement between the owner, Kernow Resources and Developments Ltd, and option partner St. Elias Mines Ltd, both of Vancouver, B.C., Canada. These companies are listed on the Toronto Venture Exchange in Canada. The property covers 8.3 km<sup>2</sup> and includes the Jales Mine and the Gralheira Deposit. The Jales Mine consists of narrow granite-hosted quartz veins from which approximately 830,000 ounces of gold were produced between 1933 and 1992 in addition to an unknown quantity during Roman times in A.D. 100-200. Gralheira is a shear-zone-hosted vein deposit in mica schist that also was exploited in shallow trenches during Roman times. St. Elias retained the services of the author to review the technical information referenced herein and, based on this review and a site visit, to comment on the economic potential of the Gralheira Deposit. For the sake of completion, some information on the Jales Mine is also given. A recent evaluation report by personnel of A.C.A. Howe International Ltd (hereafter referred to as the Howe Report) dated August 2002 gives an excellent compilation and summary of previous mining and exploration activities on the Jales/Gralheira property. To avoid unnecessary redundancy, the author refers generously to this report and concentrates mainly on economic aspects that were not emphasized in the Howe Report. An update of drilling done at Gralheira since publication of the Howe Report is also given. Two sections of this report, section 2.1 describing property and ownership, and section 2.2 describing access, climate and infrastructure are direct extracts from the Howe Report and are printed in italics.

## **1.2 Authorization and Terms of Reference**

This report, written in compliance with National Policy 43-101, was authorized by Ms. Lori McClenahan, president for St Elias Mines Ltd. The purpose of the report is to comment on the economic potential of the Gralheira deposit and to recommend future work based on a review of technical information and a site visit. A secondary objective is to present an update of work done since the Howe Report was published. The author is a member in good standing of NAPEGG and has almost 30 years of continuous exploration experience evaluating mineral prospects on four continents. Salient to the objectives of this report, the author's experience includes extensive exploration and/or academic investigation of lode gold deposits in the NWT of Canada as well as exploration for epithermal gold deposits in Peru.

The author does not have a business relationship with St Elias Mines Ltd or any other company mentioned in this report, and does not have any financial interest, directly or indirectly, in the outcome of any transaction involving the property considered in this report other than the payment of professional fees for the work undertaken.

Dollar figures quoted in this report refer to U.S.A currency



Figure 1: Location of Jales/Gralheira Project in Northern Portugal

*[Handwritten signature]*

### 1.3 Sources of Information and Disclaimer

Conclusions and recommendations given in this report are based on review of the information listed in Section 13 (references) and on observations made during a visit to the project site. While it is believed that the reviewed information is accurate and complete, the author cannot guarantee that this is so, and does not assume responsibility for distribution of this report.

## 2: PROPERTY DESCRIPTION, OWNERSHIP AND LOCATION

### 2.1 Location and Ownership

*Kernow's property is located about 30 kilometers northeast of the city of Vila Real, and approximately 150 kilometers east of the International City of Porto. This property is comprised of 8.3 km<sup>2</sup> and is situated within the District of Vila Real, in the Province of Tras-Os-Montes, northern Portugal. The Property boundaries are defined by the following coordinates and are shown on Figure 2.*

*Jales-Gralheira Portion (8.3 km<sup>2</sup>)*

*Point Mercador(m) Perpendicular (m)*

*1 44,800 200,900*

*2 49,100 200,000*

*3 48,600 199,000*

*4 45,700 199,400*

*5 44,250 197,000*

*6 43,000 197,000*

*7 44,250 199,000*

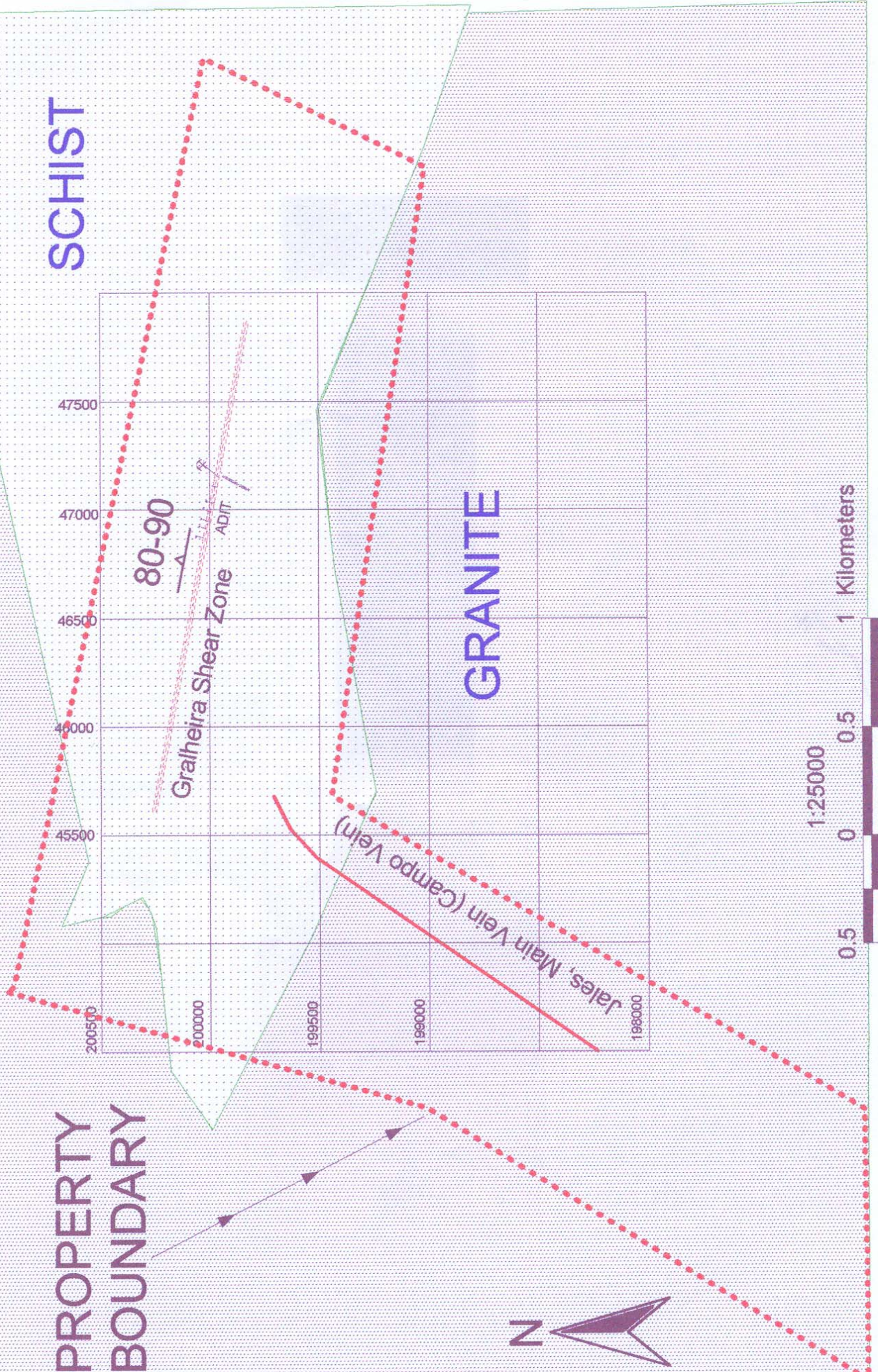
(note: the topographical datum used at the mine site, and in maps included in this report, is a rather obscure one known as the Heyford Gauss Datum).

*The property is owned 100% by Kernow Mining Portugal – Prospeccção Mineria, Sociedade Unipessoal Ltd., (certificate number 506150348, dated May 8, 2002) a wholly owned Portuguese subsidiary of Kernow Resources and Developments Ltd. The Property (Exploration License CC4-00 19-06-00) was acquired by Kernow by way of a Purchase Agreement on October 30, 2001 from Target Europe (Spain) S.A. de C.V., a wholly owned subsidiary of Target Europe Corp. for 800,000 Kernow shares and a further 750,000*

Figure 2

GENERALIZED GEOLOGY OF THE JALES/GRALHEIRA PROPERTY SHOWING PROPERTY BOUNDARIES

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*Kernow shares upon commercial production. The property was subject to the right of acquisition from Target Europe by Tellis Gold Mining Company. On November 8, 2002 this right was assigned to Kernow by Tellis through the repayment of Tellis' costs, estimated to be US\$30,729, via a promissory note bearing an interest rate of 3% per annum payable on or before December 31, 2003. This note can be converted to Kernow shares by the election of either party. In addition to the repayment of expenditures, Kernow was obligated to continue funding the on-going drilling expenses estimated to be US\$34,271 as of October 16, 2001.*

*On February 27, 2002 Kernow entered into a letter agreement with St Elias Mines Ltd. Whereby the Company granted St. Elias an option to earn a 51% interest in the Gralheira-Jales Property. St. Elias can earn this option in consideration of cash payments totaling Cdn \$50,000, and incurring exploration expenditures of not less than Cdn \$1,500,000 and issuing an aggregate of 500,000 shares over a three-year period. The minimum 1<sup>st</sup> year expenditure commitment (on or before June 30, 2003) is Cdn \$400,000 with Kernow as the operator of the project. In addition, St. Elias can elect to earn a further 24% in the Property in consideration of additional cash payments totaling Cdn \$100,000, and incurring additional exploration expenditures of not less than Cdn \$2,500,000 and issuing an additional aggregate of 1,000,000 shares over a three year period.*

*An annual exploration fee of approximately 6,000 Euros is payable to the government. Kernow has filed with the Government (IGM) an exploration program and budget comprised of 1,500 meters of drilling along with technical and logistical support totaling 180,000 Euros to be spent by June 30, 2003.*

## **2.2 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

*The main access is through a network of tarred roads northeast from Vila Real to the town of Jales (1/2 hour drive). Access to the Gralheira prospect is via tarred and graveled roads approximately 10 minutes north of Jales. Other portions of the Property are readily accessible via secondary roads that are linked to the tarred roads, and are suitable for two-wheel or four-wheel drive vehicles.*

*The Property is located in a plateau, in a geographical plateau region called the Tras-Os-Montes (behind the mountains). Until recently, this region was one of the more remote areas of Portugal primarily due to poor road conditions which were vastly improved over the last five years.*

*The area of the Property probably became a plateau in the Cenozoic, and is currently drained by tributaries of rivers, which originally drained the western edge of the Central Iberian Meseta, a plateau that forms much of the Iberian Peninsula. Granitic rocks underlie the Jales area, and drainage is generally to the northeast along NNE-SSW faults that are present in these rocks. Plateau elevations are approximately 800 meters above sea level at Jales. Some of the river valleys are incised down to 500 meters above sea level.*

*The climate in this region varies with elevation. Summer temperatures in the high plateau average around 25 °C, but at times reach over 30 °C. Winters on the plateaus are described as harsh with temperatures ranging between -4 °C and 6 °C. The annual rainfall in the area of the Property is more than 1,000 millimeters, falling mostly in the fall and winter months of September to March. Snow may remain on the summits of the highest areas for several weeks, mostly at elevations of over 900 meters.*

*The region is characterized by a patchwork of forests and agricultural lands. The farmers cultivate corn and rye in the arable land of the valleys, while orchards and olive groves occupy the lower slopes and spill over into terraces supported by granite stones as the hillsides grow steeper. Where the terrain can no longer support crops, the land is used for sheep and goat grazing. Forested areas are characterized by stands of oak and pine and appear to support a small logging industry. As a result of 60 years of mining and milling operations, the Jales Mine site contains about 1.0 million tonnes of tailings which are currently being re-contoured and lined by the government to prevent any further erosion.*

*Some mining infrastructure still remains in the town of Jales, but all required equipment and mining expertise and supplies are easily obtainable from Vila Real.*

### **3: HISTORY**

#### **3.1: Jales Mine**

The Jales Mine was first exploited by the Romans in the 1<sup>st</sup> and 2<sup>nd</sup> centuries A.D. to vertical depths of up to 120 meters below surface, but gold-production figures are lost in antiquity.

Jales was mined between 1933 and 1992 by Minas de Jales Lda to vertical depths ranging between 420-620 meters below surface. Reported production was more than 830,000 ounces of gold in ore averaging 12.9 g/t Au across a mining width of 1.0 meters. Although gold mineralization persisted at depth, it was not economical at the 1992 year-end price of \$332 per ounce. In 1994, Minas de Jales' contract of exploitation was rescinded by the State, and shortly thereafter Societe des Mines du Bourneix (Cogema) and Empresa de Desenvolvimento Miniero (EDM, representing the Portuguese government) formed a joint venture to further evaluate Jales. In a 1995 report on "Summary of Activities", the joint venture published the following "reserves" at Jales for the main (Campo) vein.

