

**SUN VALLEY GOLD MINES LTD.**

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**GEOLOGICAL, GEOCHEMICAL & DRILLING REPORT  
PHASE 1 AND 2**

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**BLACK MAMMOTH — MONTE CRISTO PROPERTY  
GILBERT MINING DISTRICT  
ESMERALDA COUNTY, NEVADA**

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**MARCH 1987**

**GEWARGIS GEOLOGICAL CONSULTING INC.**  
Exploration and Mining Geologists



**GEOLOGICAL, GEOCHEMICAL & DRILLING REPORT  
ON THE  
BLACK MAMMOTH - MONTE CRISTO PROPERTY**

**Gilbert Mining District,  
Esmeralda County, Nevada**

**FOR**

**Sun Valley Gold Mines Ltd.  
P.O. Box 10019, Pacific Centre  
3050 Toronto Dominion Bank Tower  
Vancouver, B.C. V7Y 1A1  
Tel: (604) 682-6677**

**CONSULTANTS:**

**Gewargis Geological Consulting Inc.  
Suite 405, 595 Howe Street  
Vancouver, B.C. V6C 2T5  
Tel: (604) 687-6245**

**AUTHOR:**

**Wilson A. Gewargis, B.Sc., F.G.A.C.**

**DATE:**

**March 1987**

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## ABSTRACT

The Gilbert precious metal deposit is considered by Larry J. Buchanan as a classic "epithermal deposit" and is included in his study of precious metal deposits associated with volcanic environments in the southwest, along with 60 other deposits in the U.S., Mexico, Nicaragua, Peru, Australia and New Zealand.

The Black Mammoth - Monte Cristo property, is located in the Gilbert District, Esmeralda County, Nevada, and is considered to have excellent potential for the discovery of a large bulk leachable open pit precious metal (gold-silver) system with good access to infra-structure and low mining costs.

The property has been subject to intermittent exploration and development programs. In 1924, a total of 4,465 tons at 1.25 oz/ton gold was produced in the Gilbert district, of which, approximately 75% came from the Black Mammoth - Monte Cristo property.

The property is mainly underlain by volcanics and sediments of mid-to-late Tertiary age, with banded quartz-calcite vein associated with adularia cemented breccia and barite. There are also outcrops of Jurassic quartz monzonite sediments of Ordovician Palmetto Formation. An Epithermal Vein System and hot spring mineralization occurs within the above three rock units. The volcanic environment on the property resembles the volcanic environment at the Smoky Valley property of Echo Bay Mines Ltd., Round Mountain, Nevada, which is approximately 88 kms north/northeast of the Gilbert Project and is considered the 4th largest U.S. gold mine. The sediments of the Ordovician Palmetto Formation is associated with disseminated gold mineralization.

In December 1986, Sun Valley Gold Mines Ltd., conducted an exploration program to evaluate the Black Mammoth - Monte Cristo property, which included detailed surface and underground mapping, rock chip and soil sampling, and in February 1987, a percussion drilling program was conducted on the property.

Geochemical mapping and sampling both on surface and underground revealed that

several veins containing quartz, barite, alunite, and calcite exist on the property, and carry significant gold-silver values (**Figure 5**). The Geochemical Survey indicated that the Grid Area has four (4) distinct anomalous areas for Au, Ag, As and Ba. These areas are (1) volcanic, (2) sediment, (3) epithermal veins in both the volcanic and sediments and (4) the vein and stock works in the intrusive. All of the target areas, except the intrusive, were tested during the February 1987 drilling program.

Ten (10) holes were drilled for a total of 845.2 m (2773 ft). These holes were selected due to their accessibility and geological potential. Assay results from the above drilling revealed that all ten (10) holes intersected the upper level of the epithermal system. In general, these systems are vertically zoned from agate and clay near the paleo surface passing with depth into the barren calcite, then quartz and calcite. At deeper depths it lends to quartz, adularia and precious metals and at a still deeper depth to quartz, adularia and base metals.

Six (6) of these holes totalling 470.4 m (1543 ft) were drilled to test the volcanic host and the remaining four (4) holes 374.9 m (1230 ft) were drilled to test the sediment environment.

Four (4) holes in the volcanics were drilled to test the main structure, which comprises of an area of 1000 m (3280 ft) long. The most significant results from these holes are shown on **Table 1**, (Pages 17-20) and are summarized as follows:

**Hole 87-2:** Hole 87-2 was drilled at the most northerly extension of the vein system and intersected a section from 73.2 m (240 ft) to 79.3 m (26 ft) at the end of hole, and assayed 0.036 oz/ton Au, 0.039 oz/ton Ag over 6.1 m (20 ft) with a section of 0.103 oz/ton Au, 0.13 oz/ton Ag over 1.5 m (5 ft).

**Hole 87-4** Hole 87-4 was drilled to test the south extension of the same vein and intersected at 56.4 to 57.9m, assaying 0.039 oz/ton Au and 0.51 oz/ton Ag over 1.5m (5 ft.).

**Holes 87-3 & 87-6**

were drilled between Holes 87-2 and 87-4. Hole 87-3 intersected a zone at 50.3 m to 51.8 m assaying 0.020 oz/ton Au, 0.009 oz/ton Ag over 1.5 m (5 ft). Hole 87-6 intersected a zone from 25.9 m (85 ft) to 30.5 m (100 ft) assaying 0.007 oz/ton Au and 1.58 oz/ton Ag over 4.6 m (15 ft).

The most significant results in the sediment environment were from **Hole 87-7**, where a zone was intersected from 50.3 m (165 ft) to 51.8 m (170 ft), assaying 0.016 oz/ton Au and 5.98 oz/ton Ag over 1.5 m (5 ft). or 0.009 oz/ton Au, 3.03 oz/ton Ag over 3.0 m. Other significant silver values were intersected in Holes 87-8, 87-9 and 87-10.

**Hole 87-8** intersected a zone assaying 0.004 oz/ton Au, 0.31 oz/ton Ag over 7.6 m (25 ft). **Hole 87-9** intersected a zone assaying 0.004 oz/ton Au, 0.47 oz/ton Ag over 9.1 m (30 ft), and finally **Hole 87-10** intersected a zone assaying 0.012 oz/ton Au, 0.77 oz/ton Ag over 1.5 m (5 ft), and another zone assayed 0.004 oz/ton Au, 0.63 oz/ton Ag over 1.5 m (5 ft).

The excellent geological setting of the classic "epithermal deposit", past mining history, previous and recent encouraging results from drilling, surface and underground sampling of both rock chip and soil reflects the high potential for blocking mineable ore reserves on the Gilbert project.

## **1.0 RECOMMENDATIONS**

In order to establish the economic potential of the property, mineralization continuity, grade and width of identified zones, the main thrust of the program should be concentrated on percussion drilling which will determine the tonnage and grade of Area 1 and Area 2. This could be tested by drilling a minimum of 3049 m (10,000 ft) on the property. Proposed locations (50 drill holes) are plotted on **Figure 5**. The above drilling footage will be distributed as follows:

1. A Minimum of 1524 m (5,000 ft) will be required to test the gold-silver mineralization of Area #1, in the volcanic host along the strike and down-dip between Line 0+00 to Line 12+00N.
2. A Minimum of 1372 m (4,500 ft) of drilling will be required to prove the strike extension to the north, south, and down-dip of the barite-silver vein and the disseminated mineralization in the sediments (Area #2) which has already been tested by 4 drill holes with encouraging results.
3. A Minimum of 153 m (500 ft) will be required to test the quartz vein and stock work in the intrusive (Area #3) where high silver and gold values of up to 140.37 oz/ton Ag and 0.290 oz/ton Au were obtained in Phase 1.

If the results of the Phase 3 Drilling Program are positive, then engineering studies, metallurgical tests, mining and environmental permitting will be initiated.



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**1.2 Phase 3 - Cost Estimates**

This budget will include a minimum of 3049 m (10,000 ft) of percussion drilling. Providing there are no delays, a minimum period of 25 days plus travel time will be required to complete the program. This budget will also include assaying, drilling supervision and report.

<b><u>A) DRILLING COSTS:</u></b>	<b><u>CDN FUNDS</u></b>
----------------------------------	-------------------------

- |  |              |           |
|--|--------------|-----------|
| • Drilling 10,000 ft at \$12.00/ft<br>(Room & Board for drill crew included) | \$120,000    |           |
| • Mob and Demob of drill crew, including<br>equipment plus cat.              | 5,000        |           |
| • Cat trenching, and access road for drilling                                | <u>5,000</u> | \$130,000 |

**B) ASSAYING:**

- |  |           |
|--|-----------|
| • 2,000 Rock Samples at \$14.00/sample | \$ 28,000 |
|--|-----------|

<b><u>C) SUPERVISION &amp; MANAGEMENT OF DRILLING PROGRAM</u></b>	<b>\$ 52,000</b>
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Supervision of Phase 3 Drilling Program will include the following:

- **Project Management**, which will include contacting drillers and negotiating drilling contract; planning drilling targets; reviewing assay results; purchasing field supplies; hiring crew; meetings with Sun Valley Gold Mines Ltd. directors.
- **Labor:** Senior Geologist and Geologist to provide supervision of two (2) drilling rigs.
- **Mob and Demob of Field Crew:** Vancouver to property and return (rental of truck, mileage, insurance, fuel)
- **Transportation: (on-site)** Includes rental of truck, fuel, mileage, repairs, insurance for 25 days.
- **Accommodation and Food:**
- **Field Supplies**
- **Sample Shipments**
- **Communications**

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**Gilbert Project  
Phase 3 Cost (Cont'd.)**

● **Report covering Phase 3 Program:**

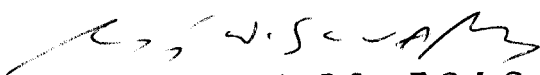
which will include all drafting, printing of maps,  
word processing, xeroxing, printing of report covers,  
binding of reports.

**TOTAL COSTS FOR PHASE #3 PROGRAM:**

\$210,000.00

Respectfully submitted by,

**GEWARGIS GEOLOGICAL CONSULTING INC.**

  
Wilson A. Gewargis, B.Sc., F.G.A.C.  
Consulting Geologist

March 31, 1987

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## 2.0 INTRODUCTION

A Phase 1 field program was conducted on the Gilbert Project between December 12 to 23, 1986, by a crew of two geologists and 1 assistant under the supervision of W.A. Gewargis, B.Sc., F.G.A.C. The program included detailed surface and underground geological mapping, sampling, soil geochem, and a VLF Survey of the 14 km grid in an area of 1800 x 600 meters.

The field results and observations of the Phase 1 program confirmed that a suitable geological environment exists for hosting bulk tonnage, gold-silver mineralization in both volcanics and sediments. Also, the epithermal quartz vein system within the above units were examined and sampled both on surface and underground.

A total of 408 soil samples were collected from the above grid at 25 m intervals and 75 rock samples from surface and underground. The results of gold, silver, and other elements such as arsenic (As), antimony (Sb), and base metals assisted in defining drill targets.

Between January 30 and February 23, 1987, Sun Valley Gold Mines Ltd., carried out a Phase 2 Program of Reverse Circulation Rotary Drilling, geological mapping and sampling on their Gilbert Project to evaluate the encouraging results of Phase 1. Ten (10) holes were drilled for a total of 845.2 meters (2,773 feet).

The following report will review Phase 1 and Phase 2 results in detail, and the potential for developing new mineral reserves in the project area.

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## 2.1 Location and Access (Figure 1)

The Black Mammoth - Monte Cristo property is located 56 kms west of Tonopah, on the eastern part of the arcuate Monte-Cristo Range, northern Esmeralda County, Nevada. The geographical coordinates of the property are 38°11' north latitude, and 117°42' west longitude, T5N, R38E.

From Tonopah, the property is reached most directly by travelling west to Reno on Highway 95 for a distance of 33 kms, then north on a county gravel road for 10 kms, then a left-fork on the county road for approximately 11 kms to the old workings of the Last Hope prospect on the north extension of the property.

