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ASSESSMENT REPORT  
of the  
GEOLOGICAL SURVEY  
AND  
DRILLING PROGRAM  
on the

KALAMALKA MINE PROPERTY  
(GUS 1-6, and CHANCE CLAIMS)

VERNON MINING DIVISION  
BRITISH COLUMBIA

Latitude:  $050^{\circ} 12' 20'' N$   
Longitude:  $119^{\circ} 05' 30'' W 06'$

**FILMED**

N.T.S. 82 L/3ME

OWNER(s):

EUGENE DODD  
815-850 West Hastings Street,  
Vancouver, B.C., V6C 1E2

*Triple Star Resource Corp.*

OPERATOR:

TRIPLE STAR RESOURCE CORP.  
530-800 West Pender Street,  
Vancouver B.C., V6C 2V6

AUTHORS:

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and

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SUBMITTED:

September 24, 1987

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

16,442

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## SUMMARY

The Kalamalka mine was the largest producer of gold in the North Okanagan region<sup>2</sup> with a recorded total of 7,267 tons mined for 2,898oz. gold, and 3,474oz. silver, ( 0.4opt Au., 0.48opt Ag.).

Triple Star Resources Corp. have obtained the mineral rights to the mine and the immediate surroundings through the option of the GUS 1&2 and CHANCE claims.

The mine portal has been rehabilitated and the geology of the workings has been mapped. An exploratory underground drill programme was completed to look for further mineralized shoots parallel to the existing mined shoot, and the continuation of the old shoot to depth. This programme produced gold values to 0.924 opt in the shear zone adjacent to the vein and gold values to 0.393 opt in the vein

It appears as if the property was not drilled prior to production, and the only recorded drilling was one hole drilled in 1967<sup>9</sup>. The property was developed in 1934-35, but for some unknown reason had limited production until 1937. In this and the following two years 5,268 tons were mined. Work continued until 1944, but at a much slower pace because of the confiscation of the compressors for the war effort. No production and limited exploration is known after this date.

The mineralization encountered in the Kalamalka mine is typical of a mesothermal vein deposited within dilatent zones associated with regional and local faulting. There are at least two generations of quartz veins, the latter heavily mineralized with pyrite and pyrrhotite. The gold values increase within the central portion of the mine, characteristic of a central mineralizing path or "shoot". Further areas with gold values in excess of an ounce per ton are known at two other widely separated locations within the workings, and it is anticipated that exploration will determine the location of a series of other mineralized shoots of equivalent size to that mined in the past. In addition the present drilling has extended the main shoot below the 2900 level beyond where the previous operators had stopped because of "faulting".

The Kalamalka property has excellent potential for the development of high grade gold mineralization in a series of "shoots" geometrically related to the existing ore zone. This existing zone can be extended to depths over 500ft below the present workings if the mineralization conforms to known mesothermal type deposits, (e.g. the Bralorne Camp).

A programme of surface and underground exploration totaling \$265,000 is budgeted within this report for the underground workings and surrounding area.

## INTRODUCTION

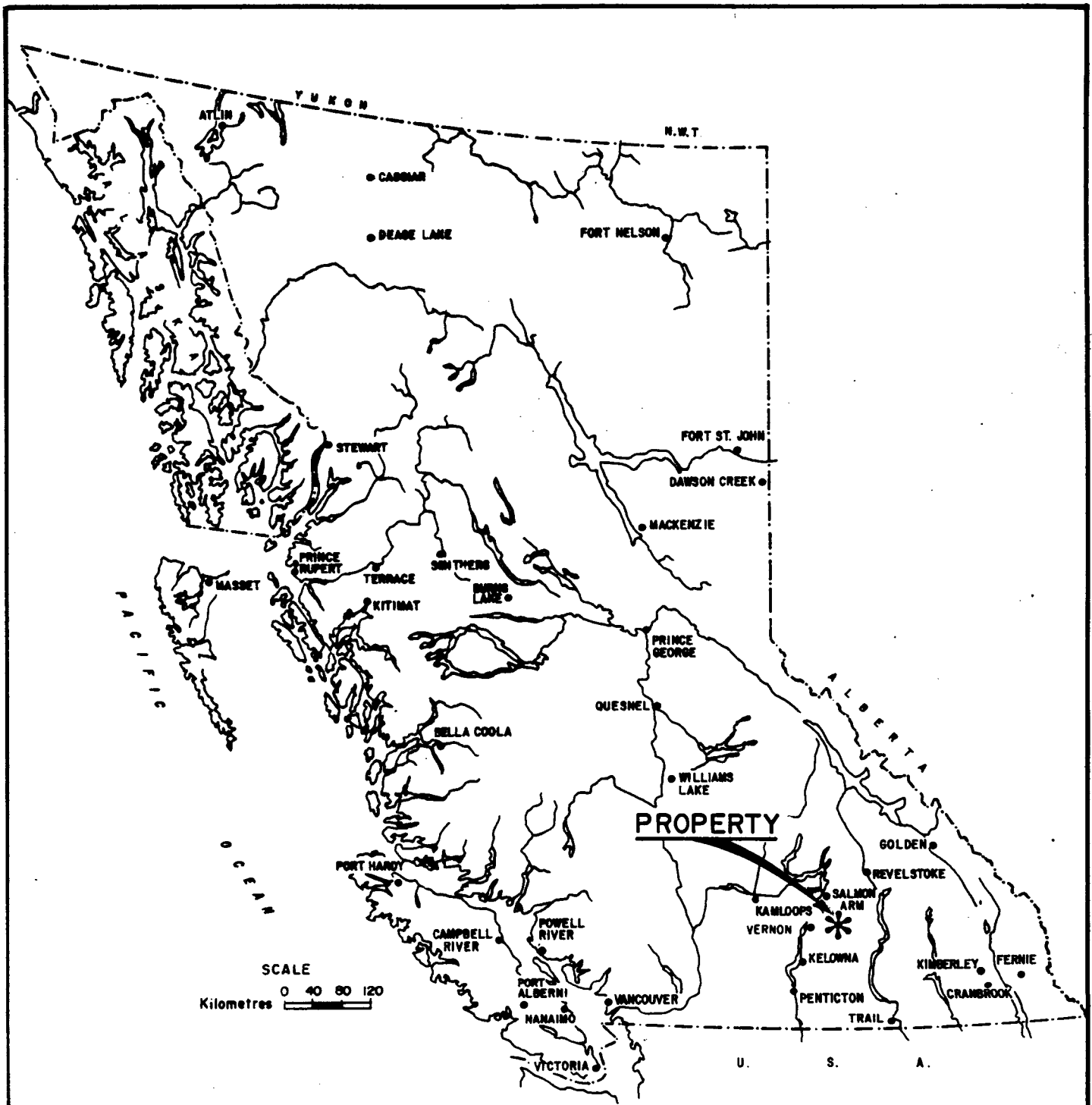
Mr. David Konnert, President of Triple Star Resource Corp., requested the authors to review the history of the Kalamalka mine and to undertake a programme of rehabilitation and mapping of the old workings to determine the potential of discovering further mineable gold mineralization. This report summarizes two months of fieldwork including drilling within the old mine workings.