	Reserves ounces	kg	Grade g/t	ounces/t
Proven Reserves	13,499	434	11.0	0.32
Probable Reserves	23,794	765	10.8	0.31
Possible Reserves	58,318	1875	09.4	0.27
Total	95,610	3074	09.9	0.29

**(It is not clear how these reserves were calculated, nor if the reserve categories correspond to CIMM definitions in instrument 43-101)**

Work done by the joint venture in 1995 included detailed structural mapping, sampling, soil geochemistry, a VLF-EM survey, trenching and drilling of 15 holes totaling 1,440 meters. The following year, 25 holes totaling 3,170 meters were added to test various targets. After reviewing the results of the 40 holes, the joint venture decided to discontinue work at the Jales Mine and to focus on evaluating the Gralheira Deposit.

## **3.2: The Gralheira Deposit**

### **3.2.1 The Romans**

The Gralheira quartz veins form part of an extensive east-west trending structure that the Romans stoped out in shallow trenches almost continuously along a strike length of 1,300 meters in the 1<sup>st</sup> and 2<sup>nd</sup> centuries AD. Neither the grade nor tonnage of the material mined by the Romans is known. At the west end of the deposit, there are a series of sub parallel trenches across 50 meters (Figure 3), suggesting that there are stacked zones of mineralization in this area, which to date has been underexplored.

### **3.2.2 Minas de Jalles Ltda**

Between 1930-1932, the Gralheira structure immediately below the Roman workings was explored by Minas de Jalles Ltda with sampling, pitting and adits. The results of this work are not known.

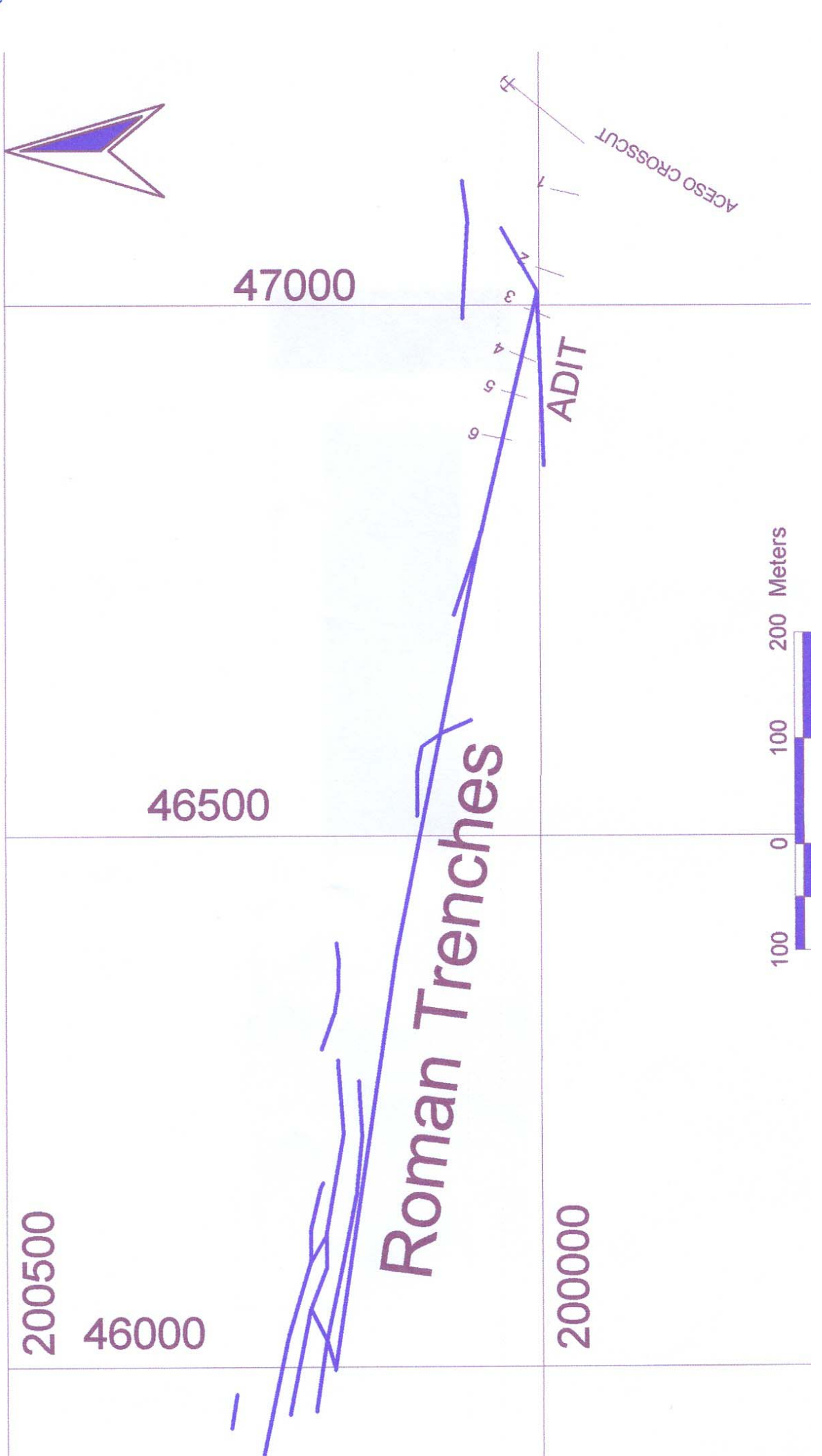
### **3.2.3 British Petroleum Minerals (BP)-Rio Tinto Zinc (RTZ)-BRGM**

Between 1985-1990, a major surface and underground exploration programme was conducted on the Gralheira Deposit by BP, and subsequently by an RTZ-BRGM joint venture .

Fifty drill holes totaling 7185 meters, the “J” series’ holes of Figure 4, were drilled to test the structure along a strike length of 1,200 meters and to depths generally 150 to 200 meters below surface. Forty-two of the holes penetrated mineralized veins in the Gralheira shear. Intercept details for select holes are given in the Howe Report.

An adit with cross-sectional dimensions of about 2.4 m by 2.4 m was drifted along a strike length of approximately 350 meters to evaluate a part of the structure identified in this report as the “Main Zone”. Six crosscuts extending for  $\pm 11$  meters into both the footwall and hanging wall were emplaced. The location of the adit, the crosscuts, and the access tunnel to the adit are shown in Figure 5. The portal was spotted on the slope of an incised creek valley, so the adit is on average about 100 meters vertically below Roman trenches on the higher plateau to the west. More than 350 samples were taken from underground workings, including 82 horizontal channel samples from drift faces at about 4.25-m intervals, 53 “vertical” channel samples from drift faces, 20 channel samples from a 24-m raise and about 200 samples from crosscuts, access tunnels, etc.

Figure 3: Roman trenches at Gralheira  
(underground crosscuts are also shown)



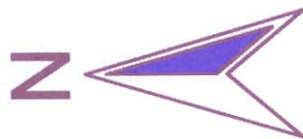
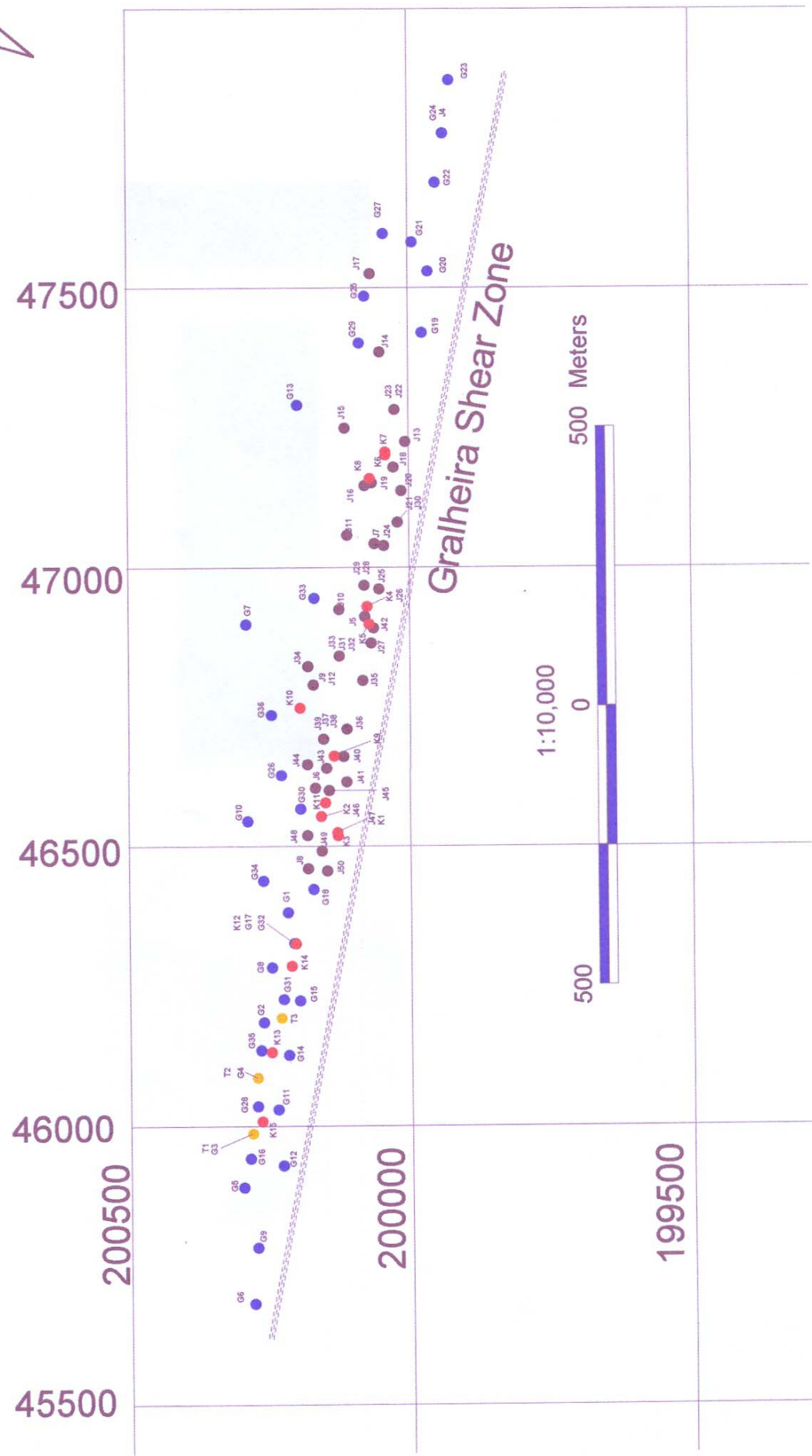


Figure 4: Diamond Drill Hole Plan and History

- drill holes
- 1 J series, 1985-1990
  - 2 GRA series 1994-1998
  - 3 T series (2002)
  - 4 KMP series, 2002-2003