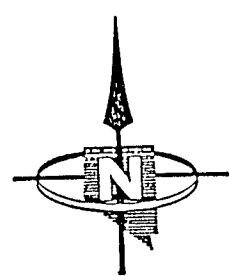
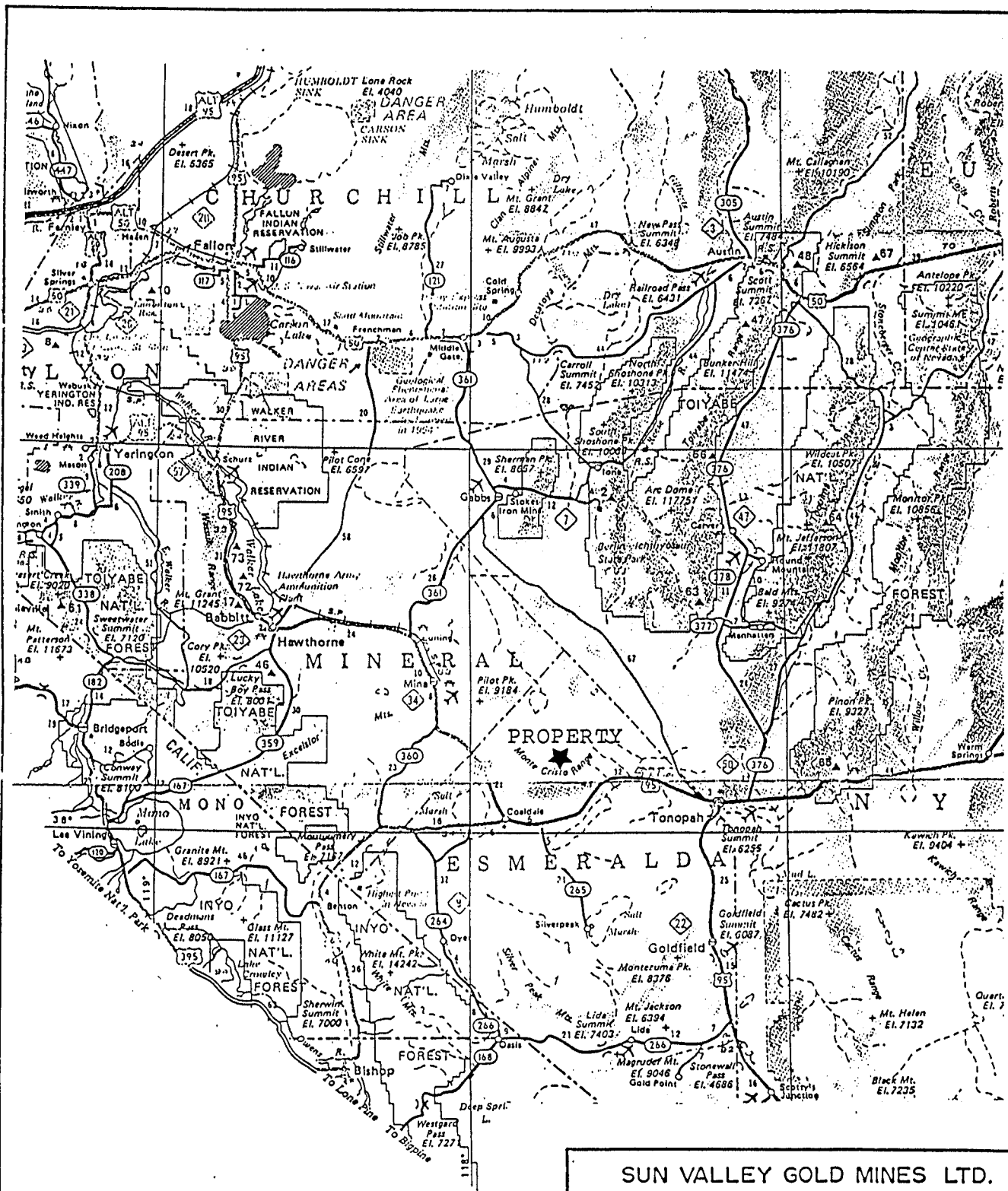
## 2.2 Topography (Figure 2)

The Gilbert District is on the northern slope of the Monte Cristo Range in a high desert area, which is unusual for the region in its arcuate shape and relatively low relief of about 500m. Vegetation consists of desert shrubs which form the main sparse ground cover, and drainage in the area is inadequate.

## 2.3 Property Description (Figure 3)

The Black Mammoth - Monte Cristo property encompasses several vein systems and workings that produced gold (Last Hope, Gilbert and Mammoth). The property consists of 45 unpatented claims for a total of 364 hectares (900 acres):.

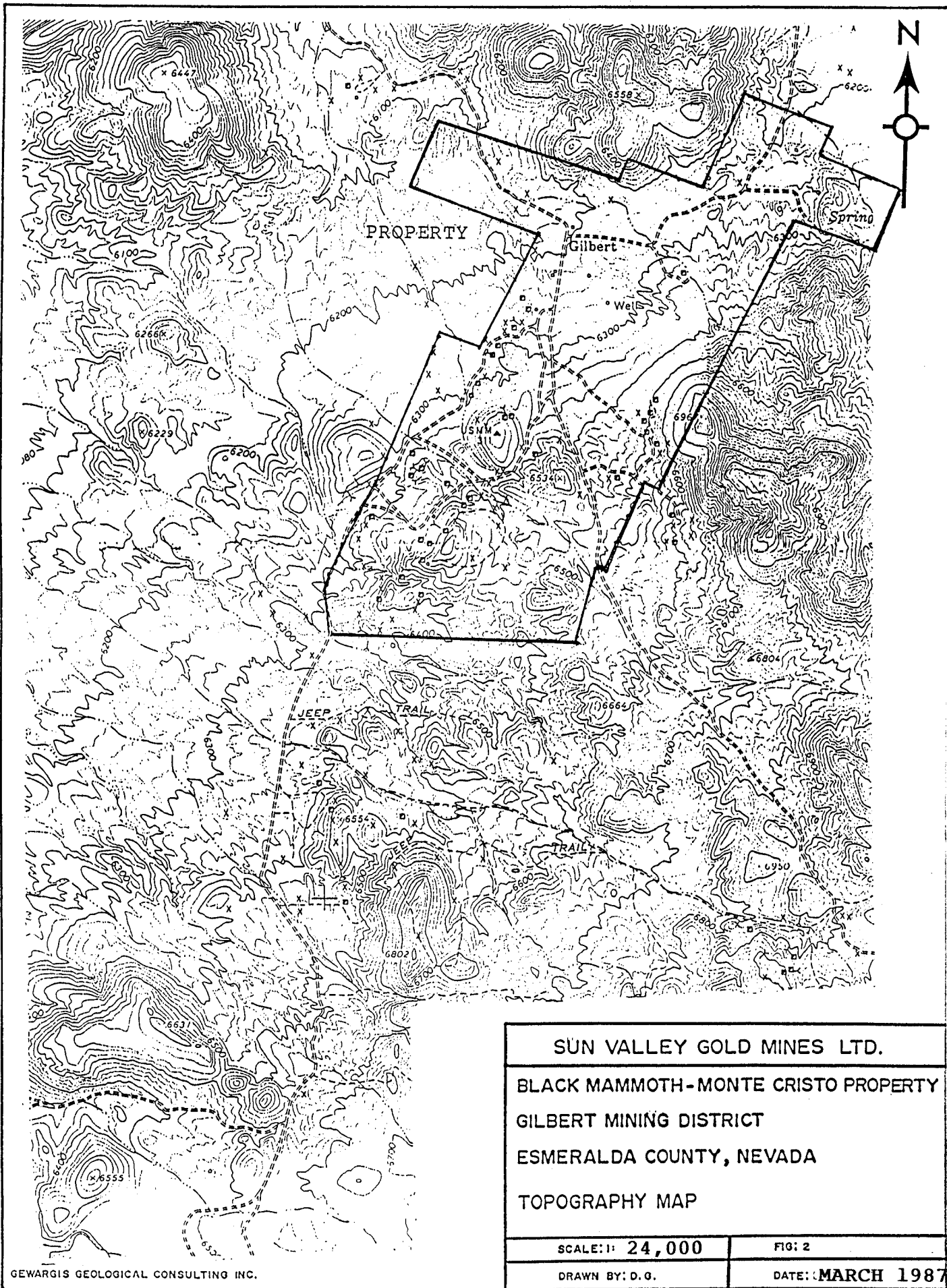
<u>Unpatented Claims</u>	<u>N.M.C. No.</u>
Home Steak No. 1	64547
Lu Lam 1-8 and 10	64548 - 64556
Red Cloud 1-6, 20-22 and 40-42	64557 - 64578
GLB 7-8	44047 - 44048
GLB 36-43	44077 - 44084
GLB 70, 72A, 74A, and 76	44111, 44114
	44117, 44119



GEWARGIS GEOLOGICAL CONSULTING INC.

SUN VALLEY GOLD MINES LTD.	
BLACK MAMMOTH-MONTE CRISTO PROPERTY	
GILBERT MINING DISTRICT	
ESMERALDA COUNTY, NEVADA	
LOCATION MAP	
SCALE: 1" = 25 MILES	FIG: 1
DRAWN BY: D.G.	DATE: MARCH 1987







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Mr. Richard Harris an Attorney from Reno, Nevada made a title search on the Red Cloud and GLB group of unpatented lode mining claims in August and September of 1986, and his findings were as follows:

- **The Red Cloud** group of claims were originally located during the period 1962 to 1966 by Luthar Lindsay, Albert H. Ray, and others, and were then relocated by D.H. Osborne on July 17, 1972. Proofs of labour have been recorded in the County and filed with the Bureau of Land Management for assessment years 1979 - 1985.
- **The GLB Claims** were located in three phases by the Anaconda company and its successor Atlantic Richfield Company (ARCO), during the period September 13, 1978 through July 29, 1982. Also, proof of labour was filed with BLM for Assessment years 1979 - 1985.

The present owner of the aforementioned claims is **Louis F. Hill**. The author does not accept responsibility for the legal status of the land holdings.

#### 2.4 Mining History

The following information on the Gilbert District from 1917 - 1949 was taken from the U.S. Department of the Interior Bureau of Mines:

- 1880: The Carrie Mine was developed.
- 1917: Desert district: The Carrie property was a producer of sulphide ore, containing lead, silver and some gold. This property is opened by a 200 ft shaft.
- 1918: Desert district: The Carrie property yielded a small quantity of oxidized silver-lead ore, shipped to the smelter by lessees.
- 1920: Desert district: The Carrie Silver and Black Mammoth Mines

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produced some shipping ore containing silver during a short period of development .

- 1921: Desert district: Silver ore from the Black Mammoth property was hauled to Millers and treated in the MacNamara mill at Tonopah. The ore is siliceous in character and readily cyanided.
- 1922: Desert district: The Carrie Silver Lead Mines Co., produced milling ore and smelting ore containing silver and lead from a prospect in the Desert district.
- 1923: Desert district: Silver ore was shipped to a milling plant at Tonopah from the Black Mammoth property, which is opened by an inclined shaft and a tunnel.
- 1924: Desert district (Gilbert): The discovery of high-grade gold ore in the Desert district caused excitement, but only a few lots were shipped. Some of the ore was sold to the custom cyanide plant of the Tonopah Mining Co., at Millers. The Gilbert Last Hope Gold Mines Co., was expected to erect a cyanide mill on its property at Gilbert.
- 1925: Desert district (Gilbert): The Last Hope Mine produced siliceous gold ore, which was hauled 14 miles to a custom mill at Millers for treatment by cyanidation. During 1925, 2,500 feet of development work was done on the property, which is opened by a tunnel 200 feet long, an inclined shaft, and several drifts. The Homestake Mine also produced gold ore which was treated at Millers.
- 1926: Desert district (Gilbert): The output of the Desert district came chiefly from the property of the Gilbert Mammoth, Last Hope Mines Co., and Homestake Monte Cristo Gold Corp. Siliceous gold ore from both mines was shipped to the Millers plant to be treated by cyanidation, and a little rich gold ore was shipped for smelting. The gold and silver recovered from ore shipped from the district were

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valued at \$20,515 or \$18.58 a ton. The Homestake company reported 6,000 tons of \$10 gold ore in reserve and 300 feet of development done in drifts and crosscuts in 1926.

1928: Desert district (Gilbert): In 1927 and 1928 the Last Hope and Black Mammoth groups in the Desert district were operated by lessees who shipped gold-silver ore which was treated at the cyanidation plant near Tonopah. One small lot of ore containing silver and lead was shipped from the Carrie Mine to a smelter.