The Kalamalka mine was the largest producer of gold in the North Okanagan region<sup>2</sup> with a recorded total of 7,267 tons mined for 2,898oz. gold, (0.4opt), and 3,474oz. silver, (0.48opt). The mine produced over 70% of its recorded gold in the first 4 years of its development 1935-1940, was minimally worked during the war years, and closed in 1944. Exploration effort for more ore since that time has been minor.

The property was developed along the strike of a strong shear zone which crosses a diorite intrusive. Several stages of quartz veining are apparent. The first periods of quartz flooding prepared the diorite for brittle fracture, and retained the proto-ore zone opening during faulting. We are able to see, from within the main stope, the character of the "ore shoot" and the trend of the shear offsets. The lack of clay alteration in the hangingwall of the shoot and the abundance of pyrrhotite indicate the mesothermal character of the deposit, and hence the potential for a vertical extent of gold mineralization exceeding 500 feet.

Our estimate of the tons mined, calculated from the dimensions of the main stope, is 12,250 tons. It is apparent that the pre-war operators had considered further development, (shown on early plans), and that the 1940's efforts were primarily scalping of the existing development, and not directed towards finding new ore shoots. The stated reasons for the closure of the mine were severe faulting and marginal grades<sup>3</sup>.

This type of mineral deposit should have several more minable "shoots" and ore grade mineralization should be found below the existing base of extraction (2900 level). The existing stope produced 54 tons of ore per vertical foot, using published figures, and 91 tons per vertical foot using our calculations. These values indicate the potential of mining 50-100 tons per day from the continuation of this shoot and similarly from adjacent shoots which are indicated from the current mapping.



TRIPLE STAR RESOURCE CORP.

KALAMALKA PROPERTY  
VERNON MINING DIVISION, B.C.

LOCATION MAP

SEARCHLIGHT RESOURCES INC.

DATE: FEB., 1987

FIGURE No. 1

The two month programme described in this report concentrated on making the underground workings safe and accessible, and to re-establishing the reported ore grades shown on the early assay plans (see figures 7 & 8). Limited surface prospecting was attempted because of snow cover, however this abated to some extent by late February, and some of the early pits and roadcuts were inspected. The underground drilling location was limited by the extent of debris in the old workings, the position of an old backfilled stope, and the nearby winze. The drilling was exploratory in nature, and limited in extent, however significant assays were obtained from the projected extensions of the ore zone.

### Location and Access

The claims are situated approximately 4km south of Lavington and 15km south east of Vernon, B.C. and can be found on NTS map 82 L/3, (Oyama). The property is centered over the old Kalamalka mine adits at 050° 12' 20" N latitude, 119° 05' 30"W longitude, and occupy a ridge between Craster and Brewer creeks.

All-season access to the property can be gained via Learmouth road south of Lavington, thence by Dawes Road to the boundary of Mr. Bellevue's farm property. A small triangle of land attached to a private dwelling legally overlies the last 55ft of access to Mr. Bellevue's property. The old mine access road continues from the end of Dawes road through private farmland to the 2900 mine portal. This track provides excellent access to most parts of the claims between Craster and Brewer creeks. Alternative access can be developed from the south west across Crown Land in the Okanagan Provincial Forest.

### Physiography and Vegetation

The GUS claims are situated on the southern flanks of a small ridge between Craster Creek and Brewer Creek and are characterized by moderately steep, relatively open slopes. The elevation of the No.2 portal is 2900ft, and the ridge above the mine 3000ft. This ridge gradually climbs to an elevation of 4000ft to the southwest where it meets a little used forest road which gives access to the Channel claims.