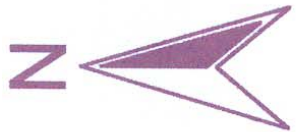
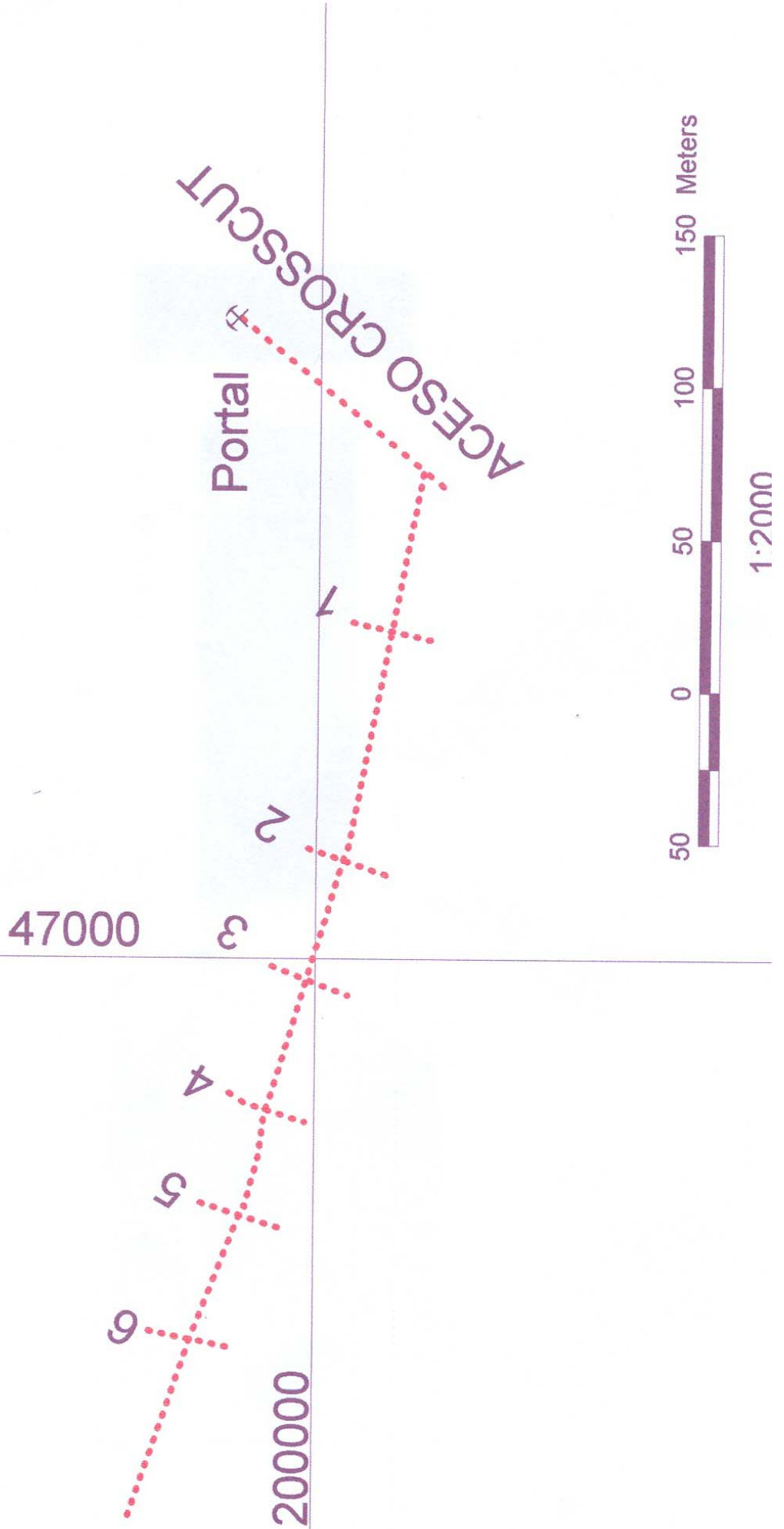


FIGURE 5  
DETAIL SHOWING LOCATION OF ADIT,  
CROSSCUTS AND PORTAL ON THE  
GRALHEIRA SHEAR SYSTEM.



The average (unweighted) gold grade of the horizontal face channels, discounting one extremely high assay of 143.0 g/t Au, is 6.24 g/t Au across an average true width of 1.91 meters. The average (unweighted) gold grade of the vertical face samples is 28.86 g/t Au (sample widths for the vertical face samples are not known). The weighted gold grade for samples from the raise is 12.63 g/t Au across an average width of 1.23 meters. (The significance of these results is discussed at length in a future section of this report.) The crosscut samples indicate that mineralization extends for some distance into the footwall and the hanging wall. For example, the weighted average of samples taken from crosscut 6 includes 3.2 g/t Au across 8.5 meters, which suggests that a bulk-mining scenario at Gralheira warrants consideration. (The significance of which will also be discussed in a future section of this report).

Preliminary metallurgical testing was done on two composite samples of drill core weighing about 50 kg each and with head grades of 7.55 g/t and 9.30 g/t Au. Flotation tests designed to replicate conditions of the Jales mill recovered 90% to 98% of the gold. Bottle roll tests to examine effectiveness of cyanidation recovered 69% to 87% of the gold after 48 hours with a grind of 73% finer than 80 microns. Details are included in the Howe Report. RTZ-BRGM withdrew from the project in 1990.

### 3.2.4 Societie des Mines du Bourneix (Cogema) and Empresa de Desenvolvimento Miniero (EDM)

The Cogema-EDM joint venture explored Gralheira between 1994 and 1998. Work done included geological mapping, trenching, soil geochemistry, geophysics, underground sampling, metallurgical test work, 7240 meters of drilling in 36 holes (GRA 1-36), and a preliminary feasibility study.

Drill holes are shown as G1 to G36 in Figure 4. All drill holes except for GRA 19 encountered intervals (often multiple intervals) with >1 g/t gold. The drilling extended the strike extent of Gralheira to 2,200 meters and tested parts of the deposit to depths of 300 meters below surface. Details for select holes are given in the Howe Report.

A total of 2406 soil samples were analyzed for Au, As, Cu, Zn and Pb. The soil survey shows that Gralheira corresponds to a gold-lead-arsenic anomaly that is 3.2 km long, suggesting that mineralization might continue for an additional 700 meters to the west and 300 meters to the east of the presently defined limits of the deposit (Figures 6, 7 and 8). Survey results also show that there is a broad area of anomalous Au-As-Pb between Gralheira and the north end of the Jales Deposit.

TABLE 1: SUMMARY STATISTICS, GRALHEIRA SOIL SURVEY

	<b>Au ppb</b>	<b>As ppm</b>	<b>Cu ppm</b>	<b>Pb ppm</b>	<b>Zn ppm</b>
<b>mean</b>	71	226	18	111	93
<b>maximum</b>	7760	4990	211	4466	484
<b>minimum</b>	<5	9	<1	14	13
<b>Standard dev'n</b>	257	289	14	163	44



# Figure 7

# Figure 8

Cogema-EDM resampled the adit faces (presumably the back or floor), obtaining results that are consistent with albeit slightly higher grade than results obtained by RTZ-BRGM, and calculated an uncut grade of 8.0 g/t Au (5.8 g/t when cut to 25 g/t) across 1.26 meters along a length of 349 meters (the length of the adit). In addition, the crosscuts were sampled to test bulk-tonnage potential of the deposit with results as shown in Table 2. The average grade of the crosscuts is 3.38 g/t Au across an average width of 7.21 meters.

A series of 8 bulk samples (AM 1 to AM 8) weighing between 170 and 500 kg were collected from the adit at intervals of approximately 50 meters. Assay results ranged from a low of 1.3 g/t Au to a maximum of 35.0 g/t Au. Metallurgical test work was done on two of the bulk samples, AM 1 (20 g/t Au) and AM 2 (35 g/t gold). Six flotation tests on the first sample yielded recoveries ranging from 98.7% to 99.1%; one test on the second yielded a recovery of 98.1%. Cyanidation tests done on the flotation concentrates yielded recoveries of 93.8% to 96.1%. A recovery rate of 92% was used for purposes of a prefeasibility study.

TABLE 2: RESULTS OF COGEMA-EDM CROSSCUT SAMPLING

<b>Crosscut</b>	<b>Grade (g/t Au)</b>	<b>Width</b>
1	3.84	8.05
2	2.26	7.35
3	1.69	8.58
4	3.23	5.00
5	3.02	4.60
6	2.87	10.06
Aceso	6.75	6.82

Various resource estimates calculated by Cogema-EDM as well as highlights of a prefeasibility study are reviewed in the Howe report. In conclusion, Cogema-EDM decided that Gralheira was not economic under conditions as of February, 1997 (gold price \$350). The prefeasibility study indicated that considering the disparity in grades based on the core drilling versus the underground sampling, additional bulk sampling was necessary to attempt to resolve this uncertainty. Cogema-EDM concluded that an increase of 30% in the grade (or, presumably in the price of gold) would significantly increase the economic viability of the project.

### **3.2.5 Target Europe Corp, Tellis Gold Mining Company, and Kernow**

Target Europe Corp acquired the Jales/Gralheira property in 1998 and optioned a right to property acquisition to Tellis Gold Mining Company in 2001. Kernow Resources and Development Ltd acquired the property from Tellis and Target in 2001. Work done by Kernow in 2001-2002 included limited underground sampling, testing the west end of the Gralheira Deposit in three drill holes totaling 585.2 meters (“T” holes of Figure 4), and engaging A.C. A. Howe International Limited to write an evaluation report summarizing the results of previous work.

## **4: REGIONAL GEOLOGICAL SETTING**

Refer to the Howe Report, which includes an excellent and detailed account of the regional geological setting. In summary, the Jales/Gralheira district is within the Central Iberian Zone of the Iberian Massif, which constitutes the westernmost exposure of the Variscan orogen. The Central Iberian Zone is interpreted to correspond to the moderately subsident stable platform of Gondwana during the Lower Paleozoic. Subsequently, the sediments of the stable platform were folded and intruded by Upper Paleozoic (Hercynian) granitoids during the Variscan Orogeny. Gold mineralization in the Jales/Gralheira District is spatially related to tension fractures developed in granite and shear zones developed in metasedimentary rocks during a late stage of the Variscan orogeny. Elsewhere in the Central Iberian Zone, the Hercynian granites are host to important deposits of tungsten and tin such as Panasqueira, Vale das Gatas and Boralha.

## **5: PROPERTY GEOLOGY**

### **5.1 General**

The property is underlain by Lower Paleozoic mica schist and siliceous mica schist intruded by Upper Paleozoic Hercynian (~300 Ma) granite. Jales is hosted mainly in the granite, whereas Gralheira is mainly within siliceous schist (Figure 2). Although treated as two separate deposits in most of the literature reviewed, there is ample evidence to suggest that Gralheira and Jales are two manifestations of the same mineralized system. This evidence includes:

1. They are in close spatial proximity. The north end of the Jales deposit is within 500 meters of the Gralheira Shear Zone.
2. Soil geochemistry indicates that there is a large gold-arsenic-lead anomaly in the mainly covered area between the north end of the Jales deposit and the Gralheira Shear Zone, suggesting that there is a physical connection between the two deposits.
3. Although the divergence between the overall strike directions of veins in the Jales Mine (040°) and the Gralheira shear zone (100°) is profound, the veins passing from granite to schist at the north end of the Jales Mine swerve abruptly toward the east. This suggests that rheological differences between the host rock at Jales (brittle, isotropic granite) and the host rock at Gralheira (ductile, anisotropic schist) are responsible for the dramatic shift in strike direction. Syn- to post-mineral fabric-parallel faulting, as is seen in the Gralheira adit, could explain why Gralheira extends further to the west than would be anticipated if the two mineralized zones were connected.
4. At both Jales and Gralheira, veins are narrow and gold mineralization is associated with anomalous concentrations of silver, arsenic and lead.

5. The age of mineralization in both deposits is clearly later than the intrusion of the granite. Mineralized quartz veins at Jales cut the granite. Mineralized quartz veins in mica schist at Gralheira cut and displace granite dikes.
6. Mining at Jales and drilling/underground work at Gralheira have demonstrated that both deposits consist of steeply plunging segments of higher-grade mineralization (>5.0 g/t Au), 50 to 200 meters long, separated by similar-sized segments of lower-grade material (1.0 to 5.0 g/t Au).
7. Despite the different host rocks (granite vs. schist), the alteration assemblage in both deposits is similar (quartz-sericite-adularia-chlorite-illite) (Rosa, 2000).
8. The ratio of gold, silver, copper, lead and zinc concentrations to mean crustal averages is identical for both deposits (Rosa, 2000)
9. Arsenopyrite geothermometry shows that the arsenopyrite formed at both deposits in the same temperature range, 290° to 430°C (Rosa, 2000).

Recognition of an affiliation between the two deposits is important in the following respect. If Jales has been profitably mined to a depth of 620 meters below surface, and if Jales and Gralheira are indeed linked as the above observations strongly suggest, then there is every reason to postulate that mineralization at Gralheira will extend at least to, and possibly beyond, this depth. At present, Gralheira has only been drilled to a depth of about 300 meters below surface.

## **5.2: Structure**

Early Variscan D1 isoclinal folding generated S1 schistosity trending approximately 120°/vertical. A later deformation event (D2) is indicated by a subhorizontal crenulating S2 fabric. During the Late Variscan, open D3 folds were formed with fabrics coaxial with S1. The D3 folds control the intrusion of the Jales granitic massif, which crops out within their cores. Reactivation of S1 during the Late Variscan (D3) resulted in formation of tension fractures hosting the Jales Deposit and shear zones hosting the Gralheira Deposit.

The granite hosting the Jales deposit is interpreted to belong to a syn- to late-tectonic suite responsible for metamorphosing the mica schists to andalusite-biotite grade. It is a medium- to coarse-grained two-mica granite with minor phases of fine-grained tourmaline-muscovite granite. It is equigranular to porphyritic, peraluminous, and contains quartz, microcline, plagioclase, biotite and minor muscovite as essential components. It is considered to be a reduced granite of the ilmenite series (Rosa, 2000). A weak S3 fabric is formed from oriented plagioclase and microcline phenocrysts.

