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# **1989 ASSESSMENT REPORT**

# ON THE

# HARRISON GOLD PROPERTY

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JAN 1 7 1990	
M.R. #	
VANCOUVER, B.C.	
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NTS: 92 H5.	
LATITUDE: 49° 15° North	ninasi taka
LONGITUDE: 121° 42' West	
CLAIMS: RN, MB-1, FF, Hot 1 - Hot 8	
Cold 1 - Cold 15	
OWNER: Bema Gold Corporation, Abo Resource	
Corporation	
OPERATOR: Bema Gold Corporation	
AUTHOK: G. Norman, Norman Geological	
DATE: January, 1990	

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#### **SUMMARY**

A program of 7,145 metres of NQ2 core diamond drilling was completed on the Harrison Gold Property of Bema Gold Corporation in late 1988. This drilling was undertaken to follow up targets developed by field geological, geophysical and geochemical work on the Harrison Gold Property in general, and targets developed by previous drilling on the Jenner and Portal Gold Zones in particular.

Gold on the Harrison Gold Property occurs in association with small quartz diorite stocks. Work by previous owners indicated a possibly economic deposit at the Jenner Stock and significant high grade intersections at the Portal Stock. A number of other stocks on the property had not been adequately tested by drilling. In addition, a hydrothermal, strongly altered breccia zone was also considered to be an excellent target for gold mineralization.

Three drill rigs were on site between October 10, 1988 and December 21, 1988, to complete the drilling of 7,145 metres of core. Two of the rigs were on surface exploration and in-fill drilling targets while one drill rig was used underground, testing extent and grade of gold mineralization at the Jenner Stock.

Results of the geological logging and assaying of drill core has indicated the presence of two important new discoveries in the Hill Stock and the breccia zones, further high grade gold at the Portal Stock and extension of the Jenner Stock gold mineralization to the north and at depth.

#### **INTRODUCTION**

This report is written as a technical "Drilling Report" as follow up to assessment work filed on selected claims on the Harrison Lake Gold Property on November 9, 1989. This assessment report covers the drilling on the Jenner, Lake and Portal Stocks during the period December 1 to December 19, 1988. The previous assessment report prepared by B. Kahlert (February 27, 1989) covered the same drill program but for the period October 15 to November 30, 1988. As such portions of the previous report have been incorporated in this report, if it was pertinent similarly portion of this report could pertain to the previous report. Costs incurred directly for drilling and assaying have been submitted as expenditures in the filed assessment work.

A total of \$194,096.00 was expended on drilling and assays on the property from December 1 to December 19, 1989. Of this, \$21,900.00 was filed for assessment work on specified claims within the Cool Group. The remaining funds were entered into Bema's PAC account.

As all claims on the property are contiguous and cover similar geological units this report is submitted to cover requirements for the Cool Group. Drill core is stored in racks, on site.

#### LOCATION AND ACCESS

The Harrison Gold Property is located in the extreme southern portion of British Columbia, approximately 130 kilometres east of Vancouver at the southeast corner of Harrison Lake (see Figure 1). The main showing, Jenner Stock Gold Zone, is situated 4.5 kilometres northeast of the village of Harrison Hot Springs. The mineral claims comprise a north trending block 11 kilometres in length by 3.5 to 6.5 kilometres in width, the geographic centre of which is 40°15 north latitude and 121°41 west longitude and N.T.S. map sheet is 92H5.

Access to the claims is via Trans Canada Highway #1, 130 kilometres east from Vancouver, and B.C. Highway 9 which leads north from the Trans Canada Highway at Agassiz and to Harrison Hot Springs. Access to various parts of the claims is by 4-wheel drive gravel roads, which lead outward from a paved road that connects the village of Harrison Hot Springs to Sasquatch Provincial Park, approximately 4.0 kilometres north of the village.

Harrison Hot Springs, with a population of approximately 200, is a small resort community in which most services are available. B.C. Hydro power line follows along the aforementioned paved road north of Harrison Hot Springs within 500 metres of the Jenner Stock.







# TABLE I

4. 7.

# <u>Claim Status</u>

Claim Name	Record No.	# of Units	Recording Date	Expiry Date (Pre Nov 9, '89)	Years Work Filed	New Expiry Date
RN	46(8)	15	Aug.26, 1975	Aug.26, 1998		August 26, 1998
MB-1	592(5)	20	Sep.20, 1979	Sep.20, 1997		September 20, 1997
FF	2051(9)	15	May 3, 1983	May 3, 1998		May 3, 1998
HOT 1	2579(12)	16	Dec.17, 1984	Dec.17, 1992		December 17, 1992
HOT 2	2580(12)	9	Dec.17, 1984	Dec.17, 1992		December 17, 1992
HOT 3	2581(12)	8	Dec.17, 1984	Dec.17, 1995		December 17, 1995
HOT 4	2582(12)	6	Dec.17, 1984	Dec.17, 1995		December 17, 1995
HOT 5	2583(12)	3	Dec.17, 1984	Dec.17, 1995		December 17, 1995
HOT 6	2584(12)	15	Dec.17, 1984	Dec.17, 1998		December 17, 1998
HOT 7	2585(12)	1	Dec.17, 1984	Dec.17, 1995		December 17, 1995
HOT 8	2587(1)	15	Jan.10, 1985	Jan.10, 1996		January 10, 1996
COLD 1	3473	20	Nov.15, 1988	Nov.15, 1989	3 years	November 15, 1992
COLD 2	3474	1	Nov.13, 1988	Nov.13, 1989	<u>3 years</u>	November 13, 1992
COLD 3	3475	3	Nov.20, 1988	Nov.20, 1989	3 years	November 20, 1992
COLD 4	3476	1	Nov.13, 1988	Nov.13, 1989	3 years	November 13, 1992
COLD 5	3477	1	Nov.21, 1988	Nov.21, 1989	3 years	November 21, 1992
COLD 6	3478	18	Nov.17, 1988	Nov.17, 1989	3 years	November 17, 1992
COLD 7	3479	1	Nov.17, 1988	Nov.17, 1989	3 years	November 17, 1992
COLD 8	3480	20	Nov.18, 1988	Nov.18, 1989	3 years	November 18, 1992
COLD 9	3481	1	Nov.18, 1988	Nov.18, 1989	3 years	November 18, 1992
COLD 10	3482	1	Nov.18, 1988	Nov.18, 1989	3 years	November 18, 1992
COLD 11	3483	20	Nov.18, 1988	Nov.18, 1992		November 18, 1992
COLD 12	3484	20	Nov.20, 1988	Nov.20, 1992		November 20, 1992
COLD 13	3487	1	Nov.21, 1988	Nov.21, 1989	3 years	November 21, 1992
COLD 14	3485	4	Nov.21, 1988	Nov.21, 1989	3 years	November 21, 1992
COLD 15 Fr.	3486	1	Nov.21, 1988	Nov.21, 1989	3 years	November 21, 1992

#### MINERAL PROPERTY

The Harrison Gold Property consists of 26 mineral claims (including one fractional claim), comprising 236 units located within the New Westminster Mining Division, covering approximately 5900 hectares (see Figure 2). Table I lists the individual claims with present expiry dates. All claims are currently registered in the name of Bema Gold Corporation.

#### **PHYSIOGRAPHY**

The Harrison Gold Property is located in the B.C. Coast Range Mountain physiographic region. Elevations range from a base of 10 metres above sea level at Harrison Lake to over 1,000 metres above sea level on Bear Mountain, the highest point on the property. Elsewhere in the region, elevations of mountain tops exceed 2,000 metres.

Slopes are steep, ranging from 10° to 40° with occasional short precipices. Most of the area has been previously logged, resulting in second growth evergreen and deciduous trees ranging up to 20 centimetres in diameter, with frequent dense undergrowth, including devils club. Mean annual precipitation in the area ranged from 150 to 200 centimetres.

#### HISTORY AND PREVIOUS WORK

In the early 1970's, the Harrison Gold Property was known as the GEO claim. It was restaked as the RN Claim in 19775. In 1979, the MB-1 Claim was added to the east. The FF Claim was added in 1983 and the Hot 1-8 Claims were recorded in December 1984 and January 1985. In November 1988, the Cold 1-14 and Cold 15 Fractional Claims were staked.

Between 1972 and 1982, a small tonnage was mined from the property and produced 30.44 kilograms gold, 10.14 kilograms silver and 615 kilograms copper from 643 tonnes of ore. This was mined from the Portal Stock adit, which was 50 metres long and included four raises up to 15 metres long. The ore consisted of quartz-pyrrhotite veins containing visible gold.

Abo Oil Corporation (later known as Abo Resource Corporation, "Abo") acquired the property in 1982 and, using A & M Exploration Services, explored the property in 1982 and 1983. Work consisted of geological mapping, soil sampling, and EM surveying. This was followed by a drilling program of 27 diamond drill holes totalling 2,588 metres. In March of 1982, Abo 1-7 Claims were staked; then in May 1983 the FF Claim was staked.

In 1984, Sawyer Consultants of Vancouver, B.C. reviewed all data for Abo and made recommendations for further work. Abo drilled a further seven diamond drill holes in 1984, totalling 754 metres including the extension of two previously drill holes.

Gold was intersected in three of these (DDH 84-28, 84-29 and 84-30). The best intersection was a 64 metre interval in DDH 84-28 which averaged 3.77 g/t gold. This came from the newly indicated Jenner Stock Prospect, whereas original production and exploration work concentrated on the Portal Stock.

In late 1984, Kerr entered into a joint venture with Abo to continue exploration. The Abo 1-7 Claims were re-staked as the Hot 1-7 Claims; the Hot 8 Claim was added in January 1985.

In 1985, Kerr re-mapped the property and carried out substantial stream, soil and rock chip geochemical sampling. This was followed by a program of 834 metres of diamond drilling in four new holes as well as extensions of previous Abo drill holes.

In 1986, Kerr completed a major exploration program on the property. Geological mapping, based on gold geochemical anomalies, indicated the presence of a number of newly located quartz diorite stocks located to the south and east of the Jenner Stock as well as a 1,000 metres long, 100 metres wide, north trending feldspar porphyry dyke.