The CHANCE claim, which overlies the GUS claims, encompasses similar ground and the tributaries to Craster and Brewer Creeks, the property's main drainage. The eastern edge of the CHANCE claim is 1000 meters to the west of Bluenose mountain, and the Aberdeen Lake road.

Most of the more open ground is privately owned and used for ranching. To the south and west the land rises to a plateau of approximately 4500ft elevation which is managed as the Okanagan Provincial Forest, and is the scene of active logging operations.

The area is characterized by mature stands of conifer trees typical of the Interior Douglas fir biogeoclimatic zone. The more abundant species include Douglas fir, ponderosa and western white pine, and white spruce. Undergrowth is moderate and more prevalent on north facing slopes, while southern slopes tend to be drier and open. Logging companies are presently active south west of Brewer Creek and there is evidence of logging on the property some years (30?) ago. Precipitation here varies from 36-56 cm per annum, much of it falling as snow from November until March.

### Property

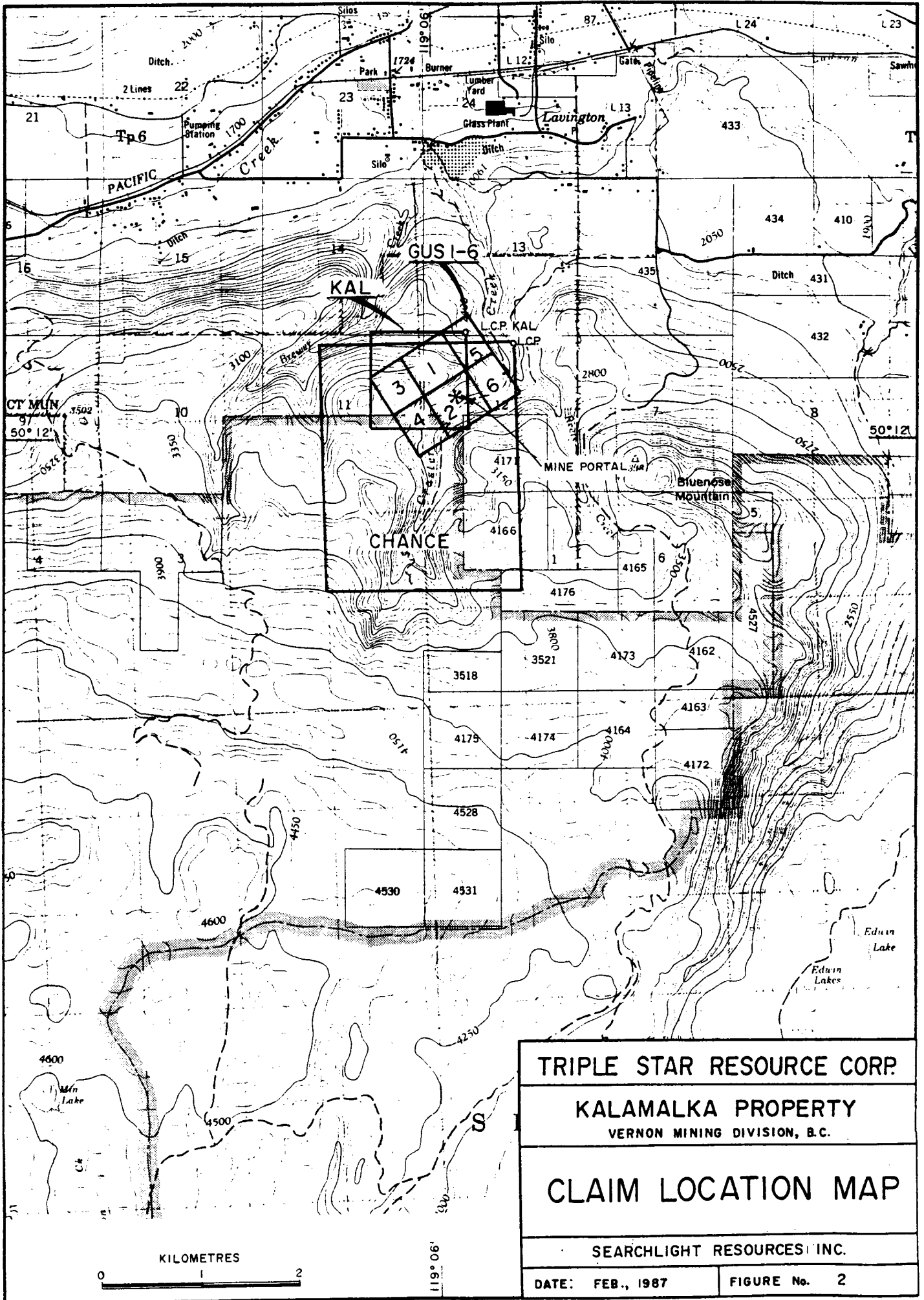
The claim group consists of the following six contiguous 2 post claims, and one 20 unit modified grid mineral claim, staked by Mr. Eugene Dodd, but at present under contest by the stakers of the Bluenose 1-4 claims, in accordance with section 50 of the Mineral Act. The KAL claims overly these earlier claims.

Claim	Units	Record No	Anniversary Date
GUS 1-2	2	2146-47	29 September, 1987
GUS 3-6	4	n/a	12 November, 1987
CHANCE	20	n/a	12 November, 1987
KAL	4	n/a	n/a
KAL 1-4	4	n/a	n/a

The GUS 1-2 claims were staked on 28 August 1986, and the GUS 3-6 claims were staked November 7 1986. The CHANCE claim was staked on November 8, 1986. All were staked by Mr. Eugene Dodd.