1928: Desert district (Gilbert): The total output of the Desert district amounted to 449 tons of ore yielding \$13,991 in gold, 2,791 ounces silver, 7,126 lbs of copper and 1916 lbs of lead, valued in all at \$16,854, or \$37.54 in metals a ton. The Last Hope and Homestake groups were operated by lessees who shipped gold ore to the cyanide plant near Tonopah. Some lead ore from the Carrie property was shipped to California and Utah.

1930-1932: Desert: 5 lode mines, 233 tons ore, 171.39 oz gold, 460 oz/silver, total value \$3,673 (1933 gold or \$20.67 t/oz) (\$0.34/oz for silver).

1930: Desert district (Gilbert): Five (5) lode mines in the desert district produced 414 tons of ore yielding \$8,128 in gold, 1,292 ounces of silver and 4,751 lbs of copper, valued in all at \$9,243 or \$22.33 in metals a ton. Most of the output was siliceous ore averaging nearly 2 ounces of gold to the ton, which came from the Homestake, Mammoth and Yellow Rose claims. The ore with some dump material containing copper was hauled by truck 20 miles to a siding on the Tonopah and Goldfield R.R. The ore amenable to cyanidation was shipped 15 miles by rail to the desert custom mill at Millers, and the copper ore was shipped to a smelter in Utah. In 1930 trucking, freight, and cyanidation charges at the desert mill were covered by a flat rate of



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\$8.75 a ton on \$30 ore, with an advance of \$1 a ton for every \$10 increase in value of the ore.

1931: Desert district (Gilbert): Five lode mines in the desert district produced 239 tons of ore yielding \$6,218 in gold and 511 ounces of silver valued together at \$6,366 or \$26.64 in metals a ton. In 1930, the district output was 414 tons of ore averaging \$22.33 a ton in gold, silver, and copper. Most of the output in 1931 was treated at the Desert Custom Mill at Millers; only 30 tons of siliceous gold ore shipped from Gilbert to a smelter in Utah. The green gold property was the largest producer of siliceous gold ore. The Mammoth is developed to a depth of 360 feet by a vertical shaft and 500 feet of drifts.

1933: Desert: 5 lode mines, 437 tons ore, 180.70 oz/ton gold, 654 oz. silver, total value \$3,964.

1934: Desert: 4 lode mines, 1,692 tons ore, 238.1 oz gold, 788 oz silver, total value \$8,831.

1935: Desert district and The Gilbert Mammoth Gold Mines Co., shipped a small quantity of ore in 1935 and treated some ore in its 15 ton mill.

1936: Production desert: 5 lode mines, 2 placer, 713 tons ore, 124.97 oz gold lode, 21.11 oz. placer gold, 792 oz. silver, 238 lb. lead, total value \$5,692.

Desert district: Three (3) lessees worked in the Mammoth and Last Chance Mine in 1936, and treated their output by amalgamation in a 15 ton mill; some other small operations were reported in the district.

1937 (1938) Not listed. (Prices 1938, \$35/oz Au, \$0.65/oz Ag).

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1938: Desert: 7 lode mines, 1 placer, 352 tons ore, 252 oz lode Au, 8 oz placer Au, 426 oz Ag, total value \$9,375.

Desert: In 1938, a lessee of the Homestake No. 1 Mine of the Gilbert Homestake Gold Mining Co., shipped 156 tons of gold ore which yielded 223 oz of gold and 280 oz of silver; 59 tons of the ore were treated at a custom cyanide plant and 97 tons were smelted.

1939: Desert: 6 lode mines, 130 tons ore, 80 oz Au, 355 oz Ag, total value \$3,041.

1940: Desert (Gilbert): 6 lode mines; 622 tons ore, 465 oz Au, 1,385 oz Ag, total value \$17,260.

Desert (Gilbert) district: Lessees at the Homestake Mine in 1940 shipped to custom cyanide plants 418 tons of ore from which 346 oz Au and 726 oz of Ag were recovered. In addition, 1 ton of high-grade ore shipped to a smelter contained 32 oz of Au and 46 oz Ag.

1941: Desert: 8 lode mines, 181 tons ore, 216 oz Au, 436 oz Ag, total value \$7,870.

Desert: 1 lode mine, 57 tons, 144 oz Au, 94 oz Ag, total value \$5,107.

1944: Desert: 1 lode mine, 1 ton ore, 1 oz Au, 48 oz Ag, total value \$69.00.

1949: Gilbert: 1 lode mine, 3 tons ore, 5 oz Au, 2 oz Ag, total value \$177.00.

1949-1970: The claims were relocated by several people who carried out an exploration and prospecting program to fulfill the Assessment requirements.

1970's: Additional drilling was carried out on the adjacent property.

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- 1978: Anaconda carried out a porphyry exploration program which led to the initial land acquisition in the Gilbert District.
- 1979-1981: Several holes were drilled by Anaconda to test the porphyry targets. Geochemical, geophysical and geological mapping were carried out.
- 1982: Further claims were acquired by Anaconda through a Lease Option with U.S. Borax.
- 1982-1984: Anaconda carried out extension drilling and geological mapping on the entire claim block.
- 1985: Anaconda shut down their Mineral Division and all their properties were put up for sale, including the Gilbert project.
- 1987: Sun Valley Gold Mines Ltd., optioned the property and carried out Phase 1 and 2 programs and the results are included in this report.

### **3.0 CURRENT WORK - December 1986, February 1987**

A field program was conducted on the Gilbert Project between December 12 to December 23, 1986 by a crew of two geologists and 1 assistant. The program included geological mapping and sampling of the underground workings and surface exposures, geochemical and trial geophysical (VLF) surveys over 14 kms (8.6 miles) of grid lines (an area of 1800 meters x 600 meters). The grid area covers the Black Mammoth - Monte Cristo epithermal vein and disseminated mineralization structures in both volcanic and sediment rocks. The grid area represents only approximately 20% of the entire claim block which covers 900 acres; this area has never been thoroughly explored by previous owners.

A total of 408 soil samples from the above grid were collected at 25 meter intervals and 75 rock chip samples were taken from accessible underground workings and surface showings (Figure 4).

A trial VLF-EM Survey was conducted over the entire grid area. The purpose of this survey was to aid in geological mapping, mainly in the area of heavy overburden, and to outline interesting structures and mineralization.

In February 1987 a Percussion Drilling Program was conducted on the property. A total of 845.2 m (2773 ft) was drilled to test the volcanic and sediment environments. For details, refer to Page 16-25.

#### **4.0 GEOLOGY**

##### **4.1 Property Geology (Figure 5)**

The oldest rocks in the Monte Cristo consists principally of dark colored shale, siltstone, phyllite, chert and minor limestone of the Palmetto Formation of Ordovician age (Ferguson 1953). Small stocks less than a kilometer in diameter intrude the Paleozoic rocks. The stock and related dikes have granitic to monzonitic composition, porphyritic texture and are commonly altered.

The greater part of the Monte Cristo mountains are underlain by volcanic and sedimentary rocks of the Tertiary age which unconformably overlie the Paleozoic strata and Mesozoic intrusive rocks.

Rhyolitic welded ash-flow tuffs and breccia the oldest Tertiary rocks, are overlain by shale, siltstone, sandstone, and limestone. Rhyolite flows, plugs and domes overlie and intrude the sedimentary rocks in the central and eastern parts of the Monte Cristo Mountains.

The younger rocks, also of Tertiary age, consist of widespread andesitic flow rocks that cover most of the higher portions of the Monte Cristo Mountains. These flows are called the Gilbert Andesite and are about 15 million years old (K-AR dating by Silberman and others, 1975). Overlying the andesite, in areas several kilometers east of Gilbert, is a thick sequence of lacustrine sediments and tuffs that are intruded by rhyolite domes dated at about 7 million years (Silberman, 1975).

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Both the rhyolitic rocks and andesite outcrop over wide areas, and probably were erupted over a considerable time span.

## **4.2 Stratigraphy**

The following are descriptions of a few rock types of the Palmetto sediments and Tertiary volcanic rock and intrusive units that were observed on the property during the recent mapping program, and also described in the reports written by Anaconda's geologists during the field programs between 1978 - 1984.

### **Palmetto Sediments**

#### **S-1 and S-2 Units:**

This unit consists primarily of siltstone and breccia. The siltstone is poorly exposed in the field (mainly as sub-outcrop) where it is mainly unsilicified, dark grey to black, thinly bedded, occasionally bleached and silicified. Sub-units of the siltstone are present.

The breccia consists of angular siltstone fragments in a pale grey matrix and exhibit various degrees of silicification. The breccia is often found near but not necessarily adjacent to younger volcanic units.

### **Tertiary Volcanic:**

The Tertiary volcanic comprises four (4) distinct tuff units which are described as follows:

#### **V-1 Unit:**

This unit is white in color and consists of crystal rich quartz and up to 3 mm in size, in a fine aphanitic matrix, often quartz crystals dominate with unrecognizable lithic fragments. This unit covers several locations on the property.



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- V-2 Unit:** The unit ranges between crystal to lithic tuff to crystal-lithic, lapillic tuff gray to white in color with recognizable fragments of feldspar, quartz crystal (less obvious than V-1 Unit), often feldspar crystals dominate.
- V-3 Unit:** This unit is generally white in color, fine grained to aphanitic, locally 5-10% small feldspar crystal (1 + 3 mm. in size), and 1 mm spherical ring, and thin streaky laminations (flow-banding).
- V-4 Unit:** This unit is light to dark green to brown, crystal lithic tuff to crystal lithic lapillic tuff crystal and consists of quartz, feldspar, biotite. This unit is exposed in several locations on grid area.

**INTRUSIVE (I-1, - I-2) UNITS:**

- I-1 Unit:** This unit comprises medium to coarse grained porphyritic with 2 - 4 mm quartz, feldspar, muscovite, and is exposed on the south part of the grid, mainly between Line 3+00S 3+00E to Line 6+00S 1+75E to 3+00E.
- I-2 Unit:** This unit is porphyritic in texture and comprises 30% feldspar phenocryst ranging between 2+5 mm in size in a fine aphanitic felsic matrix.

**ANDESITE (A-1, A-2) UNIT:**

- A1 Unit:** Andesitic flows. This unit is dark greenish in color, with abundant

-15-

1-3 mm white feldspar crystal in a dark green, fine grained ground mass with porphyritic texture. This unit is exposed on the northeast portion of the grid, mainly from Line 8+00N 2+00E to Line 12+00N 1+20E.

**A-2 Unit:** Fine grained dark basalt to andesite with 10% small (2 mm) mafic phenocryst dykes, and is exposed on the southern portion of the grid mainly between Line 4+20S 1+30E to Line 4+80S 1+00E.

#### 4.3 Mineralization

Surface and underground mapping, sampling and drilling on the Gilbert Project reveals the following features:

- The precious metal values are hosted in three (3) different environments: (1) The Tertiary volcanic, (2) epithermal veins in volcanic, sediments and intrusive and (3) disseminated gold mineralization (Carlin type) in both volcanic and sediment environments.
- The vein structure comprises quartz, calcite, barite, adularia and occasional gypsum with alunite and tan color (manganese) alteration.
- The Tertiary precious metal veins are rich in silica and are accompanied by generally high contents of Mn, Ba, Ag, As, and Te.
- Gold mineralization in the above types occur as native gold.
- Silver on the Gilbert Project is present as pyrargyrite ( $\text{Ag}_3\text{SbS}_3$ ), Argenite ( $\text{Ag}_3\text{SbS}_3$ ) and Cerargyrite ( $\text{Ag}_2\text{Cl}_2$ ).
- The two ore targets with the most potential on the Gilbert project is the Tertiary volcanics with mineralized veins and the disseminated gold mineralization in the sediments, and these will be the focus of the Phase 3 Drilling Program.

## 5.0 REVERSE CIRCULATION ROTARY DRILLING

The previous surface and underground exploration work outlined and confirmed the presence of gold-silver mineralization within the volcanic, sedimentary and epithermal veins system in both the above environments which exists on the Gilbert Project.

In February 1987, a Reverse Circulation Rotary Drilling program was conducted on the Black Mammoth - Monte Cristo property. This program was designed to test and evaluate the potential of gold-silver mineralization and pin-point areas of interest. Ten (10) holes were drilled for a total footage of 842.3m (2763 ft).

A summary of the 1987 drill holes coordinates the mineralized zones and the assay results are shown on **Table 1** (Pages 17-20).