On February 10, 1987, Kerr signed a letter of intent with Bema International Resources Inc. (BIRI) whereby BIRI could earn a 55% interest in Kerr's 60% interest in the property for the net of 35% equity. To earn this interest, BIRI was required to expend \$750,000 on exploration in 1987. BIRI could earn, at BIRI's option, an additional 5% equity interest by making further expenditures of \$250,000.

During 1987, a 1,000 tonne bulk sample was procured from the Jenner underground workings on the 187 level; extensive face, rib and muck sampling (1,500 samples) was also completed. The results from the underground sampling indicated that there is a significant upgrading with respect to the drill holes assays (as much as 50%). The result s of the pilot mill test was deemed inaccurate by Kerr personnel as the gravity circuit did not live up to expectations, with only 14% (instead of an estimated 70%) of the gold being recovered by the jig and Wifely table resulting in 51% collecting in the sulphide concentrate. Problems in obtaining an accurate assay from the sulphide concentrate as well as a 40% variation between feed assay and back calculated grades raised further uncertainties in the validity of the operation.

Kerr concluded from the 1987 sampling program that the assay average computed from the extensive underground sampling program was the most accurate as compared to drill assays (3.0 g/t Au-calculated from all holes piercing footwall zone) and the pilot mill (2.2 to 2.5 g/t Au).

In estimating grade and tonnages of the Jenner Stock, Kerr made the general assumption that the average resulting from the underground workings would extend to surface and depth and that the footwall zone appeared to be the main target worth following up. A grade of 3.2 to 4.1 g/t Au was indicated from the underground sampling and the inferred tonnage was 1.3 million tonnes between surface and 100 metres above sea level, and 2.2 million tonnes from surface down to sea level for the "Footwall Zone".

By early 1988, BIRI had earned a total of 35% equity by expending \$1.0 million whereupon BIRI and Kerr spent an additional \$357,000 in mid 1988 to vest their combined interest in the property. In August 1988, BIRI purchased Kerr's remaining 25% equity in the property for shares and cash.

## 6

#### PRESENT WORK

Bema International Resources Inc. (BIRI) became operator-manager of the Harrison Gold Project effective July 1, 1988. From July to October 1988 BIRI embarked on an aggressive phase (Phase I) of Property Re-evaluation which included the completion of various detailed geologic studies (including detailed mapping), on the Portal-Jenner area; reconnaissance mapping and rock sampling orthophoto control map production, soil and rock geochemical surveys, grid establishment, road clearing, geophysical surveys (mainly magnetic) as well as the construction of a core handling and storing facility. In addition, the Cold Claims were staked to consolidate the company's land position.

Phase II, diamond drilling, was carried out October 14 to December 21, 1988, on proposed drill targets outlined from detailed sectional work by Kahlert and Associated Ltd. in the Jenner-Portal area and from outlined geological, geochemical and geophysical targets on the Hill -Lake and Breccia zones with the South Grid. A summary of the exploration work completed on the various areas throughout the Harrison Gold Property is given below: (For the convenience of the organization the property has been subdivided into the North Grid [includes Jenner-Portal Stocks and Bluff-Bear Stocks] and the South grid Area [includes Hill-Lake Stocks and Breccia Zone]). Note that for purposes of this assessment report only the diamond drilling portion of this work has been submitted.

#### NORTH GRID AREA:

#### Jenner Stock - Portal Stock

- 1. Detailed geologic mapping scale 1:1,000
- 2. Detailed structural study and interpretation of Jenner and Portal Stocks (underground and surface outcrop) by V. Campbell.
- 3. Petrographic studies by V. Campbell; F. Harris.
- 4. Grid establishment 8.3 kilometres.
- 5. Diamond Drilling Program: Underground-Jenner - 18 holes, 2,464.6 metres (8,086 feet) Surface-Portal - 5 holes, 1,312.2 metres (4,305 feet)
- 6. Underground Slashing to accommodate drill at 4 underground stations, a total of 5,828 cubic feet were removed, sampling of each group tram load was done.
- 7. Detailed sectional and level plan interpretation with re-interpretation of gold zones.

8. Computer storage of all geologic log data and assay data on the Geolog System.

- 9. Geophysical Surveys Magnetic Survey 8.3 kilometres. - Test I.P. Survey, resistivity in the Jenner - Portal Area
- 10. <u>Rock Geochemistry</u>

Surface Samples	11 lithogeochemical samples
Underground Samples	5 lithogeochemical samples
Core Samples	2250 samples Jenner
*	1040 samples Portal
Gold Assay or Geochem.	2250 samples Jenner
Analysis	~ 840 samples Portal
I.C.P. Analysis	430 samples Jenner
•	~ 106 samples Portal

#### 11. Gold Assay Studies

- a) Visible Gold Count Study versus Assay.
- b) Metallic Metal Assay versus 1 ton Assay 20 samples.
- c) Abo Assay of individual vein versus Bema/Kerr 1 metres Assay-Study (for the Jenner) 40 samples.
- d) Underground sample assay data versus drill hole Assay Study; compared all raise sample data with respect to up and down drill hole information for respective raise.
- e) Assay check-samples sent to Chemex for checks. 65 samples.
- 12. Mineral Reserve Calculation for Jenner and Portal Stocks.
- 13. Tie grid into orthophoto and re-plot Kerr soil data and magnetics.

#### Bluff Stock - Bear Stock

- 1. Reconnaissance prospecting and mapping at 1:1,000 along existing roads and grid lines.
- 2. Follow-up priority soil anomalies.
- 3. Rock Geochemistry and reconnaissance samples 37 samples. Analyzed for Gold and I.C.P.
- 4. Magnetic survey of existing grid 8.6 kilometres.

- 5. Tie existing Kerr grid into orthophoto map.
- 6. Re-plot and contour Kerr soil geochemical data, and 1988 magnetics and geology on new orthophoto map.

## North-East Grid

- 1. Grid establishment 8.0 kilometres.
- 2. Soil Geochemical Survey 249 samples.
- 3. Reconnaissance Prospecting along creek.
- 4. Reconnaissance silt sampling along creek 9 samples.
- 5. Reconnaissance rock sampling along creek 4 samples.
- 6. Magnetic survey 6 kilometres.

## South Grid:

## Lake Stock - Hill Stock - Breccia Zone

- 1. Reconnaissance prospecting and mapping at 1:2,000 scale along existing roads and grid lines for follow-up on important soil anomalies.
- 2. <u>Rock Geochemistry</u>

Surface Samples - Gold Analysis - 202 samples. Core Samples - Gold Analysis - I.C.P. every 8th sample.

- 3. Magnetic survey of existing grid 27.5 kilometres.
- 4. Grid establishment 9.7 kilometres.
- 5. Soil Geochemical Surveys 315 samples.
- 6. Re-plot-soils, geology, and magnetics with respect to new orthophoto control.

7. Diamond Drilling Program Lake Stock - 8 holes, 1,704.5 metres (5,592 feet). Hill Stock - 5 holes, 1,225.6 metres (4,021 feet). Breccia Zone - 2 holes, 438 metres (1,437 feet).

In addition to the above specific exploration work on each of the above areas, the following work covers the project areas in general:

- 1. Production of 1:2,500 scale orthophoto topographic map.
- Construction of core logging; splitting facility with water line (2 buildings 12' X 14' and 16' X 14'); construction of core racks and stacking and organization of all existing core on property.
- 3. Revamp old Kerr logging facility for use in a first aid post with running water.
- 4. Environmental studies by Norocol were completed from July to October.

#### **REGIONAL GEOLOGY**

The Harrison Gold Property lies near the junction of Coast Plutonic Complex and the Cascade Gold Belt (See Figure 3). The division between the two geological terranes is based partly on physiography with an arbitrary dividing line along the Fraser River (Holland, 1964), and partly on the higher proportion of granitic rocks in the Coast Plutonic Complex, although many rock units in this area are common to both (Monger, 1986).

The Cascade Fold Belt consists of high grade metamorphic and granitic core flanked on the east and west by weakly metamorphosed folded and faulted sedimentary and volcanic sequences. To the north, the core forms the southeastern most part of the Coast Plutonic Complex; to the east is the Permian to Middle Jurassic Hozameen Group, and to the west and south of the Fraser River is the Paleozoic Chilliwack Group.

North of the core and the Fraser River and adjacent to Harrison Lake (area of Harrison Gold Project) are Middle to Triassic to Cretaceous strata. The regional north-northwest-trending fabric formed within these rocks in Cretaceous to earliest Tertiary time was offset 80 to 100 kilometres in the Eocene by north-trending Fraser River-Straight Creek dextral wrench fault system (Monger, 1985).

Within the above described areas are five major lithostructural packages which, in order of increasing metamorphic grade are called: Harrison Lake, Slollicum, Clogburn and Settler packages (north of the Fraser), and the Chilliwack-Cultrus and Darrington packages (south of the Fraser), see Figure 3.

The Harrison Gold Project lies within the Harrison Lake lithostructural package which comprises a stratigraphic succession of sedimentary and volcanic rocks which range from Middle Triassic to Early Cretaceous.

The Harrison Gold package is bounded in the east side by the major Harrison Fault, which is a one to two kilometre wide fracture zone with a well developed cleavage which dips  $50^{\circ}$  to  $70^{\circ}$  to the east but which has no marked linear fabric within it. The Jenner Prospect lies to the west of the Harrison Fault but is cut by several possible splay faults including the fault along which the Jenner Creek flows.

The Harrison Fault, one of the major strike-slip faults in the region that largely governs the regional grain of the adjacent rocks, extends for more than one hundred kilometres north to south from the Lillooet River well into Washington State. The age of the fault appears to be Late Cretaceous and/or Early Tertiary and clearly post dates regional metamorphism and intrusion of the mid-Cretaceous Spuzzum batholith.