### 5.3: Structural Control of Mineralization

The main productive veins at the Jales Mine, the Campo veins, dip subvertically and strike 30° to 70°. Contacts with the granite are sharp, and widths range from a few centimeters to two meters (average width 30 cm). The Campo veins are interpreted to have formed in tension fractures late during D3 deformation.

At Gralheira, mineralization occurs as subvertical to steeply north-dipping vein and veinlet swarms that generally strike about 120°, more or less concordant to S3 shear fabric. However, the enveloping surface of the deposit, as can be seen by the trend of the Roman trenches, is closer to 100° than 120°, so there is a slight discordance between S3 and the strike of the mineralized zone on the deposit scale. This discordance suggests that the veins were produced in a sinistral shear regime. The veins and vein swarms occur within a sheared interval 20 to 30 meters wide (Rosa, 2000), although the geometry of the Roman trenches at the west end of Gralheira and multiple intercepts in many drill holes suggest that the mineralized shear zone may be wider in places. The mineralized veins at Gralheira cut dikes related to the syn- to late-tectonic two-mica granite, and so mineralization clearly postdates intrusion.

### 5.4: Ore Mineralogy and Alteration

The main gangue mineral at Gralheira and Jales is quartz, which normally constitutes more than 90% of the vein volume. The quartz is mainly grey and has interlobate to amoeboid grain boundaries. Rosa (2000) has documented the following minerals associated with the gold-mineralized quartz veins.

major	Arsenopyrite-pyrite
minor	Galena-sphalerite-chalcopyrite-pyrrhotite-marcasite-gold-electrum-scheelite
trace	Loellingite-tetrahedrite-freibergite-magnetite-hematite-boulangerite-bismuth
rare	Owyheeite-wolframite-cassiterite
gangue	Quartz-adularia-muscovite-chlorite-calcite-siderite-tourmaline-apatite

The presence of appreciable sulphides in veins, particularly galena, is a good indicator that the veins will carry gold, as is the presence of late-stage fracture-controlled chlorite.

Alteration halos are narrow and confined to several centimeters of vein selvages or within fractures. Mica-feldspar alteration consists of pervasive replacement of early chlorite, biotite and plagioclase by muscovite and replacement of plagioclase by microcline. Muscovite also occurs in selvages along mineralized veins. Late-stage chlorite alteration consists of fracture-controlled chlorite that selectively replaces primary and secondary muscovite and also occurs as spherical aggregates replacing sulphides. A very late-stage clay-carbonate alteration is weakly developed and consists of illite, calcite and siderite along small fractures. At Gralheira, illite preferentially replaces andalusite and biotite.

## **5.5: Distribution of Gold in Veins**

Mining at Jales and exploration at Gralheira have shown that in both deposits there are vertically plunging shoots of higher-grade material (>5.0 g/t Au) extending for strike lengths of 50-200 meters separated by intervals of lower-grade material (1-5 g/t) extending also for strike lengths of 50-200 meters. The higher-grade shoots appear to be much longer in the down-plunge direction than in the strike direction (refer to figures 12 and 14 of the Howe Report),

## **5.6: Exploration Potential, Gralheira Deposit.**

Based on drilling, trenching and mapping, it can be confidently stated that the strike length of mineralization in the Gralheira Shear System is at least two kilometers. Based on drilling the mineralized system extends to at least 300 meters below surface, but based on comparison with the neighbouring Jales Deposit, mineralization can be reasonably expected to extend to a depth of at least 600 meters below surface. However, the width of the system is more difficult to report; not because of lack of information, but because it strongly depends on the current price of gold and the economic model selected by the geologist reporting the width. Gralheira is not a single vein, rather it is an anastomosing network of bifurcating, discontinuous pinch-swell veinlets that individually are seldom wider than 30 centimeters and usually a lot narrower. The “Main Zone”-that part of the Gralheira system explored by the adit represents a part of the system where the overall concentration of quartz veinlets is relatively high, perhaps averaging 10% across about 2.0 meters. Yet, in the crosscuts, it can be seen that quartz veining extends across a true width of up to 20 meters, albeit at a much diminished concentration. This is also reflected in multiple intercepts (>1.0 g/t Au) obtained in most of the drill holes.

Consider the results of BRGM-RTZ face channel-sampling in Crosscut 6, reproduced in Figure 9. The “Main Zone” gave 6.94 g/t Au across 1.2 meters. However, 5 of 7 channel samples of 1.2 meters each in the footwall assayed better than 1.69 g/t Au (maximum 7.57 g/t gold). And three of 6 channel samples in the hangingwall assayed in the 1- to 2-gram range. Depending on the bias of the reporting person, the indicated grade could be reported in any one of the following ways.

Case 1: Two distinct zones separated by 5.5 meters, one carrying 6.94 g/t Au across 1.2m and the other carrying 7.57 g/t Au across 1.2 meters

Case 2: One continuous zone (encompassing the two higher-grade samples and the material in between) carrying 3.2 g/t Au across 8.5 meters.. (Cogema-EDM calculated a grade of 3.84 g/t across this same interval).

Case 3: One continuous zone (encompassing most of the footwall, the “Main Zone”, and the first sample of the hangingwall ) carrying 2.83 g/t Au across 12.4 meters.

Case 4: One continuous zone extending across most of the cross cut and including all assays greater than 1.0 g/t, yielding 1.51 g/t Au across 19.9 meters.

# Figure 9

In case 1, the project would be evaluated in the context of a medium-grade low-tonnage scenario. In cases 2 and 3, the possibility of a lot more ounces and a bulk-tonnage scenario could be envisioned. In case 4, open-pit mining of the upper part of the deposit could be feasible. For the sake of argument, consider the possible grade/tonnage scenarios if the grades/widths in the above cases are extended for the entire defined length of the deposit (2 km) and to a depth of 600 meters (Table 3).

TABLE 3: SPECULATIVE POTENTIAL OF THE GRALHEIRA DEPOSIT

Case	Tonnage	ounces	Grade g/t Au
1 (“Main Zone” only)	3.9 million	0.9 million	6.94
2	27.5 million	2.8 million	3.20
3	40.2 million	3.7 million	2.83
4	64.5 million	3.1 million	1.51

**These numbers are not intended to be taken as a resource estimate for Gralheira, but are merely intended to illustrate how differing width/grade suppositions can affect the economy of a deposit.**

Considering case 2 versus case 1, calculations suggest that gold production might be tripled while the grade of mineralization is reduced by only 50%, but the mill would have to process seven times more material. Yet, there are economies of scale to be considered, which this author appreciates from general experience but is not qualified to evaluate. The involved companies should secure the services of an experienced mining geologist to assess the economic viability of bulk-tonnage mining.

## 6: DEPOSIT TYPE

Evidence suggests that gold mineralization at Jales/Gralheira belongs to the “intrinsic intrusion-related” type as defined and described by Newberry et al (1995), McCoy et al (1997), Thompson et al (1999), Lang et al (2000) and Thompson and Newberry (2000). “Intrinsic” implies that gold mineralization is attributed exclusively to magmatic fluids (rather than metamorphic or mixed) related to granitic intrusion.

Although this deposit type reveals a wide variety of mineralization styles depending on formation depth, distance to intrusion, and structural controls, features common to Jales/Gralheira and the model are as follows:

- 1: association with tin-tungsten-bearing intrusions.
- 2 association with reduced granites of the ilmenite series.
- 3: metal associations of As, Bi and Sb
- 4: mineral assemblages of low oxygen and sulfur fugacity (loellingite, pyrrhotite and bismuth).
- 5: sulfur isotopes suggest that the hydrothermal fluids that mineralized Jales and Gralheira was magmatic (Rosa, 2000).

Other gold deposits considered by many to be of the intrinsic, intrusion-related type include the Fort Knox and Pogo deposits in Alaska, the Dublin Gulch deposit in the Yukon, Mokrsko in the Czech Republic, Kidston in Australia, the Salave deposit in Spain and possibly the Murantau deposit in Kazakstan. Rosa (2000) presents a grade-tonnage chart for 22 deposits considered to be of the intrusion-related type. Most of the deposits cluster in the 10 to 100 million-tonne range grading 0.80 to 8.0 g/t Au. (260,000 to 5,000,000 ounces gold).

Nonetheless, Gralheira and Jales also share some characteristics with Archean lode-gold deposits, including similar alteration and the tendency for gold to concentrate in high-grade vertically plunging shoots that are much longer in the vertical plane than the horizontal plane.

## 7: 2002-2003 DRILLING PROGRAM, GRALHEIRA

### 7.1: General

Fifteen diamond-drill holes, KMP 1 through 15 (shown as K1 through K15 on Figure 4) totaling 2102.5 meters have been drilled on the Gralheira Deposit since the Howe Report was written, bringing the total drilling to 16,477 meters in 101 holes. The KMP series are NQ-diameter (6.99 cm) infill holes drilled along a 1.2-km strike length to probe the mineralized system at depths of 50 to 130 meters below surface, although KMP 10 was a deeper hole that intersected the mineralized zone 200 meters below surface. K6, K7 and K8 also probe deeper parts of the system since they are in a valley 70 to 100 meters below the plateau where the other holes were spotted. Drilling was done between October 25, 2002 and March 18, 2003.

Table 4 lists orientation data for the holes as well as all intercepts with assays >0.5 g/t gold equivalent (silver assay was multiplied by 6/400, [price of silver divided by price of gold] and added to gold assay to give gold equivalent assay). Table 1 does not include true widths; to estimate true widths the stated widths should be multiplied by a factor of about 0.7 for the shallower holes (45°) and about 0.35 for the steeper holes (70°). All of the holes hit multiple intercepts of >1.0 g/t Au equivalent (maximum 29.97 g/t), and the program is deemed to have succeeded in demonstrating the continuity of the mineralized zone at shallow depths. Many of the multiple intercepts cluster in core segments measuring 20 to 30 meters, corresponding to a true width of approximately 14 to 21 meters, which is about the width of the veined shear zone in underground crosscuts. Many of the holes also cut narrow mineralized zones in the hanging wall 30 to 70 meters north of the “Main Zone”. Hole KMP 3 appears to have intersected a zone of multiple veins in the footwall. Drill hole sections and a drill hole plan are presented in Appendix 1.

TABLE 4: MINERALIZED INTERVALS AND ORIENTATION, DDHs KMP1-15

HOLE	FROM	TO	INTERVAL	Au EQUIV	EASTING	NORTHING	ELEV'N	AV_AZIM	AV_DIP	LENGTH
KMP1					46527.00	200129.00	796.50	198.50	71.00	81.85
	30.20	34.60	4.40	7.13						
	69.60	72.00	2.40	4.17						
	79.50	81.50	2.00	1.25						

HOLE	FROM	TO	INTERVAL	Au EQUIV	EASTING	NORTHING	ELEV'N	AV_AZIM	AV_DIP	LENGTH
KMP2					46555.00	200157.00	796.00	193.50	67.00	135.40
	54.70	55.60	0.90	2.43						
	105.45	105.95	0.50	12.06						
	119.65	129.80	10.15	1.43						
	121.95	122.90	0.95	3.05						
	125.10	126.95	1.85	3.28						
	129.00	129.80	0.80	4.10						
KMP3					46521.00	200128.00	786.70	199.00	63.50	154.45
	79.00	79.80	0.80	4.22						
	91.95	92.20	0.25	1.01						
	114.60	115.20	0.60	14.75						
	120.65	120.95	0.30	12.80						
	128.95	129.45	0.50	10.53						
	135.00	135.95	0.95	6.68						
	149.05	149.25	0.20	3.09						
KMP4					46931.00	200074.00	780.00	202.50	66.50	160.70
	19.85	21.05	1.20	1.68						
	102.00	104.60	2.60	4.77						
	109.16	110.40	1.24	1.04						
	117.25	118.00	0.75	0.87						
	123.90	124.70	0.80	7.53						
	145.00	146.00	1.00	0.81						
KMP5					46900.00	200070.00	788.50	195.00	58.00	80.00
	63.20	66.65	3.45	7.49						
	68.95	69.55	0.60	1.05						
	71.20	72.15	0.95	1.91						
	77.85	78.80	0.95	2.18						
KMP6					47202.00	200040.00	695.00	206.50	48.00	106.50
	83.00	84.50	1.50	1.90						
	88.47	89.20	0.73	2.70						
	91.25	94.05	2.80	1.36						
	96.95	97.30	0.35	29.97						
	101.78	102.55	0.77	0.68						
KMP7					47207.00	200040.00	695.00	207.00	65.50	163.50
	65.95	66.41	0.46	3.99						
	121.55	122.00	0.45	6.62						
	140.00	140.70	0.70	11.34						
	141.80	142.45	0.65	1.00						
KMP8					47160.00	200068.00	715.00	202.50	54.00	145.00
	16.30	17.00	0.70	6.25						
	18.65	19.45	0.80	1.10						
	113.55	114.60	1.05	0.82						
	115.60	116.35	0.75	1.68						
	124.12	128.20	4.08	2.78						
	129.48	130.38	0.90	1.09						
	132.25	133.20	0.95	3.30						