The drilling was undertaken by Hackworth Drilling Co., of Nevada and Pollack Drilling Co., of Idaho using Chicago pneumatic and sechramm drill rigs.

Six (6) of these holes totalling 470.4 m (1543 ft) were drilled to test the mineralization hosted by volcanics and four (4) holes totalling 375 m (1220 ft) were drilled to test the mineralization hosted by sediments.

All the cutting from the drilling was examined in the field, and samples were taken from drilling footage at 1.5 m (5 ft) interval for entry depth of the hole, and sent to Chemex Labs in Vancouver for assaying. The results are recorded on Chemex Lab Assay Sheets and Drill Log Sheets in **Appendices ("A" and "B")**.

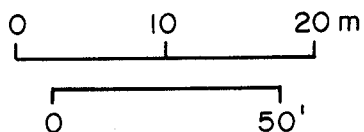
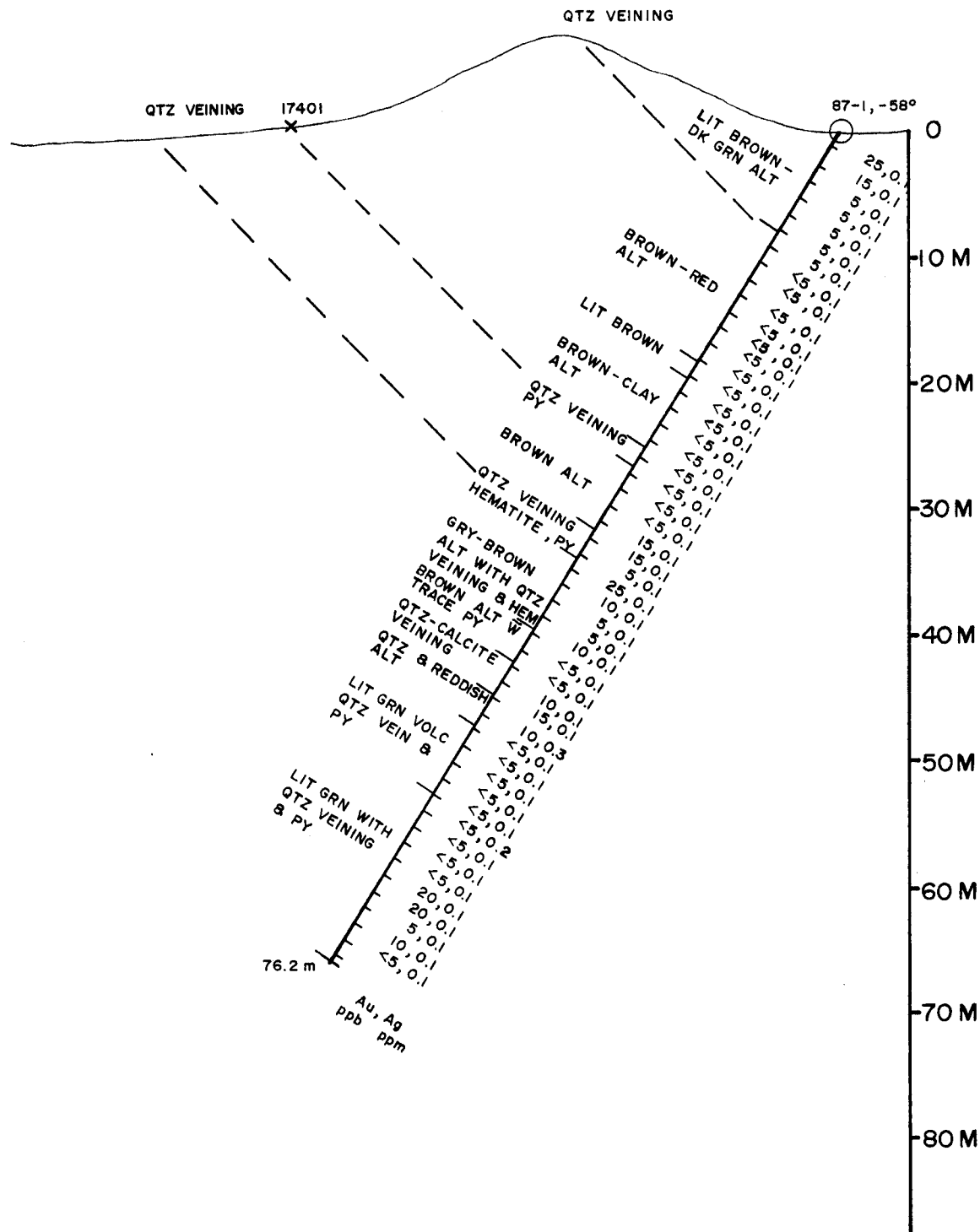
### 5.1 **Description of Drill Holes 87-1 to 87-10 (Figures 6-14)**

#### Hole 87-1 (Figure 6)

This hole was drilled from Line 10+71N, 0+74W to the west to intersect several easterly dipping veins exposed on surface on the east side of the

W

E



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BLACK MAMMOTH-MONTE CRISTO PROPERTY  
 GILBERT MINING DISTRICT  
 ESMERALDA COUNTY, NEVADA  
 DRILL HOLE 87-1 SECTION

SCALE: 1:500

FIG: 6

DRAWN BY: D.G.

DATE: MARCH, 1987

SURFACE PERCUSSION DRILLING PROGRAM - 1987

GILBERT PROJECT

TABLE #1

Page 1

DDH#	TOTAL FOOTAGE DRILLED	DIP	AZ.	COLLAR COORDINATES			MINERALIZED ZONE						REMARKS
				NORTH	EAST	ELEV.	FROM	TO	FOOTAGE	Au oz./t	Ag oz./t		
87-1	76.2m	-58°	320°	10+71N	0+74W		-	-	-	-	-	-	Volcanic
87-2	79.2m	-65°	136°	11+73N	1+22W		56.4m	57.9m	1.5m	0.005	0.032	0.032	Volcanic
							70.1m	74.7m	4.6m	0.036	0.19		
							OR 73.2m	74.7m	1.5m	0.103	0.13		
87-3	78.6m	-55°	122°	8+38N	1+26W		50.3m	51.8m	1.5m	0.020	0.009	0.009	Volcanic
87-4	97.5m	-80°	134°	2+79N	1+19W		36.6m	38.1m	1.5m	0.001	0.26	0.26	Volcanic
							47.2m	48.7m	1.5m	0.002	0.32	0.32	



SURFACE PERCUSSION DRILLING PROGRAM - 1987

GILBERT PROJECT

TABLE #1

Page 2

DDH#	TOTAL FOOTAGE DRILLED	DIP	AZ.	COLLAR COORDINATES			MINERALIZED ZONE					REMARKS
				NORTH	EAST	ELEV.	FROM	TO	FOOTAGE	Au oz./t	Ag oz./t	
87-4	Cont'd.						56.4m	57.9m	1.5m	0.039	0.51	
87.5	108.2m	-60°	159°	0+53N	0+99E		16.8m	18.3m	1.5m	0.001	0.24	Volcanic
							19.8m	21.3m	1.5m	Tr.	0.38	
							35.0m	39.6m	4.6m	0.001	0.19	
							94.5m	99.1m	4.6m	0.001	0.14	
87-6	30.5m	-58°	113°	7+31N	1+27W		22.9m	24.4m	1.5m	0.001	0.15	Volcanic
							25.9m	30.5m	4.6m	0.007	1.58	
87-7	91.4m	-55°	312°	2+26S	2+22E		29.0m	30.5m	1.5m	0.003	0.36	Sediments

SURFACE PERCUSSION DRILLING PROGRAM - 1987

GILBERT PROJECT

TABLE #1

Page 3

DDH#	TOTAL FOOTAGE DRILLED	DIP	AZ.	COLLAR COORDINATES			MINERALIZED ZONE					REMARKS
				NORTH	EAST	ELEV.	FROM	TO	FOOTAGE	Au oz./t	Ag oz./t	
87-7	Cont'd.						42.7m	47.2	4.5m	0.001	0.13	
							50.3	53.3	3.0m	0.009	3.03	
							OR 50.3m	51.8m	1.5m	0.016	5.98	Sediments
							64.0m	67.0m	3.0m	0.008	0.54	
87-8	97.6m	-55°	137°	2+29S	2+41E		27.4m	28.9m	1.5m	0.048	0.01	Sediments
							45.7m	53.3m	7.6m	0.004	0.32	
							59.4m	67.0m	7.6m	0.002	0.29	
							80.8m	81.3m	1.5m	0.007	0.07	
87-9	85.4m	-50°	335°	3+57S	2+26E		3.1m	6.1m	3.0m	0.001	0.22	Sediments

TABLE #1

[illegible]

-21-

eastern limb of the fold structure exposed in the workings of the Last Hope Prospect. Sample No. 17401 assayed 0.154 oz/ton Au and 18.29 oz/ton Ag taken from the above hole which is the target of this hole. This hole was drilled at  $-58^{\circ}$  to a depth of 76.2 m (250 ft). It intersected several vein structures with disseminated sulphide (pyrite) mainly from 29 - 30.5 m, 36.6 to 39.6 m, 44.2 - 45.7 m, 50.3 - 53.3 m, 61.0 - 62.5 m, but fails to intersect any significant gold-silver mineralization.

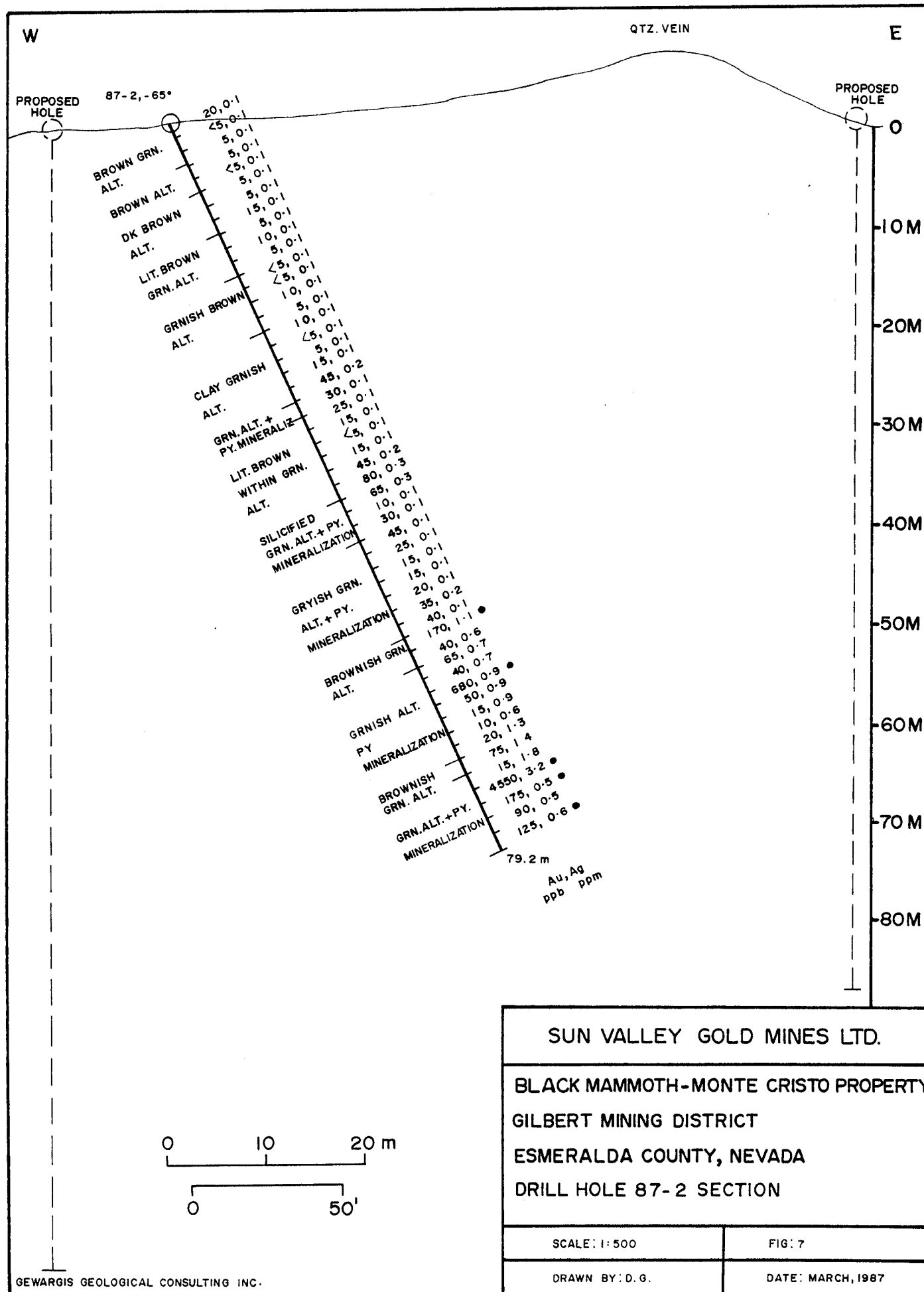
The highest gold value is 25 ppb and 0.1 ppm silver, which is located at intervals 0 to 1.5 m, 39.6 to 40.1 m. Other gold values range between 45 to 20 ppb. The highest silver value is 0.3 ppm which is located at interval 53.3 to 54.8 m. The above drilling results of Hole 87-1 show that the highest gold and silver values are located at the footwall of the quartz vein structure.