The Harrison Lake lithostructural package (on the west side of Harrison Lake) has been extensively studied by A.J. Arthur (1986) as part of M.Sc. research at U.B.C. A geologic map and a stratigraphic section, according to Arthur, is given in Figures 4 and 5 respectively. J. Monger (1989, personal conversation) believes this package of rocks, and specifically the Brokenback Hill formation, underlie the Harrison Gold Property.

The Chilliwack Group, oldest known layered rocks (Pennsylvanian-Permian), and the overlying Cultus Formation (Late Triassic-Early Jurassic) consist of pelite, carbonate, mafic to felsic flows and volcaniclastic rocks (Monger, 1970, 1977) are mainly exposed south of the Fraser River but also extend north of the Fraser River near the southern extremity of Harrison Lake, underlying the southern portion of the Harrison Gold Project claim block. Grey crinoidal limestone containing mid-Carboniferous conodonts (J. Monger, personal communication, 1989) form conspicuous cliffs in this area.

The Slollicum package of rocks includes rocks mapped as Chilliwack by Lowes (1972) east of Harrison Lake. Since there appears to be little similarity between the Chilliwack and these volcaniclastics Monger (1986) prefers the term "Slollicum". The age of the unit is not known although in general the package closely resembles the Upper Triassic Cadwallader Group (Rusmore, 1985).

The Cogburn package lies east of the Slollicum rock forming a distinctive package of bedded chert, argillite, basic volcanics, ultramafics rocks, and minor marble. These rocks were originally included with the Chilliwack Group by Lowes (1972) but was extracted by Gabites (1985) as the Cogburn Group. The grade of metamorphism of these rocks grades from greenschist in the south to amphibolite grade in the north. The age of the Cogburn Group is not known but Monger (1986) suggests that the range of lithologies is similar to that of the Permian to Jurassic Hozameen and Bridge River Groups.

The Stettler Schist structurally overlies the Cogburn Group and is structurally interrelated with Late Cretaceous high pressure granodiorites of the Scuzzy and Spuzzum plutons.

The Stettler Schist (Lowes, 1972; Pigage, 1973, et al) comprises pelitic and quartzfeldspathic schist, amphibolite, minor quartzite and ultra mafic rocks.

Rb-Sr isochrons dated at  $214 \pm 32$  Ma and  $210 \pm 27$  Ma by Bartholomew (1979) and Gabites (1985) indicate either a Triassic-Jurassic deposition of the Stettler package or partial resetting of the rocks by Mesozoic metamorphism (Gabites, 1985).

The rocks of the above packages have been intruded by Cretaceous and Tertiary granodiorite and quartz diorite stocks and batholiths including the Chilliwack batholith, Hicks Lake Batholith and in the Spuzzum Batholith.

#### LOCAL GEOLOGY

The Harrison Gold Property is underlain by sediments and volcanics of the Harrison Lake Lithostructural package (Monger, 1986) and more specifically the Brokenback Hill Formation (Monger, personal communication, 1989) of Jurassic - Upper Cretaceous Age. (See Figure 6, General Geology). The Brokenback Hill Formation conformably overlies a Buchic coquina bed of the Peninsula Formation and is composed of green crystal tuff, volcanic conglomerate and tuffaceous sandstone in the lower part of the section, which gives way to volcanic flows, pyroclastic argillite and sandstone in the upper reaches of the formation (Arthur, 1986). The formation covers the majority of the Harrison Gold Property and extends to the north up to Doctor's Point Pluton outcropping on the southwest shore of Long Island.

Previous reports by Kerr had considered the area to be underlain by the Mysterious Creek Formation which is mainly argillite with interbedded medium grained green sandstone beds near the top of the section with no volcanic component (Arthur, 1986). The volumetrically large component of volcanic flows tuffs and agglomerate within the Harrison Gold Property suggest a correlation with the upper portions of the Brokenback Hill Formation.

Chilliwack Group rocks (Pennsylvanian-Permian) are in fault contact with the Brokenback Hill Formation within the southern most part of the Claim Block (see Figure 4) and are composed of pelite, carbonate, mafic to felsic flows and volcaniclastic rocks (Monger, 1970, 1977); as well, grey cliff forming crinoidal limestone contain mid-Carboniferous Conodonts.

Sediments and volcanics within the Harrison Gold Project area have been intruded by numerous quartz diorite stocks which are probable offshoots of the Hicks Lake-Chilliwack Batholith. The age of the Jenner Stock has been dated at 23 to 25 Ma. Several diorite stocks and a feldspar porphyry dyke also intrude the package.

The Harrison Gold Project area has been divided into the North, South, and North East Grid geographic areas.

Distribution of lithostructural packages in the Cascade Fold Belt, southeastern Coast Belt, west of the Fraser River fault system. (Taken from Monger, 1986.)





Index map of Cascade Fold Belt and southeastern Coast Plutonic Complex, showing geological/physiographic belts, major structural elements and location of areas discussed here and in accompanying papers by Arthur (1986) and O'Brien (1986).

(Taken from Monger 1986.)

## **REGIONAL GEOLOGY**





Geology of study area west of Harrison Lake (see Monger, 1986, for location map.) (Taken from Arthur, 1986. Modified after personal conversation with Monger, 1988.)



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#### FIGURE 5

Stratigraphy of the Middle Triassic to Middle Albian section on west side of Harrison Lake with fossil locations. (Section not to scale.) (Taken from Arthur, 1986.)

#### **GOLD MINERALIZATION**

Gold mineralization located on the Harrison Gold Property within the North Grid Area invariably occurs mainly as free visible flakes up to 2.0 millimetres in size (generally 0.2 to 0.6 millimetres or less) within quartz veins (approaching a weak stockwork system) in association with pyrrhotite and  $\pm$  chalcopyrite. The mineralized quartz veins are confined to quartz diorite intrusive bodies (specifically the Jenner and the Portal Stocks), or their immediate periphery. A typical mineralized "Jenner Style" gold vein exhibits a banded (sheared) texture with pyrrhotite and lesser chalcopyrite crudely strung out along foliation planes. Gold is generally found in close proximity to pyrrhotite boundaries within milky white quartz.

The quartz veins which contain gold mineralization associated with gently dipping  $(15^{\circ} \text{ to } 40^{\circ})$  veins which form a conjugate set and bisectrix.

Minor sub-vertical veins also contain gold. The higher grade portions of the Jenner and Portal Stocks tend to be usually the margins of the intrusive bodies.

Gold mineralization on the surface was seen at only on point: in pyrrhotite bearing quartz diorite float on the west side of the Jenner Stock near the collars of drill holes JN 86-46 to 49; this particular area is where Kerr Addison Ltd. procured a gold bearing bulk sample.

## **DIAMOND DRILL PROGRAM - JENNER STOCK**

#### Introduction

From October 15 to December 17, Bema Gold Corporation completed 8,086 feet (2,464.6 metres) in 18 drill holes (JN 86-106 to 123) on the 187 level of the Jenner Stock. From December 1 to December 17, for which this assessment report is concerned, a total of 861.7 metres (2,827 feet) were drilled in 5 holes (JNUG 88-119 to 123). The diamond drilling program was directed toward adding additional assay data to North-South and East-West section in order to have sufficient information from which a workable geological model of gold mineralization could be formulated. As gold mineralization is related to low angle dipping veins, steeply angled drill holes were drilled to test the stock for the most part, except for "structural holes" which were drilled to gather structural information, eg. intrusive - hornfels contacts. Structural holes ( $<40^{\circ}$  dip) were not assayed.

The diamond drilling was completed by F. Boisvenue Diamond Drilling Ltd. of Vancouver using a Connors 75 horsepower underground electric drill. The system uses a 125 kilowatt generator (gen set) for a power source. The average drilling rate for the underground program was 159 feet/day (48.5 metres/day). No major problems were encountered the underground drilling program, with the job continuing steadily with two 8-hour shifts per day (6am to 2pm and 2pm to 10pm). The overall drilling cost was \$22.50 per foot (\$6.70 per metre).

Most holes were surveyed using a NQ pajari instrument rented from Pothier Enterprises Ltd.

#### **Results**

All pertinent drill data and significant assays are tabulated in Table II. Drill hole locations are also shown on Figures 6 and 7, detailed geologic logs summary sheets and rapid logs are in Appendix IV, and Min En assay sheets are located in Appendix V.

Pertinent comments concerning the various drill holes completed during the phase of drilling are given below.

## From Drill Slash #2, Reference Section 11250 E

Diamond drill holes JNUG 88-106 to JNUG 88-109 were drilled to the north. Drill holes JNUG 88-106, 107 and 109 were specifically designed to acquire structural information about the Jenner Stock, specifically the intrusive-hornfels contact to the north and south. Because of the easterly plunge of the Jenner Stock these holes pierced the westerly footwall zone.

<u>JNUG 88-106 (-25°, 360°)</u> located the north western contact 25 metres further to the north than previous projections on sections has shown. Because the visible gold counts were in the order of 30 to 50 grains, this structural hole was assayed.

<u>JNUG 88-107 (-60°, 360°)</u> was designed to test the grade of gold mineralization within the Jenner Stock to the northern contact. The hole intersected the following two significant sections of gold mineralization:

19 metres averaging 3.41 g/t Au from 7 to 26 metres and

13 metres averaging 3.67 g/t Au from 35 to 48 metres.

The hole is thought to have pierced the western contact of the stock which is plunging easterly.

<u>JNUG 88-108 (-40°, 180°)</u> was a structural hole which intersected the southern contact 45 metres earlier than anticipated. Again the core axis angles of the mineralized veins to this hole were very low.

<u>JNUG 88-109 (+30°, 360°)</u> located the Jenner Stock 10 metres further to the north than previously projected on section. Within this structural hole three sections exhibit veins running parallel to the core axis. This hole was not assayed.

FROM SLASH #3 Reference Section 11275 E diamond holes JNUG 88-110 to 116 were drilled. Holes 110, 111, 113 were drilled to the north and 112, 114, 115 were drilled to the south; JNUG 88-116 was drilled to the west.

<u>JNUG 88-110 (+30°, 360°)</u>located Jenner contact 20 metres further to the north than previously projected on section because of low C.A. angles of mineralized veins, this structural hole was not assayed.