HOLE	FROM	TO	INTERVAL	Au EQUIV	EASTING	NORTHING	ELEV'N	AV_AZIM	AV_DIP	LENGTH
KMP9					46664.00	200134.00	808.00	200.50	68.00	150.00
	74.00	74.85	0.85	0.83						
	97.50	98.00	0.50	10.67						
	101.55	102.35	0.80	1.43						
	113.00	114.00	1.00	0.68						
	136.40	137.40	1.00	0.81						
KMP10					46750.00	200194.00	790.00	195.00	66.50	233.00
	75.90	76.90	1.00	0.58						
	77.90	78.85	0.95	0.70						
	90.20	91.25	1.05	0.52						
	203.85	204.85	1.00	1.72						
	207.75	212.25	4.50	2.57						
	215.40	217.30	1.90	11.01						
KMP11					46580.00	200150.00	799.00	190.00	49.50	106.70
	66.80	67.75	0.95	2.72						
	79.25	80.25	1.00	2.74						
	83.98	84.93	0.95	12.26						
	87.90	89.80	1.90	1.10						
	93.10	94.10	1.00	0.55						
	100.40	101.30	0.90	1.45						
KMP12					46328.00	200204.00	761.00	215.00	53.00	157.10
	19.00	19.90	0.90	3.64						
	25.20	26.00	0.80	0.78						
	31.44	32.44	1.00	1.09						
	33.10	34.15	1.05	2.28						
	79.00	80.00	1.00	7.02						
	82.00	83.00	1.00	1.16						
	103.10	108.00	4.90	1.28						
	125.90	126.70	0.80	2.70						
146.90	147.80	0.90	1.48							
KMP13					46134.00	200248.00	797.00	192.50	49.00	145.20
	78.30	85.20	6.90	3.30						
	91.80	92.80	1.00	3.47						
	121.90	126.50	4.60	3.46						
	128.90	129.90	1.00	1.38						
	134.90	135.95	1.05	1.59						
KMP14					46288.00	200212.00	782.00	191.50	57.00	141.30
	84.40	85.40	1.00	5.62						
	86.60	87.30	0.70	0.65						
	100.50	101.50	1.00	2.50						
	107.50	108.40	0.90	4.17						
	110.30	111.25	0.95	1.82						
	123.65	127.05	3.40	1.78						
KMP15					46010.00	200266.00	806.00	193.50	48.00	141.80
	22.25	23.15	0.90	0.77						
	49.60	50.15	0.55	2.50						

HOLE	FROM	TO	INTERVAL	Au EQUIV	EASTING	NORTHING	ELEV'N	AV_AZIM	AV_DIP	LENGTH
KMP15	81.80	83.24	1.44	24.66						
	97.17	97.77	0.60	9.95						
	124.50	125.41	0.91	2.64						
	132.10	133.30	1.20	9.03						

A total of 474 intervals (20 to 47 intervals per hole) were analyzed for gold, silver and sometimes other elements (As, Pb, Cu, Zn). The average length of sample intervals was 89 centimeters. This corresponds to a cross-structure width (true width) of about 60 centimeters. Since the largest veins at Gralheira are only 30 cm wide, and most are much narrower, the veins in these intervals are highly diluted by country rock. As is explained in a future section, this could cause problems securing a representative split in the lab, resulting in understated gold assays and high variance in check samples. Drill logs for the KMP series' holes are presented in Appendix 2.

## 7.2: Sample Preparation, Analysis and Security

Core was recovered from the holes by standard wire-line techniques and placed in core boxes. The core was transported from the drill site to a field office and core-storage facility where it was logged and sampled. The sampling assistant used a diamond saw to cut the core; half was sent for assay and half was retained for future use. The remaining core was stored in the core-storage area, which is secured by locks and an iron door. Samples were weighed, placed in plastic-weave rice sacks and sealed. They were then transported to the airport in Porto where they were shipped by airfreight to Canada.

Samples were shipped to ALS Chemex labs in Vancouver and also to SGS/ XRAL Labs in Toronto, both of which are ISO9002-certified companies..

A review of previous operators' assaying methodologies and observation of the mineralization encountered in the holes indicated that on occasion free gold could be expected to be present in the main structures. In addition native silver can also be identified. In those intersections where significant sulphides were observed, both in the predicted main structure and in foot-wall and hanging-wall structures, the samples were assayed by 1,000-gram screen fire assay at ALS Chemex, duplicate assays are completed on the undersize and assay on entire oversize fraction. Samples shipped to SGS/XRAL from the structures as noted above were assayed by Code FASMET whereby a 250 g split is screened at 150 mesh. The entire oversize is assayed by fire assay and an assay done on a 30-gm split of the fines. Also a note was made of the sulphide content of the sample and where in excess of 10% sulphides a request was made to the assayer to ensure the correct flux was used to assay the samples. When sulphides were present in significant quantities ICP analysis were done for arsenic, lead, silver and zinc. Table 5 lists the number of samples taken from each drill hole as well as the name of the laboratory used and the analytical method employed.

Drilling and sampling of the KMP series' holes was carried out under the direct supervision of Mr. Alan Matthews, president of Kernow Resources and Developments Ltd. Based on an inspection of the core, the consistency of assay results with previous campaigns of drilling, and the quality control/quality assurance procedures detailed herein, this author has no reason to doubt the integrity of the information generated in this latest campaign of drilling.

TABLE 5: ANALYTICAL METHOD AND LAB

Hole #	Number of samples	Number assayed by FA	Number screened	Re assay/comment
KMP 001	22	15	6	XRAL
KMP 002	34	28	6	ALS
KMP 003	34	26	6	ALS
KMP 004	30	24	5	ALS
KMP 005	25	19	5	ALS
KMP 006	20	15	5	ALS
KMP 007	21	15	5	ALS
KMP 008	28	22	6	XRAL
KMP 009	47	41	2	XRAL
KMP 010	39	31	5	XRAL
KMP 011	27	24	2	XRAL
KMP 012	41	29	8	XRAL
KMP 013	37	20	5	XRAL
KMP 014	41	20	4	XRAL
KMP 015	28	17	4	XRAL
Totals	474	346	74	

Number assayed by FA 346 number assayed by Screen 74

### 7.3: Check sampling programme

The problem of securing reliable assays from Gralheira-style mineralization is illustrated by the results of check-sample analyses shown in Table 6 below. The original assays were done mainly by ALS/Chemex Laboratory and by Xral Laboratory on half-core splits. The check samples were assayed by OMAC Laboratory on quarter-core splits. All of the laboratories involved are ISO9002 certified. A total of 15 samples were checked, one for each hole, but only the nine samples that originally or subsequently assayed  $\geq 1.5$  g/t gold are included in the table (variances from consistently low-grade samples tend to be exaggerated and are not crucial to the economic evaluation of a deposit). Of the nine samples, only three show acceptably consistent results between the original assay and the check assay. Table 7 shows original and check assay results from two quarter-core samples sent to Xral Laboratories. Again, original results are far from duplicated. Of particular concern in these two tables is the fact that four check-sample assays converted waste-grade rock ( $\ll 1$ g/t) to a grade that might be considered economically important in a bulk-tonnage mining scenario.

TABLE 6: OMAC QUARTER-CORE CHECK ASSAYS

Sample number	Interval length m	original assay ppm Au	Check assay ppm Au	%difference from original
KMP013R	0.55	8.57	4.73	-44.8
KMP038R	0.85	5.11	5.18	1.4
KMP054R	0.30	12.8	12.11	-5.4
KMP070R	0.80	6.05	4.8	-20.7
KMP091R	0.90	0.45	1.97	337.8
KMP134R	0.45	6.28	11.63	85.2
KMP165R	0.95	2.62	2.9	10.7
KMP260R	1.00	0.61	2.13	249.2
KMP427R	0.65	3.3	5.09	54.2

TABLE 7: XRAL QUARTER-CORE CHECK ASSAYS

Sample number	Interval length m	original assay ppm Au	check assay ppm Au	%difference from original
KMP 116	0.90	0.05	1.81	3520.0
KMP 261	1.00	0.87	1.5	72.4

In addition to quarter-core check sampling, routine check assays were also done on rejects and pulps as is detailed in Table 8.

TABLE 8: CHECK ASSAY PROGRAM , KMP DRILLING

Hole	Sample	Au g/t Orig.	Au g/t Pulp	Au g/t Pulp	Au g/t Reject	Au g/t Reject Lab check	Au g/t Reject Lab rerun	Au g/t request on reject
1	013	8.57						
1	018	0.02			0.013			
1	019	0.15			0.31			
2	020	2.43	2.23		1.37	1.37		
2	022	0.41	0.48		2.92	0.86		
2	024	0.02			0.016			
2	025	0.02			0.029			
2	026	0.41			0.295			
2	027	<0.01			<0.005			
2	035	3.03	3.09		2.95			
2	037	0.01			0.009			
2	038	5.11	5.14	5.49	6.16	5.84		
2	039	1.65	1.88	2.12	2.85			
2	040	<0.01			<0.005			
2	041	<0.01			<0.005			
2	042	4.01	4.23		4.32			

Hole	Sample	Au g/t Orig.	Au g/t Pulp	Au g/t Pulp	Au g/t Reject	Au g/t Reject check	Au g/t Reject Lab rerun	Au g/t request reject
3	043	<0.05			0.036			
3	054	12.8						
3	057	<0.05	0.08					
4	068	4.9	4.81					
4	070	5.4	5.31	5.09	6.73			
5	091	0.45						
5	092	1.05	1.04	1.09	0.85	0.88		
5	107	2.83	2.39	2.35	3.63			
6	123	1.46						
7	134	6.28						
8	165	2.62						
9	227	0.03						
10	246	<0.03						0.54
10	250	0.17						0.10
10	260	0.61						
10	261	0.87			1.5			1.18
10	264	9.310	9.92					14.9
11	266	1.58 1.79					2.52	
11	267	0.73						
11	274	8.89					11.5	
12	293	>2		0.40 9		3.09		
12	294	0.104	0.17			0.05		
12	297	1.070	1.13			0.87		
12	299	>2				2.14		
12	294	0.05						0.15
12	311	0.6				0.71	0.74	
12	314	1.1				1.03	1.1	
12	319	>2			1.98	2.45	1.95	
12	321	1.67				1.57	1.61	
12	327	>2				2.73	2.61	
13	359	1.43						
14	380	1.01						2.42
14	384	2.87						3.92
14	387	1.66						
15	427	3.3						
6	464 116	<0.05						
10	465 261	0.87						
7	448	0.010	0.02					

It is the opinion of the author that the sampling, check sampling, preparation, security and analytical procedures were adequately executed in this drill program.

## 8: DATA VERIFICATION

The author visited the site for three days between Jan 8 and Jan 10, 2004. Core from the KMP holes was inspected and long segments of quarter-core from two holes were collected for laboratory analysis. The better part of one day was spent examining exposures in the adit and verifying evidence of previous sampling. One sample was collected of a 25-cm-wide vein. One full day was spent verifying the extent of the Roman trenches and making structural observations.

TABLE 9: SAMPLES COLLECTED BY AUTHOR

sample	hole	from	to	length	Orig assay	Check assay
K15q	K 15	124.5m	133.3m	8.8m	2.64 g/t Au/0.91m 9.03 g/t Au/1.2m	0.8 g/t
K10q	K 10	207.75m	215.4m	7.65m	2.57 g/t Au/4.5m	1.42 g/t
ZV 2290	UG			0.25m	Face 3.6 g/t Au/1.2m	7.8 g/t (consistent)

Long samples K15q and K10q are both quarter-core intervals that include unsplit core as well as intervals that were sampled with results as summarized in Table 9. The purpose of the sampling was not only to verify the original assays, but to test for gold in the unsampled portion. Samples were shipped to OMAC Laboratories Ltd in Ireland with instructions to crush, mill and homogenize, and to select three 1000-gm subsamples of each interval for coarse-metallic analysis. The original assays for intervals sampled in hole K15 can be diluted to a weighted average of 1.5 g/t gold across 8.8m. This is reasonably consistent with the assay result for K15q, suggesting that there is little gold in the intervals that were not sampled. The original assay for the interval in hole K10, diluted across 7.65 m, is also 1.5 g/t Au. This is consistent with the assay result for K10q, suggesting again that there is little gold in the intervals that were not sampled. Assay results from the quartz vein is reasonably consistent with assay results from the nearest face sample.