The Bluenose 1-4 claims were staked over the GUS 1-2 claims on 7 September 1986 by Mr. Nelson Pentecost, and on 11 November 1986, Mr. Nelson Shewchuck restaked these same claims in his name, also retaining the name Bluenose 1-4. Mr. Shewchuck later completed staking the Bluenose claim, a 20 unit claim extending west from Craster creek, on 29 November 1986.

In February 1987 a further four two-post claims, and one modified grid claim, the KAL claims, were staked over the mine by Mr. Richard Simpson, Mr. Dodds partner.



TRIPLE STAR RESOURCE CORP.  
 KALAMALKA PROPERTY  
 VERNON MINING DIVISION, B.C.  
 CLAIM LOCATION MAP  
 SEARCHLIGHT RESOURCES INC.  
 DATE: FEB., 1987      FIGURE No. 2



A land title search showed that the Kalamalka mine, and the GUS1-2 claims are on private land owned by Mr. W. Bakker of Edmonton, and that the present access road passes through six other private land lots. These owners have been notified of our exploration intentions, and have agreed on conditions of access, or have provided free access for specified durations.

### History

The property was first worked in 1896 following the finding of a large reddish quartz vein near the brow of the ridge dividing the two major creeks. The prospecting produced low gold values on surface, so work was planned to drive a crosscut adit lower on the hillside to intersect the vein to look for better values. The writer is not sure when this crosscut was completed as the records show no further activity until 1928 when 21ft of tunnel was driven. By 1933 the (2975 level) crosscut had been completed along with some drifting on the vein, and another short crosscut and shaft had been completed.<sup>4</sup>

In 1934 390ft of tunneling was reported on the affidavits of work, this was followed by 617ft of tunnel (the 2975 and 2900 level drifting?) by April 1935. The first shipment of ore is reported in 1935 as 30ton grading 1.0 ounces per ton (opt) gold.<sup>5</sup>

Production in 1936 was only 38 tons, then in 1937 more development is recorded, and production peaked at 2816tons (@ 0.42 opt gold). The following two years had mining tonnages of 1277tons and 1175 tons respectively. At this time the mine was under the ownership of Kalamalka gold mines Ltd.

The ownership changed to a lease to Messrs Stan and Cecil Penney of Vernon in 1940 and mined tons dropped to 511. The following years production reflected the scalping operations of the Penney's operations with tonnages of 917, 433, 38, and 32 tons recorded. It was reported that in 1941 mining was by hand steeling only, this was confirmed by a discussion the author had with Mr. Aubrey Penny (a brother), who reported that the mine compressors were confiscated during the war.

The mine closed in 1944. Then in 1952 Mr. Aubrey Penney staked the property. He retained the ownership by occasional rehabilitation work, until it was optioned to Coin Canyon Mines around 1966. Coin Canyon drilled one surface hole that was reported in the 1966 and 1967 affidavits of work, and in the B.C.D.M. report. There is no record of the drill information in this hole, however Mr. A. Penney provided photographs of the site, sufficient for the drill collar to be located. The dip of the hole was estimated from the photographs, and the vein intercepts were from Mr. Penney's recollection, (Figure 5).

There are various records of optioning company's buying surface land titles to the ground in the 1970s. The present owners of the surface rights, Mr. Bakker and Mr. Nyland, had the mineral claims until they expired in August 1986, and were subsequently staked by Mr. Eugene Dodd.

Other hardrock exploration in the area is reported to have occurred on the northeast side of Harris Creek, approximately 3.5 miles southeast of its confluence with Besette Creek. Here, several small quartz veins occurring in both sedimentary and plutonic rocks were explored in a series of shallow open cuts. The width of these veins was reported to vary up to two feet, although most were less than six inches. One sample of rusty quartz assayed 1.02 oz/ton gold and 0.1 oz/ton silver, while other samples returned values ranging from trace to 0.41 oz/ton gold.

The location of this mineralization probably occurred as a result of the activity generated when placer gold was discovered in Harris creek. Several leases still exist today and evidence of placer testing along the creek bank is common. The total amount of gold extracted from Harris Creek is, however, unknown.

#### Summary of Work

The 1987 program carried out on the GUS claims consisted of the following exploration assessment work:

TYPE OF WORK	CLAIMS INCLUDED
Geological mapping at a scale of 1:250 of the mine workings	GUS 1-2
Lithochemisrty - 59 samples	GUS 1-2
Mine rehab. portal and 300ft crosscut	GUS 1-2
Underground drilling 439ft	GUS 1-2