<u>JNUG 88-111 (-70°, 360°)</u> may not have reached north contact of Jenner Stock, the hole intersected the following significant mineralization:

5.0 metres averaging 4.19 g/t Au from 28.0 to 33.0 metres, 12.0 metres averaging 3.19 g/t Au from 52 to 64.0 metres, 10.0 metres averaging 3.11 g/t Au and

21.0 metres averaging 3.13 g/t Au from 128.0 to 149.0 metres.

<u>JNUG 88-113 (-50°, 360°)</u> located the Jenner northern contact 50 metres further to the north than where previously projected. Significant mineralization intersected is as follows:

7.0 metres averaging 2.2 g/t Au from 51.0 to 58.0 metres,

5.0 metres averaging 3.00 g/t Au from 62.0 to 67.0 metres,

40.0 metres averaging 3.2 g/t Au from 89 to 129 metres and

4.0 metres averaging 4.40 g/t Au from 145.0 to 149.0 metres.

FROM SLASH #3 Reference 11275 E diamond drill holes JNUG 88-112, 114, 115 have been drilled to the south, JNUG 88-116 was drilled to the west and JNUG 88-117 was drilled vertically.

<u>JNUG 88-112 (-55°, 180°)</u> intersected a number of hornfels xenoliths and locally moderate quartz-pyrrhotite veining with visible gold counts per metre commonly in the 30 to 60's. The south contact of the Jenner was located approximately where previously located. Significant mineralized sections are:

4.0 metres averaging 3.33 g/t Au from 0.6 to 5.0 metres,

8.0 metres averaging 2.66 g/t Au from 19.0 to 27.0 metres,

9.0 metres averaging 4.79 g/t Au from 34.0 to 43.0 metres, and

15.0 metres averaging 4.62 g/t Au from 50 to 65.0 metres.

<u>JNUG 88-114 (+50°, 180°)</u> intersected the southern contact approximately where previously projected. Quartz-pyrrhotite veining was generally weak with very spotty V.G. noted, assay results show no significant intersections.

<u>JNUG 88-115 (-70°, 180°)</u> was designed to test the south contact of Jenner Stock on reference section 1127 E and the grade of the Jenner Stock between the 187 level adit and the south contact vertically below JNUG 88-112 which intersected several good gold intercepts. JNUG 88-115 intersected the southeast plunging Jenner contact approximately 25 metres further to the north than previous projections had it located but compared reasonably well with JNUG 88-112. The hole intersected the following good intercepts:

9.0 metres of 3.86 g/t Au from 35.0 to 44.0 metres, 15.0 metres of 3.92 g/t Au from 61.0 to 76.0 metres and 41.0 metres of 2.53 g/t Au of 35.0 to 76.0 metres.

<u>JNUG 88-116 (-60°, 270°)</u> was designed to test the western contact of the Jenner Stock, for the possibility of narrow/high grade good mineralization inferred from previous Abo/Kerr drilling to the west of the Jenner Stock and for the possibly of a buried quartz diorite stock west of the Jenner Stock which was inferred from magnetic surveys.

The hole pierced the western contact of the Jenner Stock approximately where projected from previous drilling, but no high zone was intersected west of the Jenner. A biotite quartz diorite dyke zone was intersected in the lower portion of hole, suggesting the proximity to a buried quartz diorite stock. The dykes were weakly geochemically anomalous.

<u>JNUG 88-117 (+90°)</u> was designed to test the grade of the Jenner Stock above the 187 adit level to surface on reference section 11275 E. The hole intersected 15 metres from 32.0 to 46.0 of 5.84 g/t Au uncut and 4.82 g/t Au (cut to 34.28 g/t) and quartz diorite to surface.

<u>JNUG 88-118 (-55°, 135°)</u> was a diagonal hole drilled from Slash #3 and was designed to test the grade of gold mineralization near the southeast contact of the Jenner Stock between Kerr drill sections 9450 N and 9475 N; a step out from JNUG 88-112 which intersected 31.0 metres of 3.98 g/t gold from 34.0, 65.0 metres. The stock-hornfels contact was intersected at the expected depth. The overall gold content was lower than the 88-112 intercept, with 35.4 metres averaging 1.92 g/t gold from 0.6 to 36.0 metres, including 11.0 metres of 3.19 g/t gold from 23.0 to 34 metres.

FROM SLASH # 4, REFERENCE 9475 N diamond drill holes JNUG 88-119, 120 and 121 were drilled to the west to test the stock to the western contact.

<u>JNUG 88-119 (-60°, 270°)</u> was designed to test the gold mineralization down dip from JNUG 88-116 (25 metres averaging 3.18 g/t gold). The hole pierced the western contact of the Jenner Stock approximately where previous projections had it located. The hole returned disappointing results with only 8 metres averaging 6.64 g/t gold from 28 to 36 metre. As well a high grade section was intersected from 132 to 133 metres contained 24.4 g/t gold from hornfels sediments within the dyke zone.

<u>JNUG 88-120 (-75°, 270°)</u> was designed to test for gold mineralization down dip from JNUG 88-119 within the Jenner Stock toward the western contact.

The hole was successful in intersecting the following intercepts;

32.0 metres averaging 2.6 g/t Au from 59 to 91 metres, incl. 25.0 metres averaging 3.11 g/t Au from 59 to 84 metres and 17 metres averaging 3.01 g/t from 113 to 130 metres.

The initial intercept is located near the eastern hanging wall contact of the Jenner Stock; the second intercept is within the central portion of the stock. The hole failed to intersect the "Footwall Zone" that had been indicated by previous Abo/Kerr/Bema drilling. The dip of the footwall contact from holes 116, 119; 120 is approximately 85° East.

<u>JNUG 88-121 (-85°, 270°)</u> was to define the western contact of the Jenner Stock at depth on reference section 9475 N as well testing the grade of gold mineralization down dip from JNUG 88-120. The hole collared in hangwall hornfels, intersected Jenner stock from 61.57 to 337.11 metres, intersected a zone of hornfels with local quartz diorite dyking and zones of brecciation from 337.1 to 385.1, then re-entered the Jenner stock from 385.1 to 390.3. The last 0.15 metres of the hole to 390.45 metres is hornfels which is probably a xenolith.

The hole failed to reach the footwall contact of the Jenner stock but was stopped for technical drilling reasons. The stock was sporadically mineralized from 57 to 263 metres. An intercept from 254 to 263 of 9 metres averaged 13.5 g/t gold uncut (10.5 g/t gold cut to 34.28 g/t gold). This intercept represents the highest grade intercept obtained in the 1988 drilling of the Jenner Stock. It is also from the lowest elevation (-70 metres above sea level) of any significant intercept to date.

<u>JNUG 88-122 (+60°, 360°)</u> was drilled from Slash # 3, reference section 11275 E, to test the grade of gold mineralization above the 187 adit level in the Jenner stock to surface. The hole was designed specifically to test for a northern extension of the high grade intercept in JNUG 88-117 which averaged 5.84 (uncut) g/t gold over 15 metres from 32.0 to 46 metres.

JNUG 88-122 intersected the following intercepts:

- 10.0 metres of 6.46 g/t Au averaged over 10 metres,
- 17.0 metres averaging 6.81 g/t uncut; 4.77 g/t Au cut,
- 7.0 metres averaging 2.48 g/t Au from 44 to 51 and
- 7.0 metres averaging 1.55 g/t from 57 to 64 metres.

The zones appear to correlate with the zones intersected in JNUG 88-117.

<u>JNUG 88-123 (+90)</u> was drilled to test the grade of gold mineralization above the 187 adit level in the Jenner Stock to surface on reference section 11250 E. This hole was collared in the Jenner Stock then intersected a hornfels xenolith from 45.25 to 52.20 metres then remained in quartz diorite to the bedrock overburden interface at 54.9 metres. This hole was weakly mineralized 33 metres averaging 1.14 g/t Au from 0 to 33.0 metres compared to the two up holes on section 11275 E.

# TABLE II HARRISON GOLD PROJECT SUMMARY OF DRILL HOLES JENNER STOCK

		UND	ERGROUND PF	SIGNIFICANT ASSAYS	
DRILL HOLE#	DIP	AZIMUTH	LENGTH m/ft	LOCATION	FROM-TO Au gm/tonne (Length) metres
JNUG 88-106	-25	360*	850/279	SLASH#2.SECT.11250E 9485.5 N, 11242.6 E	14.0-27.0 (13.0) 1.29 32.0-41.0 (9.0) 2.18 51.0-59.0 (8.0) 4.9
JNUG 88-107	-60	360°	68.6/225	9485.0 N, 11242.6 E	7.0-26.0 (19.0) 3.41 35.0-49.0 (14.0) 3.50
JNUG 88-108	-40	180°	84.4/277	9482.1 N, 11242.6 E	STRUCTURAL HOLE
JNUG 88-109	+30	360°	64.9/213	9485.5 N, 11242.6 E	STRUCTURAL HOLE
JNUG 88-110	+30	360°	74.1/243	SLASH#3 SECTION 11275 9485.5 N, 11271.4 E	STRUCTURAL HOLE
JNUG 88-111	-70	360°	189.0/620	9484.4 N, 11271.2 E SLASH #3 REF. SECTION 11275E	$\begin{array}{c} 2.0-19.0 & (17.0) & 1.02 \\ 25.0-33.0 & (8.0) & 2.89 \\ 28.0-33.0 & (5.0) & 4.19 \\ 45.0-64.0 & (19.0) & 2.39 \\ 52.0-64.0 & (12.0) & 3.19 \\ 98.0-108.0(10.0) & 3.11 \\ 98.0-115.0(17.0) & 2.25 \\ 121.0-134.0(13.0) & 2.03 \\ 128.0-149.0(21.0) & 3.13 \\ 142.0-176.0(34.0) & 2.02 \end{array}$
JNUG 88-112	-55	180°	90.8/298	9482.4 N, 11271.2 E SLASH #3 REF. SECTION 11275E	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