## 9: METALLURGICAL TESTWORK

Previous metallurgical test work by RTZ-BRGM and Cogema-EDM was reported in section 3 (History). In summary, gold at Gralheira is free milling and at least 92% can be extracted using standard flotation techniques.

## 10: INDICATED RESOURCE

### 10.1 Introduction

At the Gralheira Deposit, despite a wealth of drill-hole data and for reasons that will be explained shortly, it is the opinion of this author that indicated resource can be calculated exclusively for that 350-m-long portion of the deposit that was drifted in the adit. **(The calculations that follow are only from the adit portion of the overall Gralheira Shear Zone, and they do not necessarily reflect the global potential (>one million ounces) previously or subsequently suggested for the deposit.**

This can be done in two separate calculations, one using the assay data from the faces that were channel sampled at about 3-to 5-meter intervals as the adit was being advanced, and another using assay data from 8 bulk samples collected from the adit at  $\pm 50$ -m intervals.

### 10.2 Indicated Resource from Face Samples

A total of 82 face channel-samples were collected by RTZ-BRGM during advance of the adit (Figure 10, Table 10). **It is not known precisely how these samples were collected or analyzed, but considering that the work was done by senior mining companies, it is reasonable to assume that “best-practices” standards were used.** The average sample width was 1.91 meters, but in order to compare these data with the bulk samples, widths have been cut to 1.5 meters. Silver was converted to “equivalent gold” by multiplying the silver assay by 6/400 (the current price of silver divided by the current price of gold) and adding the resulting figure to the gold assay for each interval. The distance between faces was taken as the strike-length of each block, and the depth as 50 meters (25 meters above and 25 meters below the adit). A specific gravity of 2.7 g/cc was used to calculate tonnages. The final figure is for a block measuring 348 m long (the length of the adit) by 1.5 meters wide by 50 meters deep. Using these parameters, the face-sample assays indicate a resource of 70,453.8 tonnes grading 5.80 g/t Au (6.12 g/t Au equivalent when silver is factored in) and containing 431,129.18 grams (13,861.3 ounces) of gold. A spreadsheet showing the raw data and calculations is presented in Table 10.

# Figure 10

TABLE 10: CALCULATION OF INDICATED RESOURCE FROM FACE SAMPLES

face	Au g/t	Ag g/t	width m	length m	Au g/t equiv	Au g/t diluted	Ag g/t diluted	Au g/t equiv diluted	Au gms	Au equiv gms	Tonnes in block
4A	4.09	10.95	2.52	5.90	4.25	4.09	10.95	4.25	4886.53	5082.77	1194.75
4	5.08	15.80	2.14	5.90	5.32	5.08	15.80	5.32	6069.33	6352.49	1194.75
1	143.00	78.20	2.00	4.20	144.17	143.00	78.20	144.17	121621.50	122619.14	850.5
2	8.80	52.50	2.05	3.86	9.59	8.80	52.50	9.59	6878.52	7494.07	781.65
3	10.85	54.50	1.94	3.87	11.67	10.85	54.50	11.67	8502.87	9143.53	783.675
5	6.48	30.33	2.30	3.87	6.93	6.48	30.33	6.93	5078.21	5434.75	783.675
6	7.57	55.20	2.71	3.79	8.40	7.57	55.20	8.40	5809.79	6445.26	767.475
7	7.02	20.40	2.00	4.06	7.33	7.02	20.40	7.33	5771.49	6023.07	822.15
8	2.70	7.83	2.30	3.99	2.82	2.70	7.83	2.82	2181.53	2276.43	807.975
9	5.81	20.79	2.46	3.79	6.12	5.81	20.79	6.12	4459.03	4698.37	767.475
10	3.06	16.47	2.48	3.90	3.31	3.06	16.47	3.31	2416.64	2611.74	789.75
11	2.34	22.78	2.60	3.80	2.68	2.34	22.78	2.68	1800.63	2063.57	769.5
12	1.98	16.36	2.46	3.83	2.23	1.98	16.36	2.23	1535.64	1725.96	775.575
13	1.70	12.05	2.31	3.90	1.88	1.70	12.05	1.88	1342.58	1485.32	789.75
14	2.57	18.07	2.23	3.84	2.84	2.57	18.07	2.84	1998.43	2209.20	777.6
15	2.93	14.27	2.06	3.86	3.14	2.93	14.27	3.14	2290.23	2457.55	781.65
16	0.85	11.33	2.20	3.81	1.02	0.85	11.33	1.02	655.80	786.92	771.525
17	1.44	3.52	2.43	3.78	1.49	1.44	3.52	1.49	1102.25	1142.66	765.45
18	0.82	1.95	2.54	3.89	0.85	0.82	1.95	0.85	645.93	668.98	787.725
19	0.97	4.99	2.66	3.83	1.04	0.97	4.99	1.04	752.31	810.36	775.575
20	1.89	33.85	2.50	3.81	2.40	1.89	33.85	2.40	1458.18	1849.92	771.525
21	1.59	41.31	2.46	3.75	2.21	1.59	41.31	2.21	1207.41	1677.95	759.375
22	3.39	28.46	2.68	3.75	3.82	3.39	28.46	3.82	2574.28	2898.46	759.375
23	2.07	11.03	2.57	3.64	2.24	2.07	11.03	2.24	1525.80	1647.75	737.1
24	2.86	16.58	1.94	4.12	3.11	2.86	16.58	3.11	2386.10	2593.59	834.3
25	2.82	4.95	1.91	4.74	2.89	2.82	4.95	2.89	2706.78	2778.05	959.85
26	2.08	10.44	2.34	4.63	2.24	2.08	10.44	2.24	1950.16	2096.98	937.575
27	1.42	9.50	1.83	3.69	1.56	1.42	9.50	1.56	1061.06	1167.54	747.225
28	17.22	34.95	1.71	3.10	17.74	17.22	34.95	17.74	10809.86	11138.95	627.75
29	2.64	17.94	1.52	3.78	2.91	2.64	17.94	2.91	2020.79	2226.77	765.45
30	2.24	6.20	1.41	3.51	2.33	2.11	5.83	2.19	1496.61	1558.74	710.775
31	5.43	23.69	1.53	4.30	5.79	5.43	23.69	5.79	4728.17	5037.59	870.75
32	3.07	2.70	1.46	5.13	3.11	2.99	2.63	3.03	3104.15	3145.10	1038.825
33	3.61	4.00	1.30	4.44	3.67	3.13	3.47	3.18	2812.98	2859.74	899.1
34	1.49	2.51	1.20	4.82	1.53	1.19	2.01	1.22	1163.45	1192.85	976.05
35	5.87	13.51	1.20	4.81	6.07	4.70	10.81	4.86	4574.02	4731.93	974.025
36	0.96	3.54	1.20	4.45	1.01	0.77	2.83	0.81	692.06	730.34	901.125
37	1.15	2.00	1.49	4.59	1.18	1.14	1.99	1.17	1061.77	1089.47	929.475
38	3.24	5.99	2.14	4.35	3.33	3.24	5.99	3.33	2854.04	2933.18	880.875
39	1.20	29.16	2.20	3.72	1.64	1.20	42.77	1.84	903.96	1387.22	753.3
40	0.80	2.97	1.20	4.30	0.84	0.64	2.38	0.68	557.28	588.31	870.75
41	1.79	8.47	1.20	4.15	1.92	1.43	6.78	1.53	1203.42	1288.83	840.375
42	0.72	5.15	1.59	3.73	0.80	0.72	5.15	0.80	543.83	602.18	755.325
43	1.70	11.10	1.20	4.56	1.87	1.36	8.88	1.49	1255.82	1378.82	923.4

face	Au g/t	Ag g/t	width m	length m	Au g/t equiv	Au g/t diluted	Ag g/t diluted	Au g/t equiv diluted	Au gms	Au equiv gms	Tonnes in block
44	2.46	29.95	2.13	4.52	2.91	2.46	29.95	2.91	2251.64	2662.84	915.3
45	2.75	10.65	1.61	4.28	2.91	2.75	10.65	2.91	2383.43	2521.88	866.7
46	2.54	11.17	2.65	4.37	2.71	2.54	11.17	2.71	2247.71	2395.98	884.925
47	2.96	19.61	2.94	5.09	3.25	2.96	19.61	3.25	3050.95	3354.13	1030.725
48	2.09	18.87	1.58	4.61	2.37	2.09	18.87	2.37	1951.07	2215.30	933.525
49	1.42	5.60	2.38	3.57	1.50	1.42	5.60	1.50	1026.55	1087.28	722.925
50	4.01	4.20	1.58	4.29	4.07	4.01	4.20	4.07	3483.59	3538.32	868.725
51	0.63	10.75	1.27	4.60	0.79	0.53	9.10	0.67	496.86	624.04	931.5
52	18.14	23.52	1.20	4.06	18.49	14.51	18.82	14.79	11931.04	12163.08	822.15
53	3.28	11.86	2.11	4.16	3.46	3.28	11.86	3.46	2763.07	2912.93	842.4
54	4.92	29.31	2.25	4.15	5.36	4.92	29.31	5.36	4134.65	4504.12	840.375
55	5.82	40.41	2.14	3.97	6.43	5.82	40.41	6.43	4678.84	5166.14	803.925
56	7.49	12.41	2.40	4.71	7.68	7.49	12.41	7.68	7143.77	7321.32	953.775
57	3.31	23.57	2.73	4.92	3.66	3.31	23.57	3.66	3297.75	3649.99	996.3
58	7.55	53.71	1.20	4.44	8.36	6.04	42.97	6.68	5430.56	6010.05	899.1
59	2.41	5.61	1.20	4.35	2.49	1.93	4.49	2.00	1698.33	1757.63	880.875
60	5.92	18.80	1.20	4.31	6.20	4.74	15.04	4.96	4133.46	4330.36	872.775
61	15.47	110.27	1.20	4.40	17.12	12.38	88.22	13.70	11027.02	12206.02	891
62	6.86	10.75	1.20	4.38	7.02	5.49	8.60	5.62	4867.58	4982.00	886.95
63	2.21	0.52	1.20	4.50	2.22	1.77	0.42	1.77	1611.09	1616.78	911.25
64	2.37	11.49	1.99	4.67	2.54	2.37	11.49	2.54	2241.25	2404.24	945.675
65	1.32	10.56	2.29	4.60	1.48	1.32	10.56	1.48	1229.58	1377.13	931.5
66	4.90	39.73	1.97	4.19	5.50	4.90	39.73	5.50	4157.53	4663.18	848.475
67	12.50	82.69	1.20	4.14	13.74	10.00	66.15	10.99	8383.50	9215.38	838.35
68	6.78	39.29	1.20	4.21	7.37	5.42	31.43	5.90	4624.10	5026.04	852.525
69	3.59	28.26	1.97	4.25	4.01	3.59	28.26	4.01	3089.64	3454.46	860.625
70	2.82	13.27	1.99	4.57	3.02	2.82	13.27	3.02	2609.70	2793.90	925.425
71	4.51	18.69	1.23	4.41	4.79	3.70	15.33	3.93	3302.59	3507.88	893.025
72	7.79	1.39	1.20	4.24	7.81	6.23	1.11	6.25	5350.80	5365.12	858.6
73	6.68	55.40	1.97	4.58	7.51	6.68	55.40	7.51	6195.37	6966.08	927.45
74	5.81	31.80	2.03	4.55	6.29	5.81	31.80	6.29	5353.19	5792.68	921.375
75	2.83	4.76	2.06	4.31	2.90	2.83	4.76	2.90	2469.95	2532.27	872.775
76	12.88	91.35	2.03	4.36	14.25	12.88	91.35	14.25	11371.75	12581.55	882.9
77	13.89	22.53	2.12	4.30	14.23	13.89	22.53	14.23	12094.72	12388.99	870.75
78	1.82	12.55	2.06	4.26	2.01	1.82	12.55	2.01	1570.02	1732.42	862.65
79	3.12	39.30	1.99	4.20	3.71	3.12	39.30	3.71	2653.56	3154.93	850.5
80	12.34	38.57	1.20	4.43	12.92	9.87	30.86	10.33	8855.92	9271.13	897.075
81	3.64	35.96	1.96	4.43	4.18	3.64	35.96	4.18	3265.35	3749.24	897.075
<b>totals</b>				<b>347.92</b>					<b>408878.68</b>	<b>431129.18</b>	<b>70453.8</b>

grade 5.80 6.12

### 10.3 Indicated Resource from Bulk Samples

A total of 8 bulk samples were collected from the adit at approximately 50-m intervals (Figure 11, Table 11). These weighed between 170 and 500 kg and on average were 1.3 meters wide. **Once again, it is not known precisely how the samples were collected or analyzed.** Indicated resource is calculated by diluting the sample assays across 1.5 meters. For example, sample AM1 assayed 20 g/t Au across 1.45 meters. The assay used for the calculations is  $20 \times 1.45/1.5 = 19.33$  g/t Au. Each bulk sample is given an area of influence of 50m by 50m except for the easternmost and westernmost samples, which are given an area of influence 25m by 50m. A specific gravity of 2.7 was used to calculate tonnages. The final figure is for a block measuring 350 m long (the length of the adit) by 1.5 meters wide by 50 meters deep (ie: the same size as was calculated using face-sample assays). Using these parameters, the bulk-sample assays indicate a resource of 70,875 tonnes grading 8.71 g/t gold and containing 617,625 grams (19,857.4 ounces) of gold. A spreadsheet showing the data and calculations is shown in Table 11.