#### Hole 87-2 (Figure 7)

This hole was drilled from Line 11+73N, 1+22W to the east to test the western limb of a fold structure exposed in the workings of the Last Hope Prospect where high grade gold was produced, and also to test the north extension of the volcanics. A grab sample from mineralized material, assayed 0.374 oz/ton Au, and 1.45 oz/ton Ag.

Hole 87-2 was drilled at  $-65^{\circ}$  to a depth of 79.3 m (260 ft), and intersected a zone of grey-brown to green alteration associated with pyrite mineralization from 30.5 to 79.3 m. Within the above zone several sections of significant gold anomalous values were intersected mainly from 56.4 to 57.9 m and assayed 0.005 oz/ton Au, 0.032 oz/ton Ag, and from 62.5 m to 76.2 m, assayed 0.018 oz/ton Au, 0.078 oz/ton Ag over 13.7 m within this section from 73.2 to 76.2 m gold values assaying 0.069 oz/ton Au over 3 m. or 0.103 oz/ton Au over 1.5 m from 73.2 to 74.7 m, and also from 70.1 to 73.2 m silver values assaying 0.23 oz/ton Ag over 3.1 m.

This hole was stopped at the end of drilling in a mineralized zone.



**Hole 87-3 (Figure 8)**

Hole 87-3 was drilled from Line 8+38N, 1+26W to the east to test the quartz vein exposed in Shaft #1 and other vein structures in this area. This hole was drilled at -55° to a depth of 78.7 m and has intersected a narrow section of mineralized zone from 45.7 to 53.3 m assaying 0.005 oz/ton Au and 0.012 oz/ton Ag. Within this zone, a section from 50.3 to 51.8 m assayed 0.020 oz/ton Au, 0.01 oz/ton Ag.

This hole was drilled through an altered zone varying between light brown, grey to dark brown from 1.5 to 48.8 m then intersected dark green volcanics with pyrite mineralization.

The gold values within this hole vary between less than 5 to 55 ppb and silver between 0.1 to 1.4 ppm.

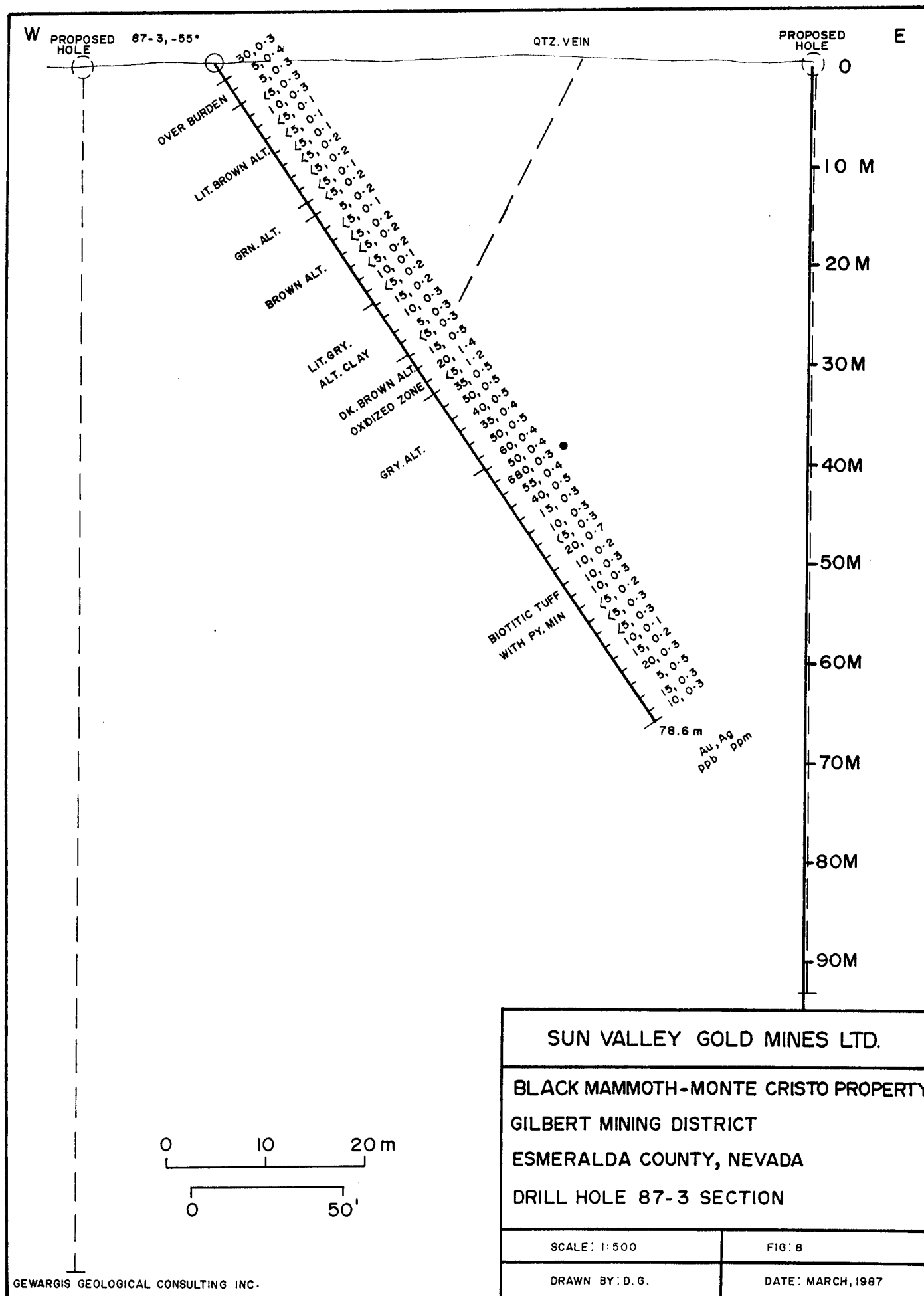
**Hole 87-4 (Figure 9)**

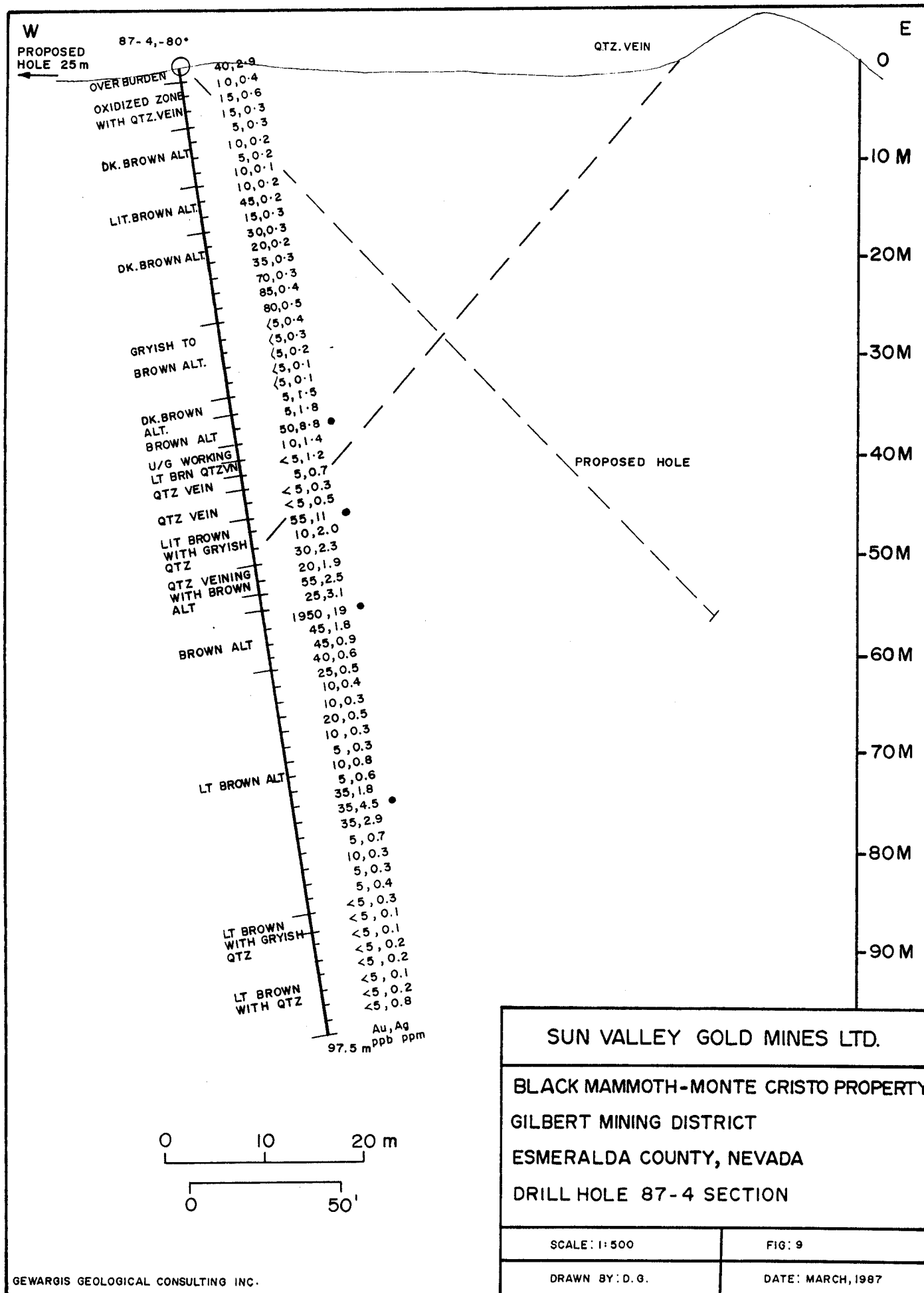
Hole 87-4 was drilled from Line 2+79N, 1+19W to the east to test the south extension of the volcanic environment below the present workings at the north extension of the 'G' Portal.

This hole was drilled at -80° to a depth of 97.5 m and intersected several significant gold and silver values mainly from 36.6 m to 38.1 m assaying 0.001 oz/ton Au, 0.26 oz/ton Ag and from 47.2 to 48.7 m, assaying 0.002 oz/ton Au, 0.32 oz/ton Ag; from 56.4 - 57.9m assaying 0.039 oz/ton Au, 0.51 oz/ton Ag over 1.5m (5 ft.) width. This hole intersected parts of the workings mainly from 38.1 to 39.6m.