## GEOLOGICAL SURVEY

### REGIONAL GEOLOGY (Gilmour 1979)<sup>1</sup>

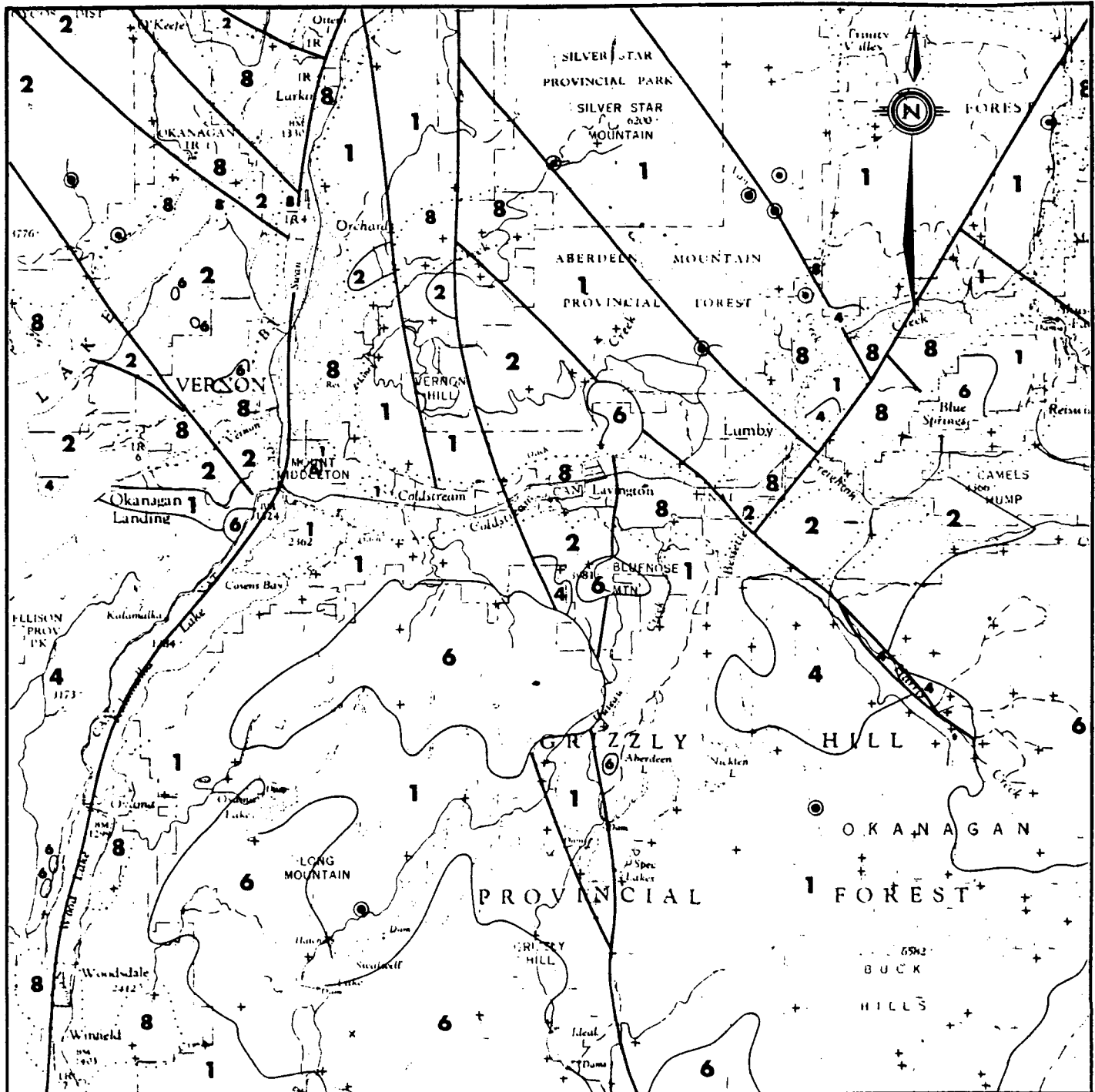
The Kalamalka property is located near the western margin of the metamorphic Shushwap Terrane. The regional geology is transitional between the Omineca crystalline belt, of which the Shushwap Terrane is part, and the Intermontane Belt of eugeosynclinal volcanic, sedimentary and intrusive rocks. The rocks in the area range in age from Lower Paleozoic (possibly Precambrian) to Miocene/Pliocene.

The oldest rocks in the area belong to the "Monashee" metamorphic rocks of Proterozoic? to Paleozoic age. This unit generally comprises layered gneiss with lesser amounts of pegmatite, marble, greenstone and gabbro. Less metamorphosed volcanic rocks of Carboniferous-Permian and Upper Triassic ages also occur in the area.

These rocks have been intruded by Jurassic to Eocene plutons. The "Nelson" plutonic rocks are biotite-hornblende diorites, granodiorites and granites with a strong to moderate foliation. The Late Jurassic "Valhalla" plutonic rocks are generally porphyritic quartz monzonite to granite and the Eocene Coryell plutonic rocks, mainly syenites, monzonite and granite, both contain high background uranium values.

In late Cretaceous to early Eocene times a profound erosional period levelled the entire region. Intense continental volcanic and tectonic (graben formation) activity with extensive deposition of volcanic and sedimentary rocks commenced in the Eocene.

A more mature topography existed in the Miocene with the formation of fluvial quartz pebble conglomerates and sandstone. In late Miocene to Pliocene times olivine plateau basalt flows covered much of the area. Later uplift has resulted in the erosion of most of the Tertiary rocks.