TABLE 11: CALCULATION OF INDICATED RESOURCE FROM BULK SAMPLES

adit loc'n	weight kg	bulk kg	width m	length m	Au g/t	Au g/t 1.5m (diluted)	grams Au in block	Tonnes in block
0m west	500	AM2	2.45	25.00	35.00	35.00	177187.50	5062.5
50m (approx)	350	AM1	1.45	50.00	20.00	19.33	202500.00	10125
100m west	198	AM8	1.25	50.00	2.30	1.92	23287.50	10125
150m west	170	AM7	1.20	50.00	1.30	1.04	13162.50	10125
200m west	270	AM6	1.20	50.00	6.80	5.44	68850.00	10125
250m west	300	AM5	1.20	50.00	6.80	5.44	68850.00	10125
300m west	190	AM4	1.30	50.00	4.50	3.90	45562.50	10125
350m (approx)	185	AM3	1.50	25.00	3.60	3.60	18225.00	5062.5
<b>totals</b>				<b>350.00</b>			<b>617625.00</b>	<b>70875</b>

**grade= 8.71**

### 10.4: Drill grades near the adit

There are 10 drill holes that pass within 25 meters of the adit. These are listed in Table 12 together with assay results from intervals that are interpreted to correspond to the “Main Zone” in the adit (usually these are the highest-grade intervals in the drill holes). No attempt is made to calculate resources in the adit using only the drill data, but the information is given to illustrate that in most of the holes, the grades are lower than the grades obtained from face samples and the mineralized intervals are generally shorter. Certainly, the drill holes offer no suggestion that there is an average grade of 3.38 g/t Au across an average width of 7.21 meters in the crosscuts (Table 2)

# Figure 11

TABLE 12: DRILL HOLES THAT PASS CLOSE TO THE ADIT

HOLE NUMBER	INTERVAL (true width, meters)	GRADE (g/t Au)
J5	0.9	8.3
J20	1.7	6.7
J24	1.0	3.3
J26	1.7	5.8
J28	0.7	2.12
J30	0.4	7.2
J31	0.7	2.04
J32	1.0	3.38
KMP 4	1.0	4.77
KMP 5	1.8	7.49

### 10.5: Discussion, Bulk Resource vs. Face Resource vs. Drill Grades

Table 13 below summarizes the indicated resources calculated using the two sets of data from the adit .

TABLE 13: SUMMARY OF BULK VS FACE RESOURCES

	TONNAGE	GRADE	GRAMS Au	OUNCES Au
FACE DATA	70454	5.80 g/t	408,879	13,861
BULK DATA	70875	8.71 g/t	617,625	19,857

The dichotomy between these results is profound and begs explanation; the bulk data suggests that there is 43% more gold in the adit than is calculated using the face data. If the bulk data were extended for the length of the deposit (2 km) and to a depth of 600 meters, Gralheira could contain 1.36 million ounces across a width of 1.5m, whereas according to the face data this is diminished to 0.95 million ounces. The drill data, although not rigorously analyzed, suggest that grade from core is even lower than the grades from face samples, and mineralized intervals are shorter. So which set of data is the more accurate?

Table 14 shows a comparison of bulk data and face data from the two faces closest to each bulk-sample site. The information is sorted from east to west (ie: AM 2 is the easternmost bulk sample and AM 3 is the westernmost bulk sample in the adit).

The table shows a disturbing trend; when the assays from the face samples are higher than the assays from the bulk samples (three of eight samples), the percent difference between the two assays is statistically insignificant (average 11%). But when the assays from the bulk samples are higher than those of the face samples (five of eight samples), the percent difference between the two assays averages more than 200% (more than 100% even if the two highest AM assays are cut by half). Nor is this effect due to a clustering of high values in a particular part of the adit. The easternmost two bulk samples have much higher assays than the corresponding face samples. The subsequent two bulk samples have assays similar

TABLE 14: COMPARISON OF BULK AND FACE GRADES

Bulk No	East	North	kg	Dimension	Gold ppm		% assay difference
					BULK	2 NEAREST FACES	
AM2	47152.00	199964.00	500	2.45x0.95x0.09	35.00	4.69	646.3
AM1	47113.00	199972.00	350	1.45x1.4x0.06	20.00	5.57	259.1
AM8	47056.00	199984.00	198	1.25x0.95x0.06	2.30	2.83	-18.7
AM7	47006.00	199996.00	170	1.2x1.0x0.05	1.30	1.20	8.3
AM6	46959.00	200011.00	270	1.2x1.0x0.08	6.80	3.07	121.5
AM5	46908.50	200025.00	300	1.2x1.0x0.09	6.80	4.25	60.0
AM4	46858.00	200040.00	190	1.3x1.0x0.05	4.50	4.69	-4.1
AM3	46815.00	200049.00	185	1.5x1.0x0.04	3.60	4.02	-10.4

to the face samples. The next two bulk samples assay significantly higher than the corresponding face samples and the westernmost two bulk-sample assays are about the same as the face-sample assays.

Information from the crosscut sampling offers a possible solution to the problematic dichotomy between bulk assays and face assays. Turning once again to assay results from Crosscut 6 (Figure 9), it is apparent that where there are no mapped veins there is negligible gold (typically less than 0.1 g/t), whereas where there are mapped veins, assays are typically >1.0 g/t. This is a simple but important observation; it says that gold is in the mapped veins, and not in the country rock. Consider the southernmost sample in the crosscut, which gave 2.62 g/t gold across 1.2 meters. There is just one quartz vein mapped in this interval, and it is only 2 cms wide. This means that possibly all of the gold in the assay interval came from this narrow veinlet. The possible grade of this vein can be estimated at 157 g/t Au by multiplying the grade of the interval by 120/2 (the width of the assay interval divided by the width of the vein). Now, consider that a typical 1.2-m-wide channel sample might weigh about 5 kg. That means that a 60<sup>th</sup> part of the sample (about 83 grams) contains essentially all the gold. This 5-kg sample is sent to the laboratory, where a typical gold assay (fire assay with atomic absorption finish) is done. Standard procedure is to crush the entire sample to -2 mm, and then to split off 150 to 200 grams for further processing. Here lies the problem. The gold is only in a 60<sup>th</sup> part of the sample, and the lab splits off a 25<sup>th</sup> part of the sample for assay. It is quite probable that the subsample will not contain a representative proportion of gold-bearing rock, and it is more probable that the grade will be understated than overstated. However, since assay variance diminishes in proportion to the weight of a sample, a bulk sample of >100 kg should give a more accurate assay than a normal sample of <5 kg. For this reason, it is considered that the bulk-sample resource estimate is more accurate than the face-sample resource estimate.

In this report, it is documented that grade from bulk samples is significantly higher than grade from the channel samples of drift faces, and both of these are significantly higher than estimations made by using drill-hole intercepts in comparable areas. This is reinforced in the Howe Report (pg 56) where it is noted that grade estimated from the channel samples of drift faces is significantly higher than grade estimated from drill holes...”may be up to 50% higher from the channel samples”. Gralheira is one of those deposits where the adage “drill for structure, drift for grade” is particularly true. It is considered that any estimate of resources calculated from drill-hole assay information will seriously understate the grade of

the deposit. This is due primarily to two specific characteristics that, in this author's experience, are unique to the Gralheira Deposit; namely, that gold is in very narrow high-grade veins and that the ratio of country rock to ore rock in channel samples and drill core is extraordinarily high. Specific recommendations to maximize the accuracy of laboratory assays in view of these unique characteristics will be given in a future section.

## 11: CONCLUSIONS

1. Gralheira is a sub-vertical, shear-zone-hosted lode gold deposit that is probably contiguous with the Jales (830,000+ ounces) granite-hosted deposit to the south. The differences in the strike orientation of the two deposits can be attributed to deflection caused by the transition from brittle, isotropic granite to ductile, anisotropic mica schist and minor subsequent syn- to post-ore faulting.
2. The Jales deposit was exploited to a depth of more than 600m, and so it is reasonable to assume that the Gralheira deposit also extends to at least that depth. The deepest hole currently on the Gralheira deposit pierces the mineralized zone about 330m below surface.
3. Drilling has traced Gralheira for a strike length of about 2 kilometers. Drill assay data show that the deposit is consistently mineralized along its strike length and consists of higher-grade steeply raking ore shoots (>5 g/t) separated by intervening lower-grade (1 to 4 g/t) material. These assays are probably understated (see point 4)
4. Gralheira consists of echelon, narrow, high-grade veins separated by larger intervals of barren country rock. Samples from drill core or underground channel samples give understated assays because of the high proportion of country rock to ore rock in sample intervals and concomitant problems splitting out a representative portion in the laboratory for analysis. .
5. The best indication of the true grade of Gralheira comes from testwork done on underground bulk samples. Calculated grade in a 350-m-long adit based on 8 bulk samples is 8.71 g/t across 1.5 m. If this grade carries through for the entire strike length of the deposit to a depth of 600m, the deposit could contain more than 1.3 million ounces of gold.
6. Gralheira has previously been looked at as a target to be exploited across a minimum mining width of 1.5 meters. However, assays (probably understated) from channel sampling of crosscuts suggest that bulk-tonnage mining across wider widths might be feasible at the present price of gold. The crosscuts, for example, average 3.38 g/t Au across an average width of 7.21 meters. The width potential of Gralheira is confirmed by multiple intercepts of >1.0 g/t gold in most drill holes.
7. A multipoint gold-lead-arsenic anomaly in soils present in the largely covered area between the north end of the Jales Vein and the Gralheira Deposit warrants additional evaluation. Flexure zones of mineralized systems often are mineralized

“plums”, and this area has neither been drilled nor adequately evaluated by trenching.

8. Additional features of Gralheira that are attractive from a mining perspective are:
  - the enveloping surface of the mineralized zone is straight and tabular; permitting consideration of economic mining techniques such as long-hole/sub level or vertical-crater retreat.
  - underground conditions are excellent; no rock fall was observed in the adit and only one short segment of the back had to be shored up.
  - according to information in the Howe Report (page 37), the nearby Jales deposit has proven and probable reserves of 39,000 ounces gold in ore grading 11 g/t Au as well as possible reserves of 100,000 ounces gold in ore grading 9.4 g/t Au that could well be exploited if the Gralheira deposit went into production. (It is not clear whether these reported reserve categories comply to definitions adopted by CIM Council in August 2000) the deposit is accessible by road and is close to a highway that leads to the Port of Porto, some 90 km to the west.
  - labour costs in Portugal are less than in most first-world countries.
9. It is concluded that Gralheira is an excellent prospect with gold potential in excess of one million ounces. Additional work, as set out in the recommendations, is warranted.

## **12: RECOMMENDATIONS**

1. The rejects from at least thirty drill-hole intervals should be selected for further laboratory test work. The intervals should represent a broad range of original assay values, but lower-grade intervals should be carefully selected to include favourable alteration (i.e.: veining with sulphides). All of the rejects should be completely and finely pulverized. The lab should be instructed to homogenize the pulverized material particularly carefully, and to do a coarse metallic screen assay, taking three 50-gm subsamples of the fines for analysis. Pulverizing the entire sample essentially skips the routine laboratory step of taking a small split from the crushed portion. It is suspected that the resulting assays will generally be higher than the assays obtained by standard methods, and if the analyses from the three pulps have only small variances, complete pulverization of key samples from future drill-core or channel samples might minimize assay problems due to excessive wall-rock dilution.
2. The crosscuts should be remapped and resampled (samples will have to be taken from the back or floor of the adit) with a view towards assessing both the narrow, high-grade model and the wider, bulk-tonnage model, and also as an orientation exercise to see if the methodology recommended below results in higher grades and better definition of the width of the mineralized zone . The sampling will have to be

painstaking to maximize quartz to wall-rock ratio. Where there are individual narrow isolated veins, these should be channel-sampled vertically using a rock saw to cut through the wall-rock on either side of the vein and as close to the vein as is practicable. Where the concentration of veins is greater than about 5%, channel samples should be taken horizontally. These samples should be large (5 kg) and never more than 0.5 meters long. All samples of material suspected to be mineralized should be completely pulverized and carefully homogenized at the laboratory. Two or three 30-gm subsamples should be split from the pulverized rock for assay in order to monitor variance. (If the variance is acceptable, this practice can be discontinued after awhile. If the variance is high, the strategy recommended herein will have to be reconsidered) At least every third sample of material suspected to be mineralized should be screened for coarse metallics. Intervals of unveined wall-rock need not be sampled in such detail. At the end of this exercise, the new data should be compared to previous sampling data in the adit to see if the “painstaking” work has substantively improved the grade and/or width of the mineralized zone (i.e.: are results now closer to bulk-sampling results?) If not, another sampling strategy (probably bulk sampling) will have to be considered.