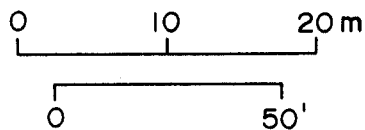
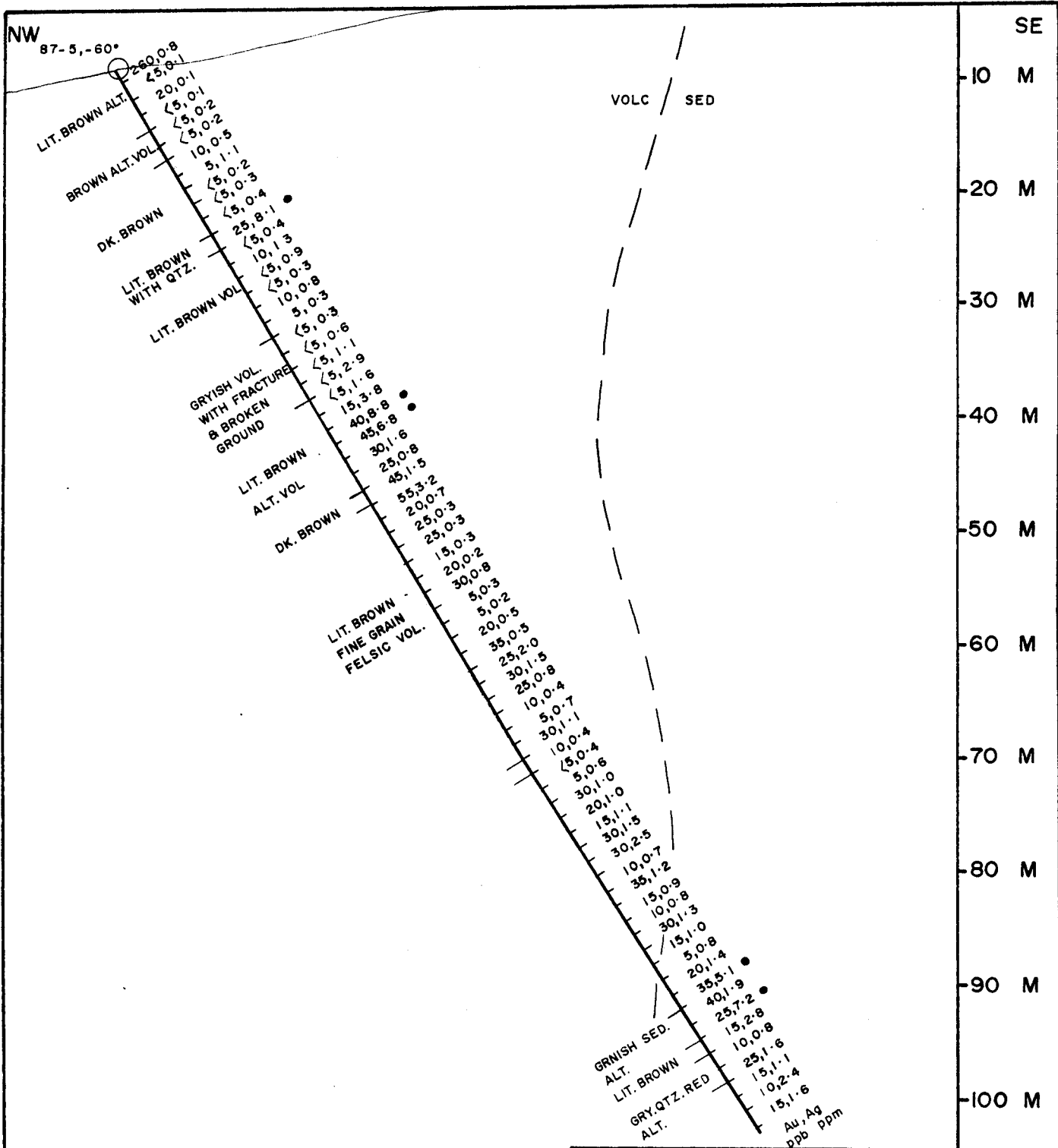
**Hole 87-5 (Figure 10)**

This hole was drilled from Line 0+53N 0+99E to the east to test the down









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ESMERALDA COUNTY, NEVADA  
DRILL HOLE 87-5 SECTION

SCALE: 1:500

FIG: 10

DRAWN BY: D.G.

DATE: MARCH, 1987

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dip extension of the quartz vein structure in "C" Portal. It was the only hole drilled to test the quartz mineralized vein exposed in the underground workings in the sediments Area #2. Hole 87-5 was drilled at  $-60^{\circ}$  to a depth of 108.2 m, and intersected a zone of dark gray with quartz veining, and reddish hematitic alteration from 100.6 to 108.2 m. This hole failed to intersect the main vein structure, however, intersected several zones of encouraging silver values mainly from 16.8 to 18.3 m assaying 25 ppb (0.001 oz/ton) Au, 8.1 ppm (0.24 oz/ton) Ag; from 19.8 to 21.3 m assaying 10 ppb Au, 13 ppm (0.38 oz/ton) Ag; from 36.6 to 39.6 m assaying 42.5 ppb (0.001 oz/ton) Au, 7.8 ppm (0.23 oz/ton) Ag; and finally from 94.5 to 99.1 m assaying 33 ppb (0.001 oz/ton) Au, 4.7 ppm (0.14 oz/ton) Ag.

#### Hole 87-6 (Figure 11)

Hole 87-6 was drilled from Line 7+31N 1+27W to the east to test several vein structures exposed on surface near old workings in the volcanic environment (Area #1) along the major structure, and intersected a white quartz-calcite vein with 10% volcanic and mineralization from 21.3 to 29 m at a depth of 20 m below the surface.

The most significant gold-silver values that were intersected in this hole was from 22.9 to 24.4 m and assayed 45 ppb (0.001 oz/ton) Au, 5.2 ppm (0.15 oz/ton) Ag, and from 25.9 m to 30.5 m (end of hole), assaying 238 ppb (0.007 oz/ton) Au and 1.58 oz/ton Ag.

#### Hole 87-7 (Figure 12)

Hole 87-7 was drilled from Line 2+26S 2+22E in the vicinity of the Anaconda Hole GLB-18, which intersected a section from 70.1 to 71.6 m and assayed 0.06 oz/ton Au, 4.12 oz/ton Ag.

This hole was drilled to the west to test the quartz-barite mineralized veins within the sediments at depth and to assess the potential of disseminated sulphide in this environment.

Also Holes 87-8, 87-9 and 87-10 were drilled to test the same concept in this environment which resembles the Carlin type deposit. The above holes were drilled because of their easy accessibility; other potential areas in sediments were not accessible for drilling at that time.

The most significant sections intersected in Hole 87-7 was from 50.3 to 51.8 m assaying 0.016 oz/ton Au, 5.98 oz/ton Ag at a depth of 43 m below the surface; from 65.5 to 67.0 m assaying 0.012 oz/ton Au, 0.82 oz/ton Ag at a depth of 56 m below the surface. Other interesting and encouraging gold-silver zones intersected by this hole are from 6.1 to 7.6 m assaying 0.002 oz/ton Au, 0.12 oz/ton Ag; from 29 to 32 m assaying 0.003 oz/ton Au, 0.25 oz/ton Ag; from 42.7 to 51.8 m assaying 0.003 oz/ton Au, 0.58 oz/ton over 9.1 m (30 ft), and finally from 64.0 to 67.0 m assaying 0.008 oz/ton Au, 0.54 oz/ton Ag.

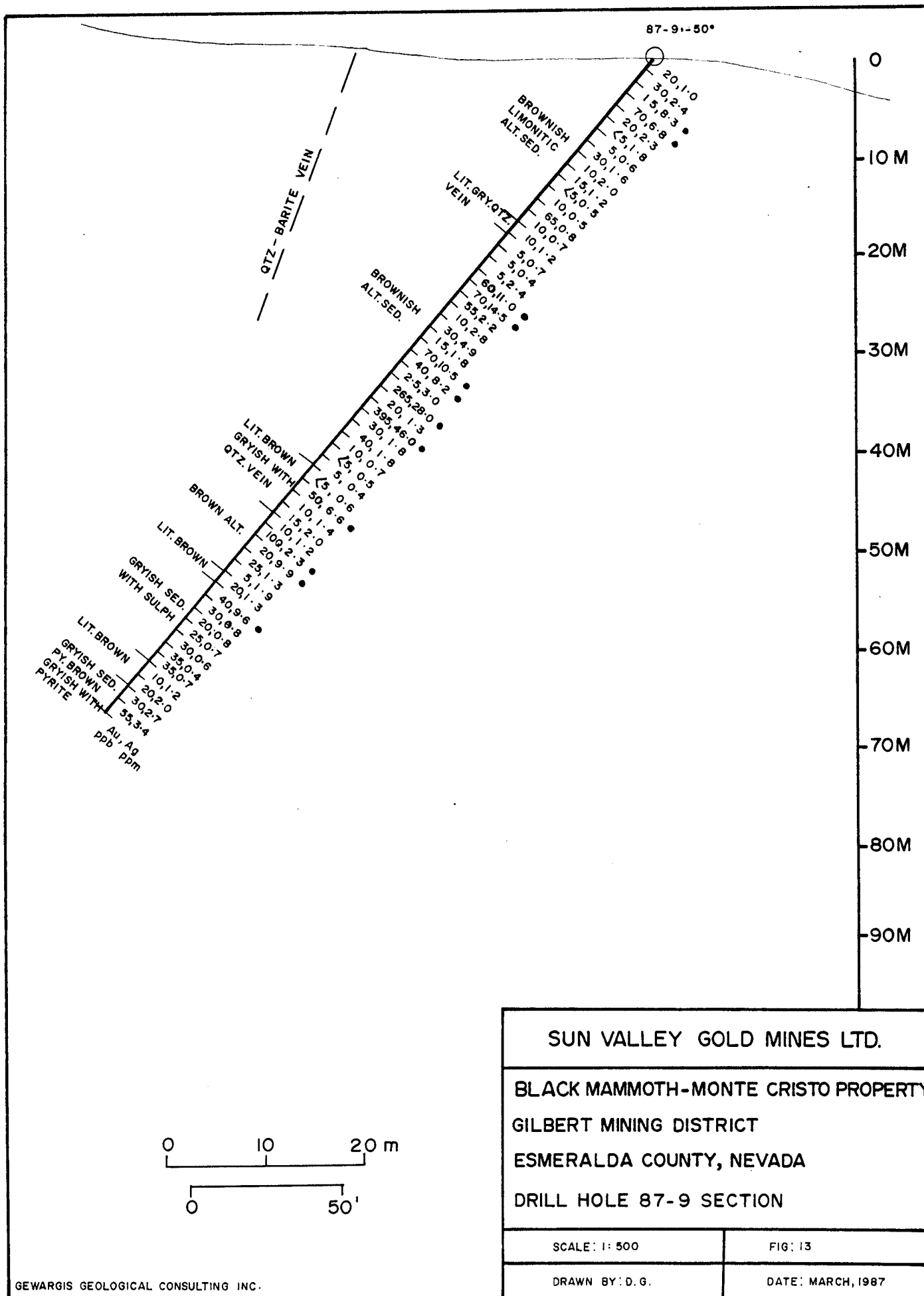
#### Hole 87-8 (Figure 12)

Hole 87-8 was drilled from Line 2+29S 2+41E, 20 m east of Hole 87-7 in the vicinity of Anaconda Hole GLB-18. This hole was drilled at -55° to a depth of 97.6m to the east (Az 137°) to test the sediment environment.

Hole 87-8 is similar to Hole 87-7 and intersected several significant gold-silver zones and the most interesting zone is from 27.4 to 28.9 m assaying 0.048 oz/ton Au, 0.01 oz/ton Ag at 23 m below the surface. Other zones are from 45.7 to 53.3 m assaying 0.004 oz/ton Au, 0.31 oz/ton Ag at 37 m below the surface and finally from 59.4 to 67.1 m assaying 57 ppb (0.002 oz/ton) Au, 10 ppm (0.29 oz/ton) Ag at 48 m below the surface.

#### Hole 87-9 (Figure 13)

Hole 87-9 was drilled from Line 3+57S 2+26E to test the high grade silver barite vein exposed on surface in the sediment environment, and this hole was drilled to the west (Az 335°) at -50° to a depth of 85.4 m.



-25-

This hole intersected several interesting silver-gold mineralized zones. The most significant is from 24.4 to 45.7 m assaying 0.003 oz/ton Au, 0.33 oz/ton Ag over 21.3 (70 ft) below the surface. Within this zone, a section of 0.012 oz/ton Au, 1.42 oz/ton Ag over 1.5 m. Other interesting zones are from 3 m to 6.1 m assaying 0.001 oz/ton Au, 0.22 oz/ton Ag; from 54.9 to 56.4 m assaying 0.001 oz/ton Au, 0.19 oz/ton Ag; from 62.5 to 64 m assaying 0.001 oz/ton Au, 0.29 oz/ton Ag and 68.6 to 70.1 m assaying 0.001 oz/ton Au, 0.28 oz/ton Ag.