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#### TABLE II CONTINUED 1

		UND	ERGROUND PRO	SIGNIFICANT ASSAYS	
DRILL HOLE#	DIP	AZIMUTH	LENGTH m/ft	LOCATION - ELEVATION	FROM-TO Au gm/tonne (Length)meters
JNUG 88-113	-50	360°	164.0/538	9485.1 N, 11271.2 E SLASH #3 REF. SECTION 11275E	6.0-10.0 (4.0) 1.45 30.0-46.0 (16.0) 1.65 34.0-65.0 (31.0) 3.98 51.0-68.0 (17.0) 2.03 62.0-67.0 (5.0) 3.00 77.0-82.0 (5.0) 1.37 *89.0-129.0(40.0) 3.21 138.0-141.0 (3.0) 1.18 145.0-149.0 (4.0) 4.40
JNUG 88-114	+50	180°	76.2/250	9481.4 N, 11271.2 E 191.6m elev.	5.0-8.0 (3.0) 5.5 46.0-47.0 (1.0) 8.2
JNUG 88-115	-70	180°	117.3/385	9482.9 N, 11271.2 E 187.7m elev.	0.6-17.0 (16.4) 2.64 22.0-44.0 (22.0) 2.65 35.0-44.0 (9.0) 3.86 35.3-76.0 (41.0) 2.53 55.0-76.0 (21.0) 3.03 61.0-76.0 (15.0) 3.92
JNUG 88-116	-60	270°	298.4/979	9482.3 N, 11269.4 E 187.8m elev.	15.0-22.0 (7.0) 2.98 37.0-62.0 (25.0) 3.18 156-158 (2) 245 ppb Au 248-249 (1) 320 ppb Au
JNUG 88-117	+90	-	71.6/235	9482.3 N, 11270.2 E 191.9 m elev.	0.0-5.0 (5.0) 1.29 20.0-21.0 (1.0) 2.52 26.0-27.0 (1.0) 1.19 32.0-46.0 (14.0) 4.82 51.0-52.0 (1.0) 1.94 57.0-58.0 (1.0) 1.94 57.0-58.0 (1.0) 1.22 61.0-62.0 (1.0) 2.26 65.0-66.0 (1.0) 1.62 70.0-71.6 (1.6) 2.24 61.0-71.6 (10.6) 0.94

# TABLE II CONTINUED 2

		UNDI	ERGROUND PRO	SIGNIFICANT ASSAYS	
DRILL HOLE#	DIP	AZIMUTH	LENGTH m/ft	LOCATION -	FROM-TO Au gm/tonne (Length)meters
JNUG 88-118	-55	135°	109.1/358	9481.5 N, 11270.2 E 187.7 m elev.	$\begin{array}{c} 0.61-3.0 & (2.30) & 3.62*\\ 0.61-11.0 & (9.39) & 1.70\\ 15.0-18.0 & (3.0) & 3.68*\\ 23.0-34.0 & (11.0) & 3.19*\\ 15.0-34.0 & (19.0) & 2.49\\ 15.0-31.0 & (16.0) & 2.79\\ 0.6-36.0 & (35.4) & 1.92\\ 42.0-43.0 & (1.0)10.05\\ 47.0-49.0 & (2.0) & 1.28\\ 42.0-49.0 & (7.0) & 2.10\\ 57.0-59.0 & (2.0) & 4.36*\\ 67.0-68.0 & (1.0) & 1.06\\ 81.0-82.0 & (1.0) & 1.30\\ 88.0-89.0 & (1.0) & 2.20\\ 93.0-94.0 & (1.0) & 4.72\\ \end{array}$
JNUG 88-119	-60	270°	176.5/579	Slash # 4 Referènce Section 9475 N 9484.9 N, 11309.3 E 187.9 m elev.	22.0-23.0 (1.0) 1.70 28.0-36.0 (8.0) 6.64* 54.0-55.0 (1.0) 1.29 57.0-58.0 (1.0) 1.53 54.0-59.0 (5.0) 0.98 63.0-64.0 (1.0) 1.18 67.0-68.0 (1.0) 1.31 73.0-74.0 (1.0) 2.24 78.0-79.0 (1.0) 3.49 94.0-95.0 (1.0) 1.74 132.0-133.0 (1.0)24.40*
JNUG 88-120	-75	270°	256.04/840	Slash # 4 Reference Section 9475 N 9484.9 N, 11309.7 E 187.9 m elev.	59.0-84.0 (25.0) 3.11* 77.0-82.0 (5.0) 6.7 * 90.0-91.0 (1.0) 3.88 59.0-91.0 (32.0) 2.61 104.0-105.0 (1.0) 5.53 113.0-130.0(17.0) 3.01* 133.0-134.0 (1.0) 1.54 146.0-147.0 (1.0) 1.10 158.0-159.0 (1.0) 1.33 171.0-179.0 (2.0) 2.66 183.0-184.0 (1.0) 2.15 171.0-184.0(13.0) 1.11 227.0-228.0 (1.0) 5.0 •

# TABLE II CONTINUED 3

UNDERG	ROUND	PROGRAM	M <u>SIGNIFICANT ASSAYS</u>			
DRILL HOLE#	DIP	AZIMUTĤ	LENGTH m/ft	LOCATION - ELEVATION	FROM-TO Au gm/tonne (Length)meters	
JNUG 88-121	-85	270*	m/rt 390.5/1281	Slash # 4 9484.0 N, 11310.0 E 187.9 m elev.	57.0-58.0 (1.0) 1.38 62.0-73.0 (11.0) 2.83* 62.0-65.0 (3.0) 2.55 67.0-73.0 (6.0) 3.75* 85.0-86.0 (1.0) 1.17 91.0-98.0 (7.0) 3.45* 102.0-103.0 (1.0) 1.33 106.0-110.0 (4.0) 1.35 107.0-108.0 (1.0) 1.85 114.0-115.0 (1.0) 1.92 134.0-135.0 (1.0) 1.92 134.0-135.0 (1.0) 4.66 142.0-145.0 (3.0) 4.8 * 155.0-161.0 (6.0) 3.2 * 167.0-168.0 (1.0) 1.1 173.0-174.0 (1.0) 1.0 176.0-177.0 (1.0) 1.41 179.0-180.0 (1.0) 1.56 207.0-208.0 (1.0) 2.52	
JNUG 88-122	+60	360°	94.8/311	Slash # 3 9485.1 N, 11271.0 E 192 m elev.	$\begin{array}{c} 207.0-211.0  (4.0)  1.79 \\ 210.0-211.0  (1.0)  4.04 \\ 226.0-233.0  (7.0)  2.49* \\ 226.0-228.0  (2.0)  3.85* \\ 231.0-233.0  (2.0)  3.55* \\ 254.0-263.0  (9.0)13.51* \\ 254.0-263.0  (9.0)10.5* \\ 226.0-263.0  (37.0)  3.2 \\ \hline 15.0-20.0  (5.0)12.4 \\ 27.0-29.0  (2.0)  2.6 \\ 44.0-51.0  (7.0)  2.48 \\ 46.0-51.0  (5.0)  3.07* \\ 49.0-51.0  (2.0)  6.79* \\ 57.0-58.0  (1.0)  4.78 \\ 57.0-64.0  (7.0)  1.55 \\ \end{array}$	
JNUG 88-123	+90		56.4/185	Slash # 2 9484.0 N, 11242.3 E 191.6 m elev.	60.0-72.0 (12.0) 0.90 76.0-79.0 (3.0) 8.86* 76.0-81.0 (5.0) 5.88* 76.0-86.0 (10.0) 4.47* 86.0-92.0 (6.0) 0.35 92.0-93.0 (1.0)69.00* 76.0-93.0 (17.0) 6.81* 76.0-93.0 (17.0) 4.77 0.0-12.0 (12.0) 1.22 0.0-33.0 (33.0) 1.14 17.0-24.0 (7.0) 1.73 28.0-33.0 (5.0) 1.66 31.0-33.0 (2.0) 3.14 39.0-42.0 (3.0) 8.68	

In its upper levels, the stock is roughly circular to elliptical, measuring about 80 by 110 metres in plan. (See level plans, figures 68 to 85). At depth, it becomes more elongated north-south and measures up to about 60 by 150 metres down to the 75 metre level. Below this, sparse drill data does not allow for the accurate delineation of stock contacts. The stock plunges 80° to 85° to the east and with depth, its northern and southeastern contacts appear to flare out. Its overall three dimensional shape can be described as pipe-like. The stock is best viewed on east-west sections. On north-south sections, there is an apparent bottoming of the stock due to its easterly plunge. To date, the stock has been explored over a total vertical distance of about 500 metres (from surface down to about the -200 metre level).

Portions of the stock, mainly along its footwall contact, are occupied by a contact breccia phase which is transitional from a breccia containing both quartz diorite and country rock fragments in a quartz diorite matrix to one containing only country rock fragments. The presence of contact breccias indicated that the emplacement of the Jenner Stock was somewhat more forceful than the gentle lateral assimilation of country rock xenoliths and vertical sloping of roof pendants as envisaged by Harris and others.

Several large xenoliths or roof pendants are found within the stock. The largest of these extends from the 175 metre level to the 225 metre level, measures about 5 to 10 metres by 40 metres, and is elongate in a northeasterly direction. This xenolith was intersected in the 187 level drift from about 11240 E to 11267 E. Smaller xenoliths or xenolithic fragments, commonly ranging in size from 5 to 15 centimetres across, occur as scattered inclusions at many localities throughout the stock.

## **GEOLOGICAL AND MINERAL ZONE INTERPRETATIONS**

#### Acknowledgement and Scope

The total amount of diamond drilling completed to date on the Jenner Gold ZOne is 5,674.05 (18,616 feet) in 44 drill holes. From October 1988 to March 1989, Bema Gold Corporation computerized all geological logs and assay data with respect to the Geolog System. All geology and assay sections and level plans have been produced by Bema's "in-house" computer system.

The following discourse on the geology and gold zones (Sections 4.6.2 to 4.6.7) has been written by B. Bowen who completed the interpretations of geology and assay section and level plans. G. Nordin and the author also contributed to the geological interpretation.