3. Whether viewed as a narrow high-grade prospect or a bulk-tonnage prospect, the most reliable information on the grade and width of the mineralized zone has come from the existing adit, and the best way to demonstrate the continuity and potential of Gralheira is to extend the adit. An extension of at least 350 m towards the west is recommended, with crosscuts extending 12 meters into the footwall and 12 meters into the hanging wall at 50-m intervals (Figure 12). The adit extension and new crosscuts should be mapped and sampled as described in recommendation 2. At least 16 bulk samples should be collected for metallurgical testwork
4. A fence of 3 drill holes should be laid out at ~100-m intervals with the intent of intersecting the proposed adit extension as close as possible to the planned crosscuts. The purpose of this exercise is to relate drill hole assay data to the assay and mapping data that will be collected from the adit. This will be of incalculable value in helping to interpret assay results from deep holes that eventually will have to be drilled to define the envelope of the mineralized system at Gralheira. Very careful spatial survey control will be required for the drill holes, the existing adit, and the extension. Logging of the core should be meticulous, and assay intervals should be as short as is required for sufficient assay material.
5. A fence of five holes at 100-m intervals should be drilled at the west end of the Gralheira Shear Zone to intersect mineralization at a depth of about 200 meters below surface. Currently, the deepest hole in this area intersects the zone at about 100 m below surface.
6. Several short holes should be spotted to test gold-in-soil anomalies between the Jales Vein and the Gralheira deposit. This should be done after systematic review of historical data available from trenches, ground truthing, and a review of the soil-geochemical data summarized in Figures 6, 7 and 8.

# Figure 12

# FIGURE 13

7. Core from holes drilled at the west end of the deposit, where Roman trenching suggests the presence of multiple echelon veins across 50 meters, should be assayed with a view towards determining if open-pit operations might be feasible in this area. The entire segment of core that passes through this zone should be resampled. (Figure 13)
8. All of the historical and modern information from drill holes, adit sampling, crosscut sampling, soil sampling etc should be unified into a geological database program.
9. The core inspection facility is cramped and poorly lit. Core is stacked rather than racked. A new core shack should be constructed or leased.
10. At the end of the project, a consultant should be hired to do a prefeasibility study considering both bulk-mining and narrow-width-mining scenarios.

TABLE 15: RECOMMENDED WORK PROGRAMME AND BUDGET

			USD	USD	
Drilling	mobilization			\$3,000.00	
	demobilization			\$3,000.00	
	adit extension	3 holes, 180m each, 540m total	\$72/m	\$38,880.00	
	expl'n, west zone	5 holes, 300m each, 1500m total	\$72/m	\$108,000.00	
	soil anomalies	6 holes, 100m each	\$72/m	\$43,200.00	
	site preparation	14 sites	\$500/site	\$7,000.00	
	drill assays	30 samples/hole, 420 samples, coarse metallics equivalent price, Au+Ag	\$40 per sample	\$16,800.00	
	drill sample prep	420 samples, special prep'n	\$10 per sample	\$4,200.00	
	lab testwork	30 samples	\$60 per sample	\$1,800.00	
	check samples, special labwork	50 samples	\$40 per sample	\$2,000.00	
	Underground	new adit	350m	\$480/meter	\$168,000.00
		new crosscuts	8 crosscuts at 25m each	\$480/meter	\$96,000.00
		new raise	1 raise, 100 meters	\$600/meter	\$60,000.00
face assays, old +new adit		800 samples, coarse metallics equivalent price, Au+Ag	\$40 per sample	\$32,000.00	
face samples, prep		800 samples, special prep	\$10 per sample	\$8,000.00	
check samples, special labwork		50 samples	\$40 per sample	\$2,000.00	
bulk samples		metallurgical testwork	16 bulks at \$1000	\$16,000.00	
	muck pad preparation	levelling and lining	\$5,000.00		

	transportation of muck	mine to muckpad		\$10,000.00
	road upgrading	portal to muckpad		\$5,000.00
Personnel	project manager	project	8 mos at \$7000/mo	\$56,000.00
	senior geologist	project	6 mos at \$4000/mo	\$24,000.00
	two geologists	UG sampling-mapping	6 mos at \$3000/mo	\$36,000.00
	two assistants	UG sampling-mapping	6 mos at \$1500/mo	\$18,000.00
	two drill geologists	drill program	4 mos at \$3000/mo	\$24,000.00
	two drill technicians	drill program	4 mos at \$1500/mo	\$12,000.00
	supervisor, stockpile operations	mucking operations	6 mos at \$2000/mo	\$12,000.00
	misc (cooks, drivers, security, etc)	4 people	6 mos at 1500/mo	\$36,000.00
	consultant, mine expert	prefeasibility study		\$20,000.00
Internat'l air travel	4 return flights, Vancouver-Lisbon			\$8,000.00
National air travel	4 return flights, Lisbon-Porto			\$1,200.00
Head office	supervision, office, secretary, etc			\$20,000.00
Freight	bulks and samples to lab			\$10,000.00
Field office	rent house to lodge personnel	includes utilities	6 mos at \$3600/mo	\$21,600.00
core shack	core storage-inspection facility	construct or rent	6 mos at \$500/mo	\$3,000.00
vehicles	lease two trucks		6 mos at \$4000/mo	\$24,000.00
communication	phone, fax, email, walkie talkies		6 mos at \$1000/mo	\$6,000.00
drafting	maps, sections, etc			\$5,000.00
legal, accounting			6 mos at 500/mo	\$3,000.00
office supplies	computer, printer, scanner, etc			\$2,000.00
	miscellaneous office supplies			\$3,000.00
geological supplies	hardhats, 3 diamond saws, etc			\$6,000.00
hotel				\$2,000.00
food	2250 person days		\$20 per person day	\$45,000.00
contingency	approx 5% of above			<u>\$50,000.00</u>
		<b>TOTAL</b>	<b>US DOLLARS</b>	<b>\$1,077,680.00</b>

### 13: REFERENCES

Canadian Securities Administrators. 2000. Notice of National Instrument 43-101, Standards of Disclosure for mineral projects, Form 43-101F1, Technical Report, and Companion Policy 43-101CP, Ontario Securities Commission, Nov. 17, 2000.

CIM Estimations Best Practices Committee. 2002. Estimation of Mineral Resources and Mineral Reserves, Best Practice Guidelines, Canadian Institute of Mining, Metallurgy and Petroleum, February 1, 2002, 28p.

Canadian Securities Administrators. 2002. Frequently Asked Questions, Revised February 8, 2002, National Instrument 43-101, Standards of Disclosure for Mineral Projects, 11p.

Lang, J.R., Baker, T., Hart, C.J.R. and Mortensen, J.K., 2000, An exploration model for intrusion-related gold systems: SEG Newsletter No. 40, p. 1-15.

Matthews, Alan, 2003: Task Identification, Gralheira, unpublished internal memorandum. St. Elias Mines Ltd, 5 pgs

Matthews, Alan, 2003: Observations on check sampling programs, Gralheira, unpublished internal memorandum, St. Elias Mines Ltd, 12 pgs

Matthews, Alan, 2003: Review and Summary of reports on “reserves” and resources at Jales Mine, unpublished internal memorandum, St. Elias Mines Ltd, 12 pgs.

Matthews, Alan, 2003 (?), Review of metallurgical programs carried out by BRGM/RTZ and COGEMA, unpublished internal memorandum, St. Elias Mines Ltd, 4 pgs.

Matthews, Alan, July 2003, Summary of work completed on the Gralheira Property, unpublished internal memorandum, St. Elias Mines Ltd, 16 pgs.

Neiva, J.M.C. and Neiva A.M.R., (date uncertain), The Gold Area of Jales, Northern Portugal, Terra Nova 2, pgs 243-254.

McCoy, D., Newberry, R.J., Layer, P., DiMarchi, J.J., Bakke, A., Masterman, J.S. and Minehane, D.L., 1997, Plutonic-related gold deposits of Interior Alaska, in: Mineral Deposits of Alaska, Goldfarb and Miller, eds: Economic Geology Monograph No. 9, p. 191-241

Newberry, R.J., McCoy, D.T. and Brew, D.A., 1995, Plutonic-hosted gold ores in Alaska: Igneous vs. Metamorphic origins: Resource Geology Special Issue 18, P. 57-100

Rosa Diogo R.N., 2000 (?), Metallogenesis of the Jales Gold District, Northern Portugal, unpublished PhD thesis, Colorado School of Mines, 262 pgs.

RTZ, 1990, Primeiro Estudo de Viabilidade Economica Sobre a Jazida da Gralheira, Volume V, Dados Relativos aos Trábalos Mineiros, 40 pgs.

St. Elias Mines Ltd, , 2002-2003, News Releases between May, 2002 and November 2003.

Thompson, Anne, 2003: Petrographic Analysis of Two Samples from Gralheira, unpublished internal report, St. Elias Mines Ltd, 7 pgs.

Thompson, J.F.H., Sillitoe, R. H., Baker, T., Lang, J.R. and Mortensen, J. K., 1999, Intrusion-related gold deposits associated with tungsten-tin provinces: *Mineralium Deposita*, v 34, p. 323-334

Thompson, J.F.H. and Newberry, R.J., 2000, Gold deposits related to reduced granite intrusions in: *Gold in 2000*, Hagemann and Brown, eds: *Reviews in Economic Geology*, v. 13, p. 377-400

Titano, Dino and Brady, Bruce, August 15, 2002, Evaluation Report on the Previous Mining and Exploration Activities on the Gralheira/Jales Gold Property in Northern Portugal, for Kernow Resources and Developments Ltd and St. Elias Mines Ltd, A.C.A. Howe International Limited Report #841, 101 pgs + appendices and map. (the "Howe Report").

## 14: CERTIFICATE OF QUALIFIED PERSON

Name: John A. Brophy, PGeol

Address: Calle Independencia 561, Dpto 2, Miraflores, Lima, Peru, S.A.

Telefax: 011 511 447 1456

Occupation: Geologist

Qualifications: -28 years of continuous geological experience on four continents exploring for a variety of commodities including gold, copper, zinc, lead, uranium and silver.  
-Member #1276 of the Northern Association of Professional Engineers, Geologists and Geophysicists  
-Fellow of the Society of Economic Geologists  
-Qualified as an Independent Qualified Person in accordance with definitions and criteria established in National Instrument 43-101, Standards of Disclosure for Mineral Projects, Sections 1.2 and 1.5

Field Inspection: The subject property of the technical report, the Jales/Gralheira property in northern Portugal, was inspected by the qualified person Jan 8-10, 2004

Disclaimer: The qualified person is not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the technical report.

Prior Involvement: The qualified person has had no prior involvement with the property that is the subject of the technical report.

The qualified person has studied the contents of National Instrument 43-101 (Standards of Disclosure for Mineral Projects), and Companion Policy 43-101CP

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John A. Brophy

## **15: CONSENT OF QUALIFIED PERSON**

To:  
From: John A. Brophy, Independent Qualified Person  
Date: February 28, 2004  
Re: Technical Report on the Jales/Gralheira property, Northern Portugal  
For: St. Elias Mines Ltd.

I consent to the filing of the technical report “Observations and update of exploration on the Jales/Gralheira gold property, northern Portugal” and to the written disclosure of the technical report and of extracts from or a summary of the technical report in the written disclosure being filed.

I confirm that I have read the written disclosure being filed and do not have any reason to believe that there are any misrepresentations in the information derived from the technical report or that the written disclosure contains any misrepresentation of the information contained in the technical report.

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John A. Brophy, PGeol

## **APPENDIX 1: DRILL LOGS**

## **Appendix 2: DRILL PLAN AND DRILL SECTIONS**