**LEGEND**

- QUATERNARY**  
 8 Glacial, lacustrine, and fluvialite gravel, sand, silt and clay
- TERTIARY**  
 7 Plateau basalts, olivine basalts  
 6 Volcanic flow rocks with interbedded sedimentary rocks: 6a, conglomerate, sandstone, shale and tuff  
 5 CORVELL: alkalic plutonic rocks; porphyritic granite and rhyolite
- JURASSIC - CRETACEOUS**  
 4 NELSON and VALMALLA: granitic plutonic rocks
- JURASSIC**  
 3 Haffic and ultramafic intrusive rocks, pyroxinite, hornblende and serpentinite
- PALEOZOIC (including UPPER PROTEROZOIC and TRIASSIC)**  
 2 Basaltic and andesitic lavas, greenstone, tuff, quartzite, limestone and argillite; 2a, quartzite, argillite, limestone, slate, schist, phyllite, sandstone and conglomerate
- PROTEROZOIC (SHUSHAP TERRANE)**  
 1 Gneiss, minor schist, limestone, marble, dolomite, slate, phyllite; 1a, schist, quartzite, limestone, slate, argillite
- Geological contact.....  
 Fault.....  
 Dyke.....  
 Mineral occurrence.....



TRIPLE STAR RESOURCE CORP.

KALAMALKA PROPERTY  
 VERNON MINING DIVISION, B.C.

REGIONAL GEOLOGY

SEARCHLIGHT RESOURCES INC.

DATE: FEB., 1987      FIGURE No. 3

Legend modified and geology compiled for the geochemical map by T.G. Kainne from maps 1059A, by H.R.A. Rice 1943, 1946, and A.G. Jones 1943, 1951

## PROPERTY GEOLOGY

There are no detailed geological maps available for the mine area. Within the mine, and on the surface, the author has mapped a medium grained hornblende diorite, which shows intense deformation along a major NE-SW trending shear zone. This shear zone is occupied by quartz veins and lenses discontinuously along its length. Apparent shear offsets are noted in a conjugate array local to the main shear, but their character becomes more subtle at distances over 50ft from the main shear.

The mine workings intersected a contact with fine grained, very chloritized, grey-green metasediment, which in places is brecciated and silicified. Veinlets and dykes of diorite intrude the sediments at their margin, but no quartz vein style mineralization has been shown within the metasediments. The brecciated and silicified zones are however probably related to the veining within the diorite, and ore grade mineralization could extend into these zones.

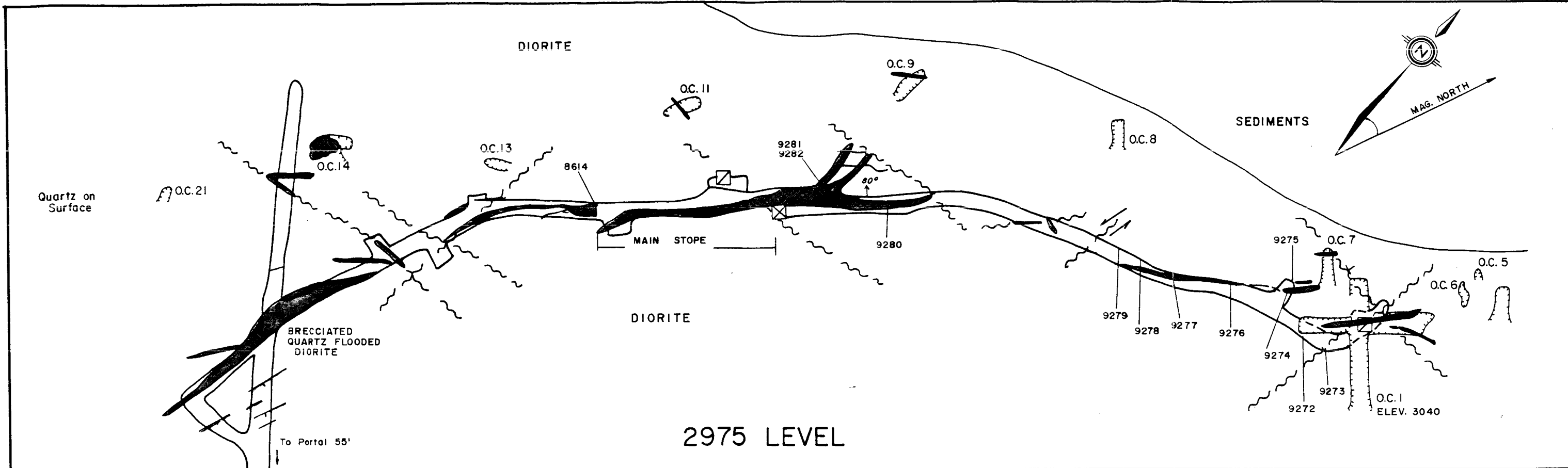
## MINERALIZATION

The shear zone hosts the main gold mineralization in pyrite and pyrrhotite rich quartz pods and veins, and in the chlorite-quartz matrix. The drill programme showed that the narrow veinlets within the wall rock which showed bleaching were also auriferous, and the sampling programme indicated areas within the mine with significantly elevated gold/silver ratios. Further work is required to confirm a relationship between elevated precious metal ratios and ore shoot development.

In 1934 the mines annual report stated... "The main shear zone, about 22 feet wide, on which most of the work has been done, consists of nearly vertical bands of quartz from 2 to 10 inches wide, generally free on the walls, with alternating bands of argillaceous and altered diorite between accompanied by graphite, pyrite, and manganese oxide. Free gold can be panned from some of this material..." A 1935 metallurgical report on a sample of this material is included in Appendix 3.