#### Geology

The Jenner Stock is a small irregular plug or apophysis of quartz diorite which has intruded sedimentary and volcanic rocks of the Brokenback Hill Formation. It is comprised of two main intrusive phases: a medium to coarse grained hornblende - biotite quartz diorite phase which occupies the central and upper portions of the stock, and a fine grained biotite - (hornblende) quartz diorite phase which is found mainly in the lowest part of hole JNUG 88-121. Numerous thin, high-angle felsic and less commonly, mafic dykes are present throughout the stock.

In its upper levels, the stock is roughly circular to elliptical measuring about 80 to 110 metres in plan. (See Level Plans, Figures 68 to 85). At depth, it becomes more elongated northsouth and measures up to about 60 by 150 metres down to the 75 metre level. Below this, sparse drill data does not allow for the accurate delineation of stock contacts. The stock plunges 80° to 85° to the east and with depth, its northern and southeastern contacts appear to flare out. Its overall three dimensional shape can be described as pipe-like. The stock is best viewed on the east-west sections. On north-south sections, there is an apparent bottoming of the stock due to its easterly plunge. To date, the stock has been explored over a total vertical distance of about 500 metres (from surface down to about the -200 metres level).

Portions of the stock, mainly along its footwall contact, are occupied by a contact breccia phase which is transitional from a breccia containing both quartz diorite and country rock fragments in a quartz diorite matrix to one containing only country rock xenoliths and the gentle lateral assimilation of country rock xenoliths and vertical sloping of roof pendants as envisaged by Harris and others.

Several large xenoliths or roof pendants are found within the stock. The largest of these extends from the 175 metre level to the 225 metre level, measures about 5 to 20 metres by 40 metres, and is elongate in a northeasterly direction. The xenolith was intersected in the 187 level drift from about 11240 E to 11267 E. Smaller xenoliths or xenolithic fragments, commonly ranging in size from 5 to 15 centimetres across, occur as scattered inclusions at many localities throughout the stock.

#### Structure

K.V. Campbell completed a study of the structural geology of the Jenner Stock, his findings corroborate those of Harris. Their work clearly demonstrates that the gold-bearing vein systems within the Jenner Stock are predominantly low-angle structures. This fact has been confirmed by vertical drilling within the stock over a vertical distance of about 400 meters. Other than the above-mentioned low-angle veins, the dominant structural features encountered in the 187 level drift were large, low-angle, west and east dipping, compressive reverse faults which cut both country rocks and the Jenner Stock. These faults have resulted in thrust development, interval shearing and localized vein offsets. It is likely that they were developed in the same structural regime as that postulated by Campbell.

The northwest trending Jenner Fault passes through the Jenner Stock area and is intersected in the 187 level drift in metapelites at 11188 E to 11196 E. The age relationship and possible influence of this fault's presence on gold mineralization is uncertain. The Jenner Fault is devoid of gold values in the area of the underground workings, and may simply be a postmineralization splay off the older parent fault system, emplaces during an episode of parent fault reactivation.

#### Alteration and Mineralization

Disseminated mineralization within the Jenner Stock consists of 1% to 3% pyrrhotite with minor pyrite and chalcopyrite and traces of molybdenite. These sulphides are fairly evenly distributed throughout the stock's groundmass, increasing to locally 5% to 10% at its western (footwall) contact.

The veins which contain the gold mineralization contain the gangue minerals quartz with minor calcite, chlorite and sericite. The major sulphide mineral is pyrrhotite with minor to trace amounts of pyrite, chalcopyrite, molybdenite, scheelite, arsenopyrite, galena and sphalerite. Bismuth-silver tellurides are present and have been observes as intergrowths with native gold grains. The amount of gold present in a given vein does not appear to correlate directly with the presence of any sulphide nor with its relative concentration, although there is a general correlation to accumulative quartz vein thickness. For a given interval, there are numerous locations within the stock where there is quartz veining with no appreciable gold values. At depth (in the bottom of holes JNUG 88-120 and 88-121) the quartz veins display a marked increase on the gangue mineral chlorite at the expense of pyrrhotite.

The low background (less that 1 g/t) of gold values throughout the stock suggest a possible disseminated style for gold mineralization in addition to that found within quartz veins. Other infrequently observed modes of golf mineralization include auriferous fault zones, native gold grains associated with hairline pyrrhotite fracture fillings and strongly disseminated visible golf in a 14 millimetre wide massive pyrrhotite vein in hole 88-117.

Shearing and faulting within the stock is commonly associated with an assemblage of pyrite (often euhedral), carbonate and chlorite. Weak to locally strong propylitic alteration of the stock is ubiquitous and consists primarily of chlorite and carbonate. Patchy zones of weak to moderate pervasive sericite alteration are present throughout the stock but the details of their distribution are unknown. Strong sericitic alteration envelopes with widths up to several centimetres are commonly developed around mineralized quartz veins.

#### Gold Zoning

The following descriptive comments on the distribution of gold within the Jenner Stock are derived from a review of assay and ore block sections. The interpretive gold zones shown on these sections are based on a synthesis of all surface and underground drilling completed to date within and adjacent to the Jenner Stock.

Based in the findings of previous workers, in particular those of Harris and Campbell, a strong sub-horizontal bias has been applied to the intercepted gold zone boundaries between drill holes. Gold zones shown on the east-west ore block sections have been "matched" with those shown on the north-south sections. To more clearly demonstrate the apparent continuity of the mineralized zones, each has been letter-coded.

The apparent dip of the gold zones on east-west and north-south sections is about 15° to 20° to the west and south respectively. The overall trend of the zones appears to be northwest strike, dipping gently to the southeast.

The highest gold concentrations are found along the preferentially mineralized western (footwall) contact of the Jenner Stock. Several underground drill holes which were collared in the central portion of the stock, show a marked increase in gold content towards the footwall contact. In addition, individual gold zones appear to coalesce towards this contact, resulting in a more or less continuously mineralized sub-vertical zone. SOme of the better intercepts within the "Footwall Zone" include 4.2 g/t Au over 62.3 metres in JNUG 84-28, 3.98 g/t Au over 31 metres in JNUG 88-112, and 3.231 g/t Au over 40 metres in JNUG 88-113.

Higher grade Au intercepts were also obtained near the roof of the stock above the 187 level adit. Better intercepts here included 4.12 g/t Au over 14 metres in JNUG 88-117 and 4.65 g/t Au over 13 metres in JNUG 86-42.

The highest grade Au intercept located to date is 10.50 g/t Au over 9 metres from 254 to 263 metres in JNUG 88-1221. This intercept is relatively central to the stock and occurs at an elevation of about -70 metres. Significantly, it is the deepest gold intercept in the stock. Below it, JNUG 88-121, intersected about 70 metres of barren fine grained quartz diorite before entering a xenolithic zone at the bottom of the hole.

On Section 9485 N, as indicated in the lower portions of JNUG 88-120 and 88-121, the mineralized system appears to be "bottoming out" at depth. Below the 50 metre level, there is a marked increase in the ratio of internal waste to blocked out gold zones.

## **DIAMOND DRILL PROGRAM - PORTAL STOCK**

#### **Introduction**

From November 29 to December 19, 1988, Bema GoLD Corporation completed 1,312.1 metres (4,305 feet) of NQ2 (NX) diamond drilling in 5 drill holes (PT 88-85 to 89) on the Portal Stock. For the period December 1 to December 19, for which this assessment report is concerned, a total of 1,209.1 metres (3,967 feet) was drilled in 5 drill holes (PT 88-85 to 89).

The purpose of the diamond drill program on the Portal Stock was to test for the possibility of high grade mineable zones within the eastern end of the quartz diorite.

The diamond drilling was again completed by F. Boisvenue Diamond Drilling Ltd. of Vancouver using a Boyles 37 drill and a Val D'or 3,000 drill. The average drilling rate on the Portal was 49.5 metres (162.5 feet) per day.

#### <u>Results</u>

The results of the program are shown in Table III. Detailed geologic logs and summary sheets are included in Appendix VI. Min En assay sheets are located in Appendix VII. Pertinent comments to the diamond drill holes completed during this drilling phase are given below.

<u>PT 88-85</u> failed to intersect quartz diorite, the hole being positioned too far to the south at this easterly location.

<u>PT 88-86</u> intersected quartz diorite at 270.0 metres. The hole appears to have traversed a contact phase, as evidences by the amount of quartz diorite dyking and silicate alteration within the hornfels. Many three metre sections returned geochem gold values in the low 100's. One sample 309 to 310 metres contains 2,000 ppb ( $\sim 2.4$  g/t Au). Visible gold was noted from 318 to 319 metres and 332 to 333 metres.

<u>PT 88-87</u> was drilled 71 metres south of PT 88-86 and was designed to intersect the intrusive within a gold intercept previously located by PT 86-43. Quartz diorite was intersected at 293.1 metres. Best intersection is from 303 to 312 metres (9 metres) of 2.79 g/t Au. A second zone was intersected from 359 to 372 (13 metres) containing 1.2 g/t Au. The hole continued to 406.9 metres and was terminated in quartz diorite. The hole was shut down, still within quartz diorite, due to budget restraints. The intrusive changed to a finer grained biotitic phase at  $\sim$  358 metres, which was very poorly mineralized; the coarse grained phase returned at  $\sim$  397 metres.

<u>PT 88-88</u> was drilled between two previously drilled section lines at 9216 N and 1147 E. The hole was successful in intersecting a well mineralized zone from 95 to 120 metres:

95 - 101 metres	(6)	8.07 g/t Au
108 - 111 metres	(3)	1.83 g/t Au
115 - 120 metres	(5)	7.60 g/t Au

The average for the entire zone is a grade of:

3.17 g/t Au /	30 metres	(90 - 120 metres) or
3.77 g/t Au /	25 metres	(95 - 120 metres).

<u>PT 88-89</u> was drills from the same set-up as per PT 88-88, but was drilled at a steeper angle (-66°) to intercept the above zone approximately 60 metres or 200 feet vertically below. This hole was somewhat disappointing, intersecting 8 metres averaging 2.9 g/t Au from 91 to 99 metres and 9 metres averaging 2.16 g/t Au from 139 to 148 metres.