#### **Hole 87-10 (Figure 14)**

Hole 87-10 was drilled at Line 0+62S 3+69E to test the quartz-barite and green alteration within the sediments environment, and was drilled to the west (Az 295°) at -50° to a depth of 100.6 m.

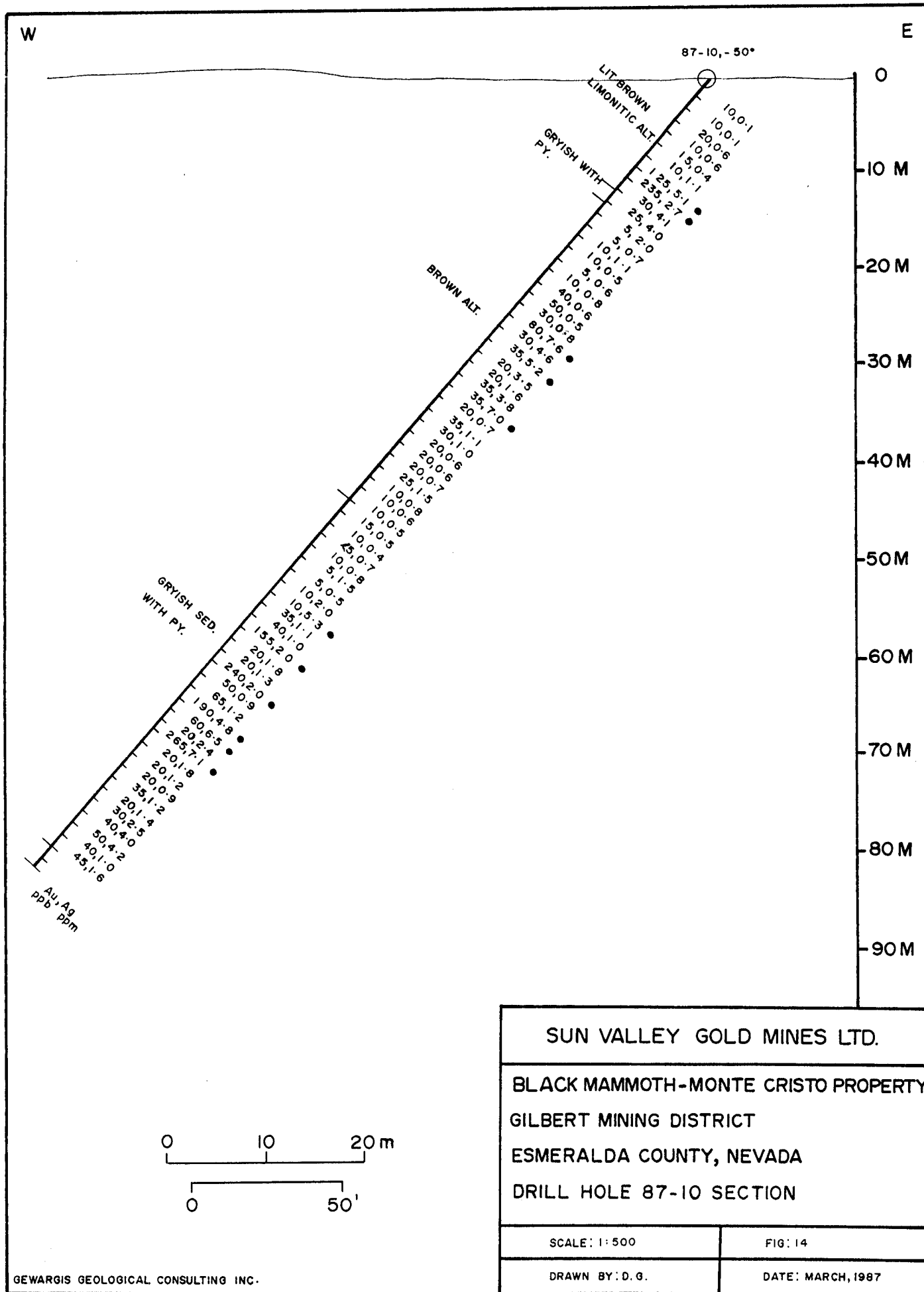
This hole intersected several interesting silver bearing zones with gold values and the most significant zone is from 10.6 to 12.1 m assaying 0.012 oz/ton Au, 0.77 oz/ton Ag at 9 m below the surface. From 70.1 to 71.6 m assaying 0.004 oz/ton Au, 0.63 oz/ton Ag at 55m below the surface.

Other interesting zones intersected by this hole are from 29.0 to 33.5 m assaying 0.001 oz/ton Au, 0.179 oz/ton Ag, and from 79.3 to 85.3 m assaying 0.004 oz/ton Au and 0.16 oz/ton Ag.

### **6.0 GEOCHEMICAL SURVEY (Figure 15 - 18)**

#### **6.1 General**

Geochemical sampling was carried out on the entire grid that was established during the Phase 1 program. This survey was carried out in conjunction with geological mapping and sampling.



A total of 408 soil samples were collected from 25 meter spacings and at a depth of 0.2 meters deep. This was done in order to evaluate the mineralization potential of the property and in particular the gold quartz vein within the Palmetto Formation and Tertiary volcanics. The samples were taken from "B" Horizon which has been developed in most areas, and is dark brown to reddish in color and organically poor.

All of the samples were sent to Chemex Laboratory in Vancouver, B.C. to test and analyze for 30 elements by ICP (Inductively Coupled Plasma). Gold was tested by AA (Atomic Absorption) Method. These analytical results were used to pin point the anomalous areas of interest, and to understand the geochemical environment of this property.

Previous geochemical work by Anaconda has indicated that the Gilbert project area may be divided into seven (7) topographic areas that have distinct geochemical associations, and the Black Mammoth - Monte Cristo is one of these areas. The geochemical associations appear to indicate at least four (4) alteration events, two (2) of which had anomalous concentrations of Au, Ag, As and Sb. The Palmetto sediments and Tertiary tuff have similar anomalous concentrations of Au, Ag in surface soil, rock chip samples and also drill hole cutting samples.

Overall geological and geochemical surveys indicate that the Monte Cristo range appears to be a favourable environment for epithermal and disseminated gold deposits.

## **6.2 Results and Interpretation**

Interpretation of available assay results for Au, Ag, As, and Ba, indicate that anomalous areas for these elements were identified within the survey grid. The geochemical anomalies coincide, in part, with known mineralization (vein and disseminated) exposed on surface and these are described as follows:

### Area 1 - Volcanic Environment

This trend extends between Line 1+00N, 0+50W to Line 11+00N, 0+75W. The values for Au, Ag, As and Ba, vary from one station to another and is concentrated in certain lines mainly Line 1+00N, 0+00W to 1+25W to Line 3+00N, 0+50W to 1+00W, Line 9+00N, 0+25W to 1+00W, Line 11+00, 0+50W to 1+00W to Line 12+00N, 0+50W to 1+50W. This area occurs within the volcanic unit V1 - V4, and is considered a major exploration target. Five (5) holes were drilled during February 1987, and four (4) of these holes intersected significant gold-silver results.

The highest Au values is 690 ppb (0.02 oz/ton) located at Line 12+00N, 1+25W and is in the area of the Last Hope Prospect where high grade gold was produced in the 1924's. Most of the gold highs coincide with known veins exposed on the surface in isolated areas; others in between are covered by a thin overburden area which will be part of the Phase 3 drilling program. Other anomalous gold values range between 25 to 600 ppb.

The highest silver (Ag) value is 19.2 ppm (0.56 oz/ton) Ag which is located at Line 9+00N, 1+00W. Other anomalous values for Ag range between 0.6 to 6.2 ppm (0.18 oz/ton Ag). The highest arsenic (As) value is 355 ppm which is located at Line 11+00N, 0+75W. Other anomalous values for As, range between 35 to 340 ppm.

The highest barium (Ba) value is 850 ppm, and is located at Line 9+00N 1+00W. Other anomalous values for Ba, range between 140 to 750 ppm.

### Area 2 - Sediment Environment

This anomaly represents Au, Ag, As and Ba mineralization and is northeast trending between Line 4+00S 1+50W to 2+50W to Line 3+00N 1+75W to 2+25W, and represents Target Area 2 in the sediment environment (S-1, S-2) where several veins are exposed on the surface. The most significant one is the major vein which has been explored and mined in the underground workings of Portals A, B, C, and D on the west side of the anomaly.



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Several barite-quartz-calcite veins are exposed on the southend of this area. Four (4) holes were drilled in this area and intersected significant silver results. The highest Au value is 270 ppb (0.008 oz/ton) located at Line 1+00N, 2+50E. Other anomalous Au values range between 25 to 230 ppb. The highest Ag value is 9.2 ppm (0.27 oz/ton) located at Line 3+00S 2+00E, where several barite veins are exposed. Other anomalous Ag values range between 0.06 to 8.4 ppm (0.24 oz/ton).

The highest As value is 410 ppm located along Line 1+00N, 2+50E. Other anomalous As values range between 35 to 320 ppm.

The highest Ba value is 3040 ppm, located at Line 2+00N 0+50E. Other anomalous Ba values range between 190 to 259 ppm.

### Area 3 - Sediment Environment

This anomaly represents Au, Ag, As, and Ba mineralization and is northeast trending between Lines 6+00N, 1+50W to 1+75W and Line 8+00N, 1+50W to 1+75W. The highest Au value is 40 ppb, located at Line 6+00N, 2+00E. Other anomalous Au values range between 25 to 30 ppb.

The highest Ag value is 4.4 ppm (0.17 oz/ton) located at Line 7+00N, 1+25W. Other anomalous Ag values range between 0.6 to 2.0 ppm. The highest As value is 75 ppm located at Line 6+00N, 1+75E. Other anomalous As values range between 35 to 40 ppm.

The highest Ba value is 1100 ppm, located at Line 6+00N 1+75E. Other anomalous Ba values range between 170 to 920 ppm.

### Area 4 - Intrusive

This anomaly represents Au, Ag, As, and Ba mineralization with high silver values in rock chip up to 140 oz/ton Ag; stock work and veins occur within this area and are located between Line 6+00S, 0+75E to 2+75E and Line 5+00S, 0+25E to 2+50E.

The highest Au value in soil is 350 ppb (0.010 oz/ton) and is located at Line 6+00S, 1+50 E. Other anomalous Au values range between 25 to 60 ppb.

The highest Ag value in soil is 5.8 ppm (0.17 oz/ton) and is located at Line 6+00S, 1+00E. Other anomalous Ag values range between 0.6 to 3.2 ppm.

The highest As value in soil is 250 ppm and is located at Line 6+00S, 1+50E. Other anomalous As values range between 35 to 95 ppm.

The highest Ba value in soil is 1280 ppm and is located at Line 6+00S 2+75E. Other anomalous Ba values range between 190 to 1150 ppm.

In general, the Geochemical Survey on the Grid area confirmed the presence of four (4) main mineralized trends, which coincide with the main showings on the property. Also, it proved to be an excellent tool for exploration that could be used in evaluating the rest of the claim block in future exploration and developing stages.

## **7.0 UNDERGROUND MAPPING AND SAMPLING (Figure 20, 21)**

Several underground workings exist on the property mainly in the grid area. The most interesting ones are on the Last Hope prospect in the volcanics, the A,B,C,D, and 'F' Portals in the sediments, 'G' Portal (Mammoth Prospect) and Shaft #1 in the volcanics. Most of these prospects have been worked intermittently between 1890 and 1924.

### **Last Hope Prospect:**

Located at Line 12+00N on the western portion of the Red Cloud #1,2 claims. Drill Holes 87-1, 87-2 were drilled to test this prospect. The Last Hope prospect was the site of the discovery of high grade ore by the Gilbert brothers in the fall of 1924. The mineralization in the area consists of brecciated volcanics cemented with fine grained quartz. The present workings are inaccessible, but could be reached by a 30.5 m shaft a short distance northwest of the discovery point.

**'A' Portal (Figure 19)****Portal Elevation: 1954 m (6410 ft)**

This portal is located at Line 0+61N 1+04E, and is driven easterly through the volcanics to 46 m, and the contact between the volcanics (tuff) and light gray fine grain sediment at this point is dipping to the east 75°.