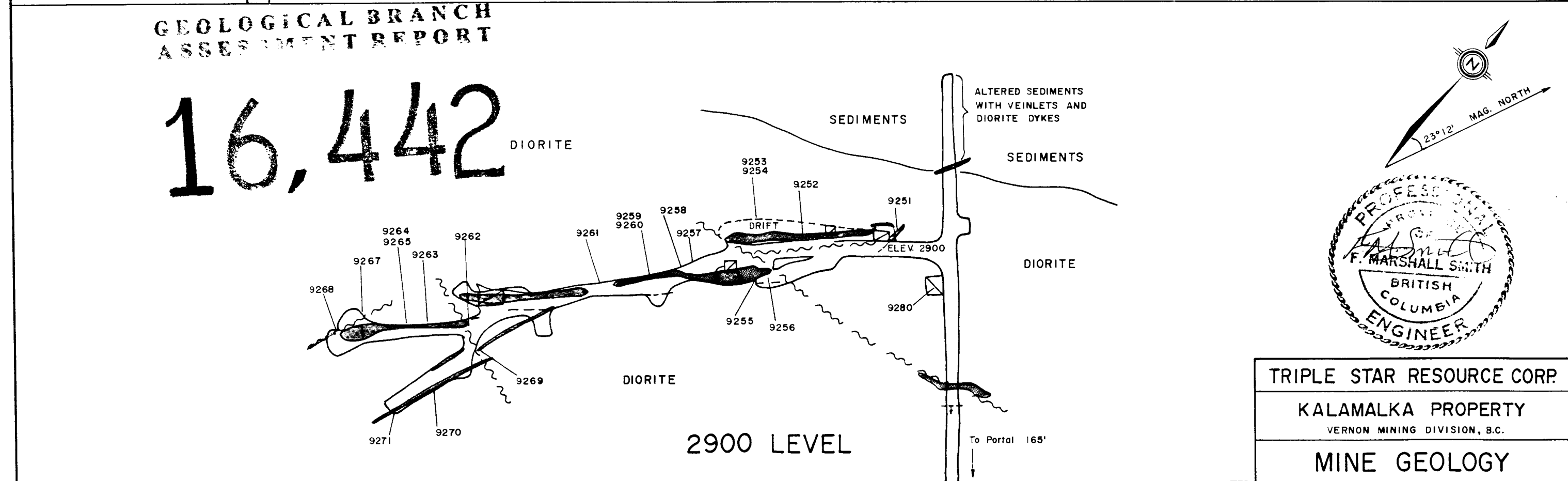
This material described in the early reports has since been mined, however the mapping in 2900 drift south of the raise showed similar material, although with a maximum gold value of 0.19 opt (sample 9258). The recent exploratory drillholes were to determine if the ore shoot continued below or around this zone

The drilling was successful as it picked up extensions of the high grade mineralization below the drift in drill hole K-87-2, - with 0.924 opt gold in the chloritized shear zone between 16' 9" and 21' 10", (5' 1"), and values to 0.254 opt gold in the adjacent quartz vein, hole K-87-3.



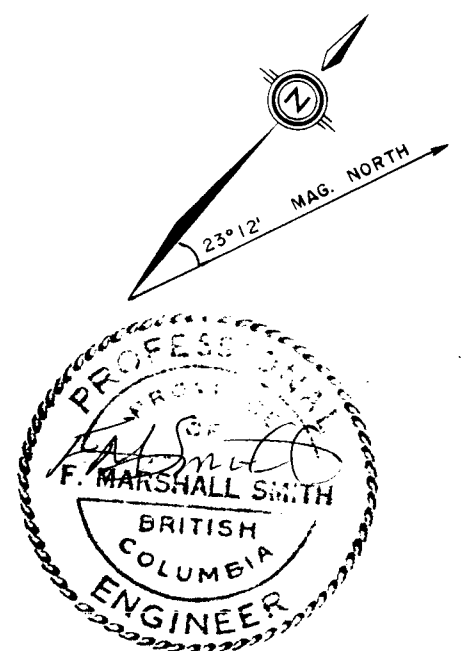
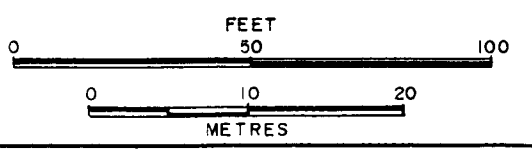
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**LEGEND**