## TABLE III HARRISON GOLD PROJECT SUMMARY OF DRILL HOLES PORTAL DRILL PROGRAM

SIGNIFICANT ASSAYS

DRILL HOLE#	DIP	AZIMUTH	LENGTH m/ft	LOCATION - ELEVATION	FROM-TO Au gm/tonne (Length)meters or ppb
PT 88-85	-60	360°	212.8/698	9204 N, 11242 E 348 ASL	NO SIGN. RESULTS
PT 88-86	-75	360°	354.48/1163	9244 N, 11207 E 317 ASL	309 -310 (1) 2000 ppb
PT 88-87	-60	360°	407.8/1338	9173 N, 11193 E 327 ASL	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
PT 88-88	-50	360*	154.84/508	9216.1N, 11147 E 290 ASL	95-101 (6) 8.07* 108-111 (3) 1.83 115-120 (5) 7.6 *
PT 88-89	-66	360*	182.27/508	9216 N, 11147 E 290 ASL	91-92 (1) 12.70 91-93 (2) 7.1 91-94 (3) $4.93$ 96-99 (3) 2.62 91-99 (8) 2.9 104-105 (1) $4.28$ 107-108 (1) 1.42 139-140 (1) 8.4 141-142 (1) 1.66 139-142 (3) 3.43 144-145 (1) 1.56 147-148 (1) 7.56 144-148 (4) 2.29 139-148 (9) 2.16

#### **GEOLOGICAL AND MINERAL ZONE INTERPRETATIONS - PORTAL STOCK**

#### Acknowledgement and Scope

The total amount of drilling to date on the Portal Stock has been 6,978 metres (22,895 feet) in 50 drill holes. From October 1988 to March 1989, Bema Gold Corporation has endeavoured to organize and present all the drill data by utilizing the Geolog Computer System developed by Lynx Geosystems Ltd. Dave Novak was contracted to convert all written geologic logs to the Geolog format. All drill data was entered into the Geolog program and output was checked and corrected. All geologic and assay sections and level plans have been produced by Bema's in-house computer department, managed by Wendy Mathison.

The following discourse on the geology and gold zones of the Portal Stock has been written by Greg MacMaster, who completed the interpretation of geologic and assay sections and level plans. G. Nordin and the author also contributed geological interpretation.

#### Geology and Gold Zones

Prior to 1988, the dimensions and orientation of the Portal Stock were not well understood and diamond drilling was purely exploratory. This produced a seemingly random drilling pattern (see Figure 7) and created numerous projection distortion problems on cross-sections and level plane through the stock. Diamond drilling during the fall of 1988 concentrated on the eastern portion of the stock (east of 11040 E) which had produced the best gold mineralization intercepts to date.

Geological level plans and surface mapping show that the stock can be separated into two distinct domains. The western portion of the stock (shown west of 11000 at surface) is roughly circular body with an average diameter of 140 metres and smooth or regular contacts. The eastern portion of the Portal Stock is dyke-like, narrowing from approximately 100 metres in the west to 40 to 50 metres near the eastern contact, with irregular or bulging contacts. Eastwest oriented vertical geological sections suggest the entire stock is plunging approximately 70° to the east.

Gold bearing quartz vein attitudes, relative to drill core axis, in vertical and steep  $(-70^{\circ} \text{ to } -90^{\circ})$  drill holes range from  $60^{\circ}$  to  $90^{\circ}$ . This suggests that the gold bearing veins, and therefore gold zones, are oriented horizontally to sub-horizontally within the Portal Stock. Drill intersected gold zones are shown on assay sections 11040 E to 11200 E. It should be noted that, due to a lack of systematic (i.e. sectional) drilling, the interpretation of these zones is tentative. However, the ability to project a number of the zones from section to section provides some support for this interpretation. Overall, the zones appear to be dipping 15° to 20° to the west and 5° to 20° to the south. Drilling to date suggests that gold grades within the zones improve towards= the intrusives contacts and particularly the northern contact.

Gold mineralization also appears to associated with the northern contact or footwall of a felsic dyke shown on section 11100 E (Figure 61). This dyke is described as a quartz flooded granite or diorite with intense associated chlorite-sericite-biotite-silica alteration along internal fractures and quartz veins, and 2% to 10% disseminated pyrrhotite. This association should be addressed in future drilling.

## DIAMOND DRILLING PROGRAM - SOUTH GRID PROPERTY

#### Introduction

From October 14 to December 6 1988, Bema Gold Corporation completed 11,050 feet (3,368 metres) of diamond drilling in 15 diamond drill holes within the South Grid Area. The Diamond drilling program was directed toward 3 specific gold targets, namely the Hill Stock, Lake Stock and the Breccia Zone.

The Diamond drilling was completed by F. Boisvenue Diamond Drilling Ltd. of Vancouver B.C., utilizing a Boyles BBS37 drill and a Val D'or 3000 drill (new fully hydraulized drill, the first one used in Western Canada). The average drilling rate for the Boyles rig was 47.5 metres per day (156 feet per day) while the Val D'or rig averaged 37.8 metres per day (124 feet per day). The differences in production between the two rigs is attributed to start-up and mechanical difficulties with the new rig.

No major problems were encountered in drilling the Hill Stock and Breccia Zones. High pressure artesian water was encountered in numerous Hill Stock holes which required water plugs to seal the holes at the bedrock overburden interface. Artesian water from HL 88-126 was utilized to drill the remaining holes in the Hill and Breccia area which eliminated the logistical problem of a long water line (900 metres) from Bear Lake.

Severe problems were encountered in drilling of the northwestern margin of the Lake Stock. The upper portions of the holes were very broken ("blocky ground") and required reducing from NQ2 to BQ or the drilling of NW casing down through the broken zones.

The overall direct drilling costs on the Hill Stock and Breccia Zone were \$80.38 to \$82.00 per metre (\$24.50 to \$25.00 per foot), while the costs on the Lake Stock averaged \$91.86 to \$98.42 per metre (\$28.00 to \$30.00 per foot).

As the Hill and Breccia Zones have been described in the previous assessment report prepared by B.H. Kahlert, only the results from the Lake Stock will be discussed herein.

#### Lake Stock - Diamond Drill Program

From October 31 to December 6, 1988, a total of 1,704.5 metres (5,592 feet) of diamond drilling was completed on the Lake Stock in 8 drill holes. The holes specifically drilled include LK 88-132,133, and 135 to 140, and were designed to test the quartz diorite intrusive body at 150 metre centres on the eastern and southern margins of the stock and at 60 to 80 metre spacing within the more geochemical anomalous northwestern portion of the stock.

For the period December 1 to December 3, for which this assessment report refers, a total of 228.9 metres (751 feet) was completed in 2 holes (LK 88-139 & LK 88-140).

#### <u>Results</u>

All drill data and significant assays are assembled in Table IV. Geologic logs and summary sheets are located in Appendix VIII; assays are found in Appendix IX. The results of the drill program on the Lake Stock were disappointing overall. Although some sections of interesting "shear type" veining containing quartz-carbonate pyrite, chalcopyrite, pyrrhotite, and  $\pm$  arsenopyrite and rare visible gold were intersected in a number of holes, the gold content of the zones is very sporadic with only several 1 to 2 g/t Au values from holes within the northwestern portion of the stock. The best intersection was 2.24 g/t Au from 12-14 metres (2 metres) in hole LK 88-137.

Hole LK 88-135 was designed to test an impressive magnetic response (up to 4000 gama relief), along the southern projection of the Lake Stock. As well, strongly anomalous rock geochemistry up to 1710 ppb Au was located in highly hornfelsed and altered sediments adjacent to the magnetic anomaly. LK 88-135 failed to intersect quartz diorite and returned negative assay results. The upper portion of the hole intersected highly magnetic sediments containing up to 15% disseminated magnetite. The magnetic anomaly and associated gold mineralization may be associated with a quartz diorite body to the east or at depth.

#### TABLE IV HARRISON GOLD PROJECT SUMMARY OF DRILL HOLES LAKE STOCK

#### SIGNIFICANT ASSAYS

284-286

84 ppb

DRILL HOLE#	DIP.	AZIMUTH	LENGTH m/ft	LOCATION - ELEVATION	FROM-TO (Length)m	Au gm/tonne eters
LK 88-132	-60°	300°	257.3/844	LAKE STOCK 7705 N. 11853 B	35-37(2) 191-193/2	140 ppb Au
				925 m ASL	131-133(L	., pps nu
LK 88-133	-50°	300°	243.2/798	LAKE STOCK	50-52	423 ppb Au
				7869 N, 1187 E	189-190(1	.)310 ppb Au
				921 m ASL	220-221(1	)182 ppb Au
LK 88-135	-55	90*	196.6/645	<u>LAKE STOCK</u> 7566.5N, 11561 E 850 <b>B ASL</b>	no signi results	ficant
LK 88-136	60	300*	185.9/610	7897 N. 11641E	25-26	225 ppb
				855 m ASL	35-36	306 ppb
LK 88–137	-55	120°	300.84/987	7796 N, 11523 R	12-14	2.24 g/t A
				832 m ASL	14-16	202 ppb
					1618	524 ppb
					36-38	160 ppb
					86-88	123 ppb

# TABLE IV CONTINUEDHARRISON GOLD PROJECTSUMMARY OF DRILL HOLESLAKE STOCK

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SIGNIFICANT ASSAYS

DRILL HOLE#	DIP.	AZIMUTH	LENGTH	LOCATION -	FROM-TO	Au gm/tonne
			m/ft	ELEVATION	(Length)me	ters
LK 88-138	-55	120°	188.4/618	7897 N, 11638 E	76-77	1.7 g/t
				+1.4ppm Ag, 22.0ppm Cd	62-64	138 ppb
				+9.4ppm Ag, 31.5ppm Cd	6466	310 ppb
				855 🖿 ASL	72.3-73	118 ppb
					110-112.2	152 ppb
					151-152	200 ppb
					1.25 g/t	t
					164-165	445 ppb
	~~			7054 # 11540 8	26.20	40C
LK 88-139	-60	300	148.43/48/	7854 R, 11542 E	30-38	480 ppp
				823 M ASL	00-09.2 47_40	1 5 g/+ant
					47-45 63_65	259 ppb
					71_73	253 ppb
					77_79	104 ppb
					97_99	158 ppb
					135-137	2 A 3 a/t h n
					133-137	2145970 114
LK 88-140	-55	120°	164.29/539	7854 N, 11546 E	15-17	1.58g/tAu*
				825 M ASL	19-21	259 ppb
					33-35	118 ppb
					39-41	137 ppb
					85-86	378 ppb
					139-140	210 ppb

#### Geology and Mineral Zone Interpretation

The Lake Stock is the largest and best exposed of the gold bearing quartz diorite stocks. The intrusive underlies the east central portion South Grid Area and outcrops along baseline 11600 E and the main road to the northwest of Bear Lake (see Figure 6). The stock is massive in texture with little variation in composition from margin to margin except for local variations in the size of the amphibole and the amount of biotite present. Black amphiboles are occasionally porphyritic occurring as large laths or blocks to 4 centimetres in length which rarely have green alteration rims. The biotite content is irregular, but shows a slight increase near margins of the stock.