The main vein is exposed at 80 m from the portal striking 44° dipping between 65° to 90° west. The mineralogy of this vein comprises of a vuggy quartz, calcite, adularia, alunite with manganese oxidized and limonitic staining. The vein is fairly uniform and ranges in width between 0.04 m to 0.8 m.

Ten (10) samples were taken from the vein structure, and the gold values range between trace to 0.142 oz/ton and silver values range between 0.035 to 0.29 oz/ton. Several stopes, shaft, and an ore bin have been developed on the vein structure.

Numerous veinlets or shears ranging between 2 cm to 0.3 m with quartz and manganese oxides have been developed on both hanging and footwalls of the vein structure. Assay results from the sediments range between trace to 0.038 oz/ton Au and 0.020 to 0.21 oz/ton Ag.

**"B" Portal (Figure 19)****Portal Elevation: 1969 m (6460 ft)**

This portal is located at Line 1+90N 1+80E and is driven southwest along the vein structure. The vein is exposed in the drift for a distance of 104 m, striking 30° - 35°, dipping 68° to 85° westerly and occurs in light gray fine grained siliceous sediments.

The main vein consists of vuggy quartz, calcite, adularia, alunite with black manganese and brown limonitic staining. The vein zone with alterations is 0.2 to

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0.5 m wide. Twelve (12) samples were taken from the vein and the sediments. Six of these samples were taken from the vein structure. The highest gold value is 0.314 oz/ton Au and silver 0.83 oz/ton Ag. Other values range between 0.030 to 0.146 oz/ton Au, and 0.178 to 0.67 oz/ton Ag. The values for both gold-silver in sediment rock range between 0.001 to 0.166 oz/ton Au, 0.07 to 0.40 oz/ton Ag.

Several stopings up to the surface range between 5 to 10 m long occur within the working area with only one winze down approximately 5 m.

### **"C" Portal (Figure 19)**

#### **Portal Elevation: 1964 m (6442 ft)**

This portal is located at Line 0+84S 1+60E, and is driven 25 m east and then northeast/southwest on the vein structure for a distance of 55 m. The vein structure strikes 55° and dips between 45° to 90° west.

The vein consists of vuggy quartz, calcite, adularia with black manganese and brown limonitic staining and is 0.3 to 0.5 m wide. It is cut by parallel high angle fault at the end of the drift with northwest side down. Several small stope areas exist within this structure and a winze about 6.1 m deep. The highest gold value is 0.774 oz/ton Au and 0.90 oz/ton Ag.

### **"D" Portal (Figure 19)**

#### **Portal Elevation (6422 ft)**

This portal is located at 0+60S 1+63E, and is driven southeast through the volcanic and sediments. It intersects the volcanics at 15 m from the portal and the volcanic-sediment contact at this point is 25° west.

The main vein structure is exposed in the drift at 30 m from the portal trending north-south and dipping 77° to 90° easterly.

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The above vein comprises of weak quartz, adularia, alunite in brecciated fault zone, average width of this zone up to 0.5 m with 0.2 m quartz vein, associated with the fault zone and limonitic, hematitic with local manganese staining. Numerous narrow silicified breccia, gypsum and quartz veinlets occur on the hanging wall of the main quartz vein.

The vein appears to have low gold silver values. The highest gold-silver value being 0.106 oz/ton Au and 0.245 oz/ton Ag.

#### **"E" Portal (Figure 4)**

This portal is located at Line 11+10N 1+00W and driven at Azimuth of 127° for a distance of 23 m in greenish clay alteration with abundant white feldspar crystals 1 to 5 mm in size, and limonitic staining. Two samples were taken from this portal and gold-silver values range between 20 to 30 ppb and silver between 0.9 to 1.1 ppm.

#### **"F" Portal (Figure 4)**

This portal located at Line 6+90N 0+80E along the contact between the volcanics and sediments was driven southeasterly along the vein for a distance of 14 m. At this point stopping to the surface exists. A winze is developed to approximately 10 m deep where an inaccessible working to the southeast (approximately 5.0 m) is possibly connected to the other shaft in this area.

The vein is 0.4 m wide and consists of quartz/barite and continues up to the surface to the middle of the workings. The strike of the vein is 145°, and dips 48° to 85° easterly.

Several samples were taken from the vein structure, sediments and muck pile. The assay results from the vein structure vary between 0.038 to 0.088 oz/ton with up to 27.77 oz/ton Ag.

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One grab sample was taken from the muck pile near the portal consisting of quartz/barite and assayed 0.056 oz/ton Au, 13.96 oz/ton Ag.

The "F" Portal vein structure is associated with the Barite vein and has high silver values. It is considered a primary target for high silver values, and good gold values.

### "G" Portal (Figure 20)

The 'G' Portal, also known as "The Mammoth Prospect" is located at Line 1+73N 0+70W. This prospect develops a part of the well-defined vein which strikes in a southwesterly ( $235^{\circ}$  -  $240^{\circ}$ ) and dipping westerly  $45^{\circ}$  to  $53^{\circ}$  in the volcanic rocks. The tunnel level comprises about 152.0 m of irregular workings, mostly in the footwall side of the vein.

At 47 m from the portal an inclined shaft was sunk 44.5 m on the dip of the vein, which varies from  $38^{\circ}$  to  $45^{\circ}$  N.W. Several levels were started on the vein mainly from 15 m, 23.0 m, 30 m and at 44.5 m.

The vein is fairly well defined, though the walls are irregular in places and has a width of 3.1 m to 9.1 m. The greater part, especially along the footwall is coarsely crystalline banded white and light brown calcite. The precious metals occur close to the hanging wall where the vein consists of quartz in part fine grained, calcite with a little gypsum and anhydrite.

It has been noted that small dark patches in the fine grained white quartz contains very finely divided argentite.

Several samples were taken from the surface and underground at various levels. The gold values vary between trace to 0.032 oz/ton Au and silver between 0.012 to 1.49 oz/ton Ag.

**Shaft No. 1 (Figure 4)**

This shaft is located at Line 8+80N 1+00W and was sunk on a quartz vein. Three (3) samples were taken from the shaft area; one sample from the quartz vein structure assayed 0.032 oz/ton Au, 3.37 oz/ton Ag and others from altered massive tuff, assayed 0.016 oz/ton Au, 1.28 oz/Ton Ag. Also, a grab sample was taken from the muck pile near the shaft and consists of white tuff with disseminated pyrite, dark brown alteration assayed 0.038 oz/ton Au, 4.96 oz/ton Ag.

Drill Hole 87-3 was drilled in this vicinity to test the vein structure at depth.

**8.0 SUMMARY AND CONCLUSIONS**

The studying and examination of the data on the Gilbert property revealed the following:

- 1) The property has a history of intermittent exploration and production over a long period from early 1880 to present.
- 2) It was only in 1978 that efforts were made consistent or careful enough to indicate the economic potential.
- 3) There are four (4) favourable geological areas which carry significant gold-silver values in place and appear to offer at present the best potential for developing targets of economic interest. These areas are as follows:
  - The volcanic (Area 1) has the potential target area of 1100 m strike length and has been tested by drilling from 5 sites with very encouraging results.
  - The sediments (Area 2) has potential target area of 1300 m strike length, and has been tested in one location only, with (4 drill holes) with encouraging gold-silver values.

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- The main vein structure (Area 3) has a potential target area of 200 m strike length, and has been developed by A, B, C, D, Portals and the vein at Portal 'C' was tested by one drill hole.
- The intrusive (Area 4) has the potential target area of 300 m strike length, with high-silver gold values in vein and stockworks.

- 4) Surface sampling from the above four (4) areas show very encouraging and high results for both gold-silver.

The highest gold value for Area 1, is 0.374 oz/ton at Line 12+10N, 0+70W and the highest silver is 18.29 oz/ton at Line 10+80N 1+25W. The highest gold value for Area 2, is 0.330 oz/ton, and the highest silver value is 27.4 oz/ton. The highest gold value for Area 4, is 0.290 oz/ton Au, 140.37 oz/ton Ag.

- 5) A Geochemical Survey for both rock & soil has confirmed the potential of these areas and revealed anomalous Au, Ag, As, Ba, which coincide with vein structures in these areas.
- 6) A Reverse Circulation Drilling Program (1987) demonstrated that significant gold-silver values intersected, and also the drilling has explored the top level of the epithermal system on the Gilbert property. Most of the significant values are Hole 87-2 which intersected a zone assaying 0.036 oz/ton Au, 0.19 oz/ton Ag over 4.6 m. Within this zone a section of 1.5 m assaying 0.103 oz/ton Au, 0.13 oz/ton Ag.

**Hole 87-4** intersected a mineralized zone assaying 0.039 oz/ton Au, 0.51 oz/ton Ag over 1.5 m.

**Hole 87-6** intersected a mineralized zone at the end of the hole assaying 0.007 oz/ton Au, 1.58 oz/ton Ag over 4.6 m.



Hole 87-7 intersected a mineralized zone with high silver values assaying 0.009 oz/ton Au, 3.03 oz/ton Ag over 3.0 m. Within this zone a section over 1.5 m assayed 0.016 oz/ton Au, 5.98 oz/ton Ag.

Hole 87-8 intersected several mineralized zones with good silver values assaying 0.004 oz/ton Au, 0.31 oz/ton Ag over 7.6 m and 0.002 oz/ton Au, 0.29 oz/ton Ag.

Hole 87-9 intersected a high silver zone of 0.012 oz/ton Au, 1.42 oz/ton Ag over 1.5 m.

Hole 87-10 intersected several good silver mineralized zones, mainly 0.012 oz/ton Au, 0.77 oz/ton Ag over 1.5 m, and 0.004 oz/ton Au, 0.63 oz/ton Ag over 1.5 m.

- 7) Detailed mapping and sampling had shown that several quartz-calcite barite vein structures exist within the property in three different environments, volcanic, sediments and intrusive with high silver values up to 28 oz/ton Ag in sediments, and up to 140 oz/ton Ag in intrusive, 18 oz/ton Ag in volcanics.
- 8) An alteration envelope of partial propylitic, alunitic and silicification surrounds the vein zones. Further studying is needed to pin point the alteration pattern.
- 9) Though general areas of mineralization can be identified, there is as yet, insufficient drilling data to calculate the tonnage and grade. The data should be established during the proposed Phase 3 program.
- 10) Finally, all the above indications (geology, surface assay results, underground and drilling, mineralization) access to infra-structure (low mining costs, good environmental regulations) make the Gilbert Property an excellent prospect for the discovery and development of leachable open pit precious metal operation.

## **9.0 BIBLIOGRAPHY**

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APPENDIX 'A'

STATEMENT OF QUALIFICATIONS

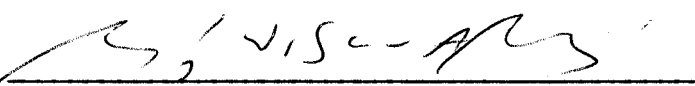
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**10.0 STATEMENT OF QUALIFICATIONS**

I, Wilson A. Gewargis, with an address in the City of Richmond, British Columbia, do hereby certify that:

1. I am a Consulting Geologist with an office at Suite 405, 595 Howe Street, Vancouver, British Columbia.
2. This report is based on the writer's supervision of the Phase 1 Exploration Program and Phase 2 Drilling Program on the Black Mammoth - Monte Cristo Property between December 1986 to February 1987.
3. I am graduate of the University of Mosul, Iraq (1970), and hold a Bachelor of Science degree in Geology. In addition, I spent two years of post graduate studies in geology and geophysics at the University of Stuttgart, West Germany.
4. I have practised my profession for 17 years in British Columbia, Yukon, Ontario, U.S.A., Europe and the Middle East.
5. I am a Fellow of the Geological Association of Canada and a member of the Society of Mining Engineers of AIME.
6. I have no interest in any property or company holding property within 10 kms of the Black Mammoth - Monte Cristo property.
7. I have no interest either direct or indirect in the securities of Sun Valley Gold Mines Ltd..
8. To the best of my knowledge, all of the information above and within this report, is factual, correct and true.
9. This report has been prepared for submission to the Vancouver Stock Exchange and any other regulatory authorities and as such, I hereby consent to the inclusion of my name in any sections of this report as are deemed necessary in any Statement of Material Facts or any other financial document of Sun Valley Gold Mines Ltd.

Dated at Vancouver, British Columbia, this 31st day of March 1987.

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Wilson A. Gewargis, B.Sc., F.G.A.C.  
Consulting Geologist