The Lake Stock locally contains up to 3% finely disseminated pyrrhotite. Quartz veins are not common, and are found predominately near the margins of the stock. They are geochemically gold enriched on the northwestern margin where assays up to 9.2 g/t Au have been returned from outcrop. A float sample from the same general area returned an assay of 16.6 g/t Au from vein material.

Diamond drilling of the Lake Stock shows that for the most part the stock below the surface is a homogeneous medium grained biotitic quartz diorite with minor phase changes to a hornblende porphyritic quartz diorite. The stock becomes leucocratic in various areas and shows minor variations in grain size. The stock contains interesting shear related pyrrhotite pyrite quartz and carbonate veins more concentrated within the northwestern portion of the stock. Gold mineralization, however, is sporadic with the odd vein containing visible gold and returning values up to 2.24 g/t Au.

For further information of drill results the reader is referred to drill logs for drill holesHL 139-140 located in Appendix VIII.

#### **CONCLUSIONS**

Drilling on the Harrison Gold Property in late 1988 resulted in the discovery of two new mineralized zones at the Hill Stock and at the Breccia Zone. At the Jenner Stock, the extent of the mineralized zone is expanded to the north and at depth. At the Portal Stock, additional high grade gold mineralization was also encountered.

At the Jenner Deposit, ore reserve estimates from the drill data will lead to metallurgical and engineering studies designed to determine if an economic deposit exists. The economics of the Jenner Deposit would be positively enhanced if mineable zones of high grade gold were encountered at the Portal or Hill Stocks or if a substantial deposit of base-precious metals was indicated at the Breccia Zone.

## **RECOMMENDATIONS**

Drilling programs designed to evaluate the extent of gold and base metal mineralization of the Portal, Hill and Breccia Zones should be undertaken as soon as possible. A program of 3,000 metres diamond drilling, costing \$300,000 is recommended.

J. Norman

George Norman

Jan 19/90

# APPENDIX I

# STATEMENT OF COSTS

# HARRISON LAKE PROJECT SUMMARY OF COSTS

Diamond Drilling Program .. December 1 - December 19, 1988

## I. DIAMOND DRILLING COSTS

(F. Boisenue Diamond Drilling Ltd.)

A) Lake Stock

228.9 m @ \$86.85/metre = \$ 19,878.97

#### B) Portal Stock

407.8 m @ \$86.85/metre	=	35,426.86	
801.3 m @ \$72.05/metre	=	57,732.84	
			93,149.70

## C) Jenner Stock

861.7 m @ \$74.87/metre	-	64,512.00
Total Drilling	=	\$177,540.00

## II. ASSAY/GEOCHEM COSTS (Min En Laboratories)

A) <u>Lake Stock</u>

127 samples - Au Geochem @ \$11.00/sample = 1,397.00

## B) Portal Stock

249 samples - Au Geochem @ \$11.00/sample = 2,739.00 292 samples - Au Assay @ \$12.00/sample = 3,504.00 6,243.00

# C) <u>Jenner Stock</u>

 743 samples - Au assay @ \$12.00/sample
 8,916.00

Total Assay/Geochem

GRAND TOTAL DRILLING & ASSAY

\$<u>194,096.00</u>

\$ 16,556.00

# Bema Gold Corporation Flow Through Expenditures December 31, 1988

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Nov	3	Min-En Labs	11699	Oct	119.00
Nov	9	Min-En Labs	11697	Oct-Nov	519.50
Nov	14	Min-En Labs	11771	Nov	3354.00
Nov	14	Min-En Labs	11766	Nov	4352.00
Nov	21	Min-En Labs	11876	Nov	3874.50
Nov	25	Min-En Labs	11918	Nov	2973.00
Nov	28	Min-En Labs	11984	Nov	135.75
Nov	29	Min-En Labs	11990	Nov/38	4048.50
Dec	5	Min-En Labs	12042	Nov	504.30
Dec	7	Min-En Labs	12065	Nov	5135.50
Dec	10	Min-En Labs	12121	Nov	4237.50
Dec	14	Min-En Labs	12169	Nov-Dec 14	4641.50
Dec	3	Min-En Labs	12078	Nov	730.00
Dec	16	Min-En Labs	12191	Nov	2745.90
Dec	23	Min-En Labs	12268	Nov	4204.50
Dec	22	Min-En Labs	12247	Nov	2798.00
Dec	31	Min-En Labs	12377	Nov	4328.45
Jan	9	Min-En Labs	12381	Jan	2137.90
Jan	5	Min-En Labs	12354	Jan 5	44.95
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# **APPENDIX II**

# STATEMENTS OF QUALIFICATIONS

I, GEORGE E. NORMAN, the author of the foregoing report, hereby certify that:

- I am a self-employed Consulting Geologist, operating since 1985 under the name of Norman Geological, resident at 28 West 43rd Avenue, Vancouver, B.C.;
- I have been registered with the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 1975 and am a graduate of the University of Alberta with a B.Sc. (Honours Geology, 1973);
- I am a registered Fellow with the Geological Association of Canada;
- 4. I have worked for a number of major mining firms as an exploration geologist, consultant geologist, and mine geologist in British Columbia, the Yukon and the Northwest Territories during my sixteen years of practical exploration experience. I have been employed previously by the following exploration/consulting firms: Terra Mines Ltd. (1984), Fox Geological Consultants Ltd. (1983-1984), Bema Industries Ltd. (1980-1983), Utah Mines Ltd. (1976-1980), and Kaiser Exploration and Mining Company (1973-1974);
- 5. The foregoing report is based on the 1988 exploration program and data compilation to March 1989.

DATED at Vancouver, British Columbia on this 11th of April, 1989.

Norman

GEORGE E. NORMAN, B.Sc.

JEAN-DENIS FOURNIER was employed by Bema International Resources Corporation from October to December 1988 to log core for the Harrison Gold Project; as well, J.D. Fournier:

- 1. resides at #105, 10818 81 Avenue, Edmonton, Alberta.
- graduated from the University of Alberta with a B.Sc. in Geology in 1987.
- 3. has worked as an exploration Geologist since graduation with a number of exploration mining companies and consulting groups, including BHP - Utah Mines Ltd., Falconbridge Inc. and Trigg-Woollett & Olson Consulting Ltd.

As Jean-Denis Fournier was not available to write a Statement of Qualification at this time, I, G.E. Norman, certify that the above statements are correct.

Dated at Vancouver, British Columbia, this 11th day of April, 1989.

THUR HOUSE

norman

G.E. NORMAN, B.Sc.

I, Brian K. Bowen, of Surrey in the province of British Columbia, do hereby certify that:

- 1. I am a Consulting Geological Engineer with an office at 12470 99A Avenue, Surrey, British Columbia, V3V 2R5.
- 2. I am a graduate of the University of British Columbia with a degree of Bachelor of Applied Science in Geological Engineering, attained in 1970.
- 3. Since 1970, I have been employed as both a mine and exploration Geologist in British Columbia and elsewhere.
- 4. I am a member in good standing of the Association of Professional Engineers in the Province of British Columbia.
- 5. I have no interests in Bema Gold Corporation nor in the property reported on herein, nor do I expect to receive any.

Dated at Surrey, British Columbia this twenty-seventh day of February, 1989.

B. M. Bowei

Brian K. Bowen, Consulting Engineer

I, Deirdre K. Riley, with a residence address of 95 West 49th Avenue, Vancouver, British Columbia V5Y 2Z4, do hereby certify that:

- 1. I have been employed with Bema Gold Corporation as a Geologist since October, 1988.
- 2. I am a graduate of the University of Regina with a B.Sc. Honours degree in Geology (1987).
- 3. I have worked in the mining industry as an exploration geologist and consultant geologist in British Columbia and Timmons, Ontario since 1987. I have been previously employed by Westmin Resources Limited (1987 & 1988) and Kian A. Jensen, Consultant Geologist (1988).
- 4. I have logged core for Bema Gold Corporation at their property in Harrison, British Columbia (1988).

Dated at Vancouver, British Columbia this 27th day of February, 1989.

Deirdre Deley

Deirdre K. Riley, B.Sc. Honours

I, Greg A. MacMaster, with a residence address of 1701 - 195 Barrington Avenue, Toronto, Ontario, M4C 5M2, do hereby certify that:

- 1. I am a graduate of Queen's University at Kingston, Ontario with a B.Sc. Honours degree in Geological Sciences.
- I have been employed full time as a Geologist since graduation and have seven summers of related experience in Ontario and the Northwest Territories. That my previous employers are the Ontario Geological Survey (1982 - 1988) and BHP - Utah Mines (May to September 1988).
- 3. I have been employed as a Geologist by Bema Gold Corporation since October, 1988.

Dated at Vancouver, British Columbia this 27th day of February, 1989.

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Dues Mar Master

Greg. A. MacMaster, B.Sc. Honours



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