- Quartz Vein in Shear Zone
- Major Cross Shear
- Surface Open Cut



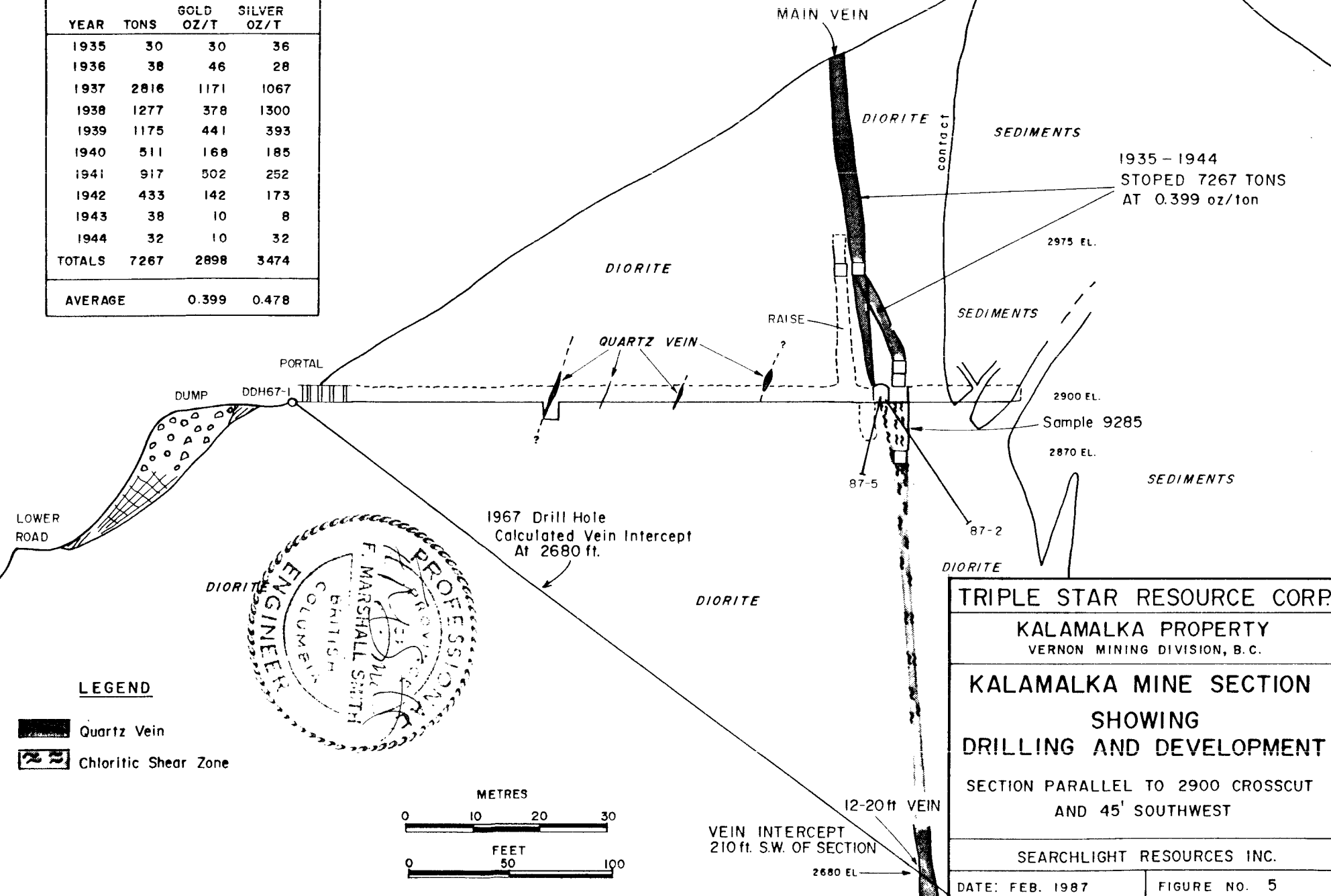
TRIPLE STAR RESOURCE CORP.	
KALAMALKA PROPERTY VERNON MINING DIVISION, B.C.	
MINE GEOLOGY WITH 1987 SAMPLE LOCATIONS	
SEARCHLIGHT RESOURCES INC.	
DATE: FEB., 1987	FIGURE No. 4

SOUTHEAST



NORTHWEST

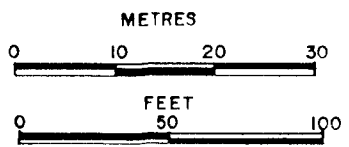
KALAMALKA MINE PRODUCTION

YEAR	TONS	GOLD OZ/T	SILVER OZ/T
1935	30	30	36
1936	38	46	28
1937	2816	1171	1067
1938	1277	378	1300
1939	1175	441	393
1940	511	168	185
1941	917	502	252
1942	433	142	173
1943	38	10	8
1944	32	10	32
<b>TOTALS</b>	<b>7267</b>	<b>2898</b>	<b>3474</b>
<b>AVERAGE</b>		<b>0.399</b>	<b>0.478</b>



1935 - 1944 STOPED 7267 TONS AT 0.399 oz/ton

- LEGEND**
-  Quartz Vein
  -  Chloritic Shear Zone



**TRIPLE STAR RESOURCE CORP.**  
**KALAMALKA PROPERTY**  
 VERNON MINING DIVISION, B.C.

**KALAMALKA MINE SECTION**  
**SHOWING**  
**DRILLING AND DEVELOPMENT**

SECTION PARALLEL TO 2900 CROSSCUT AND 45' SOUTHWEST

SEARCHLIGHT RESOURCES INC.

DATE: FEB. 1987      FIGURE NO. 5

These drill values are similar to the values obtained from sampling in the drift at the 2900 level, where the author obtained 0.393 opt gold over 80" (sample 9255) from the quartz vein adjacent to the drill station, and to the values reported on the 1934 and 1937 assay plans, (see figures 7 & 8).

The following table details the more significant assay results, a full descriptive listing is in appendix 2.

SAMPLE	WIDTH	Au.opt	Ag.opt	REMARKS
9285	5'1"	0.924	5.98	K-87-2, 16'9"-21'10"
9293	2'6"	0.107	0.80	K-87-3, 13'6"-16'0"
9299	2'8"	0.085	0.69	K-87-3, 50'0"-54'6"
8610	2'0"	0.316	-	K-87-6, 33'0"-35'0"
9251	8"	0.136	0.09	Vein at winze.
9253	10"	0.260	0.13	Vein in cross shear
9255	80"	0.393	-	Main vein at 2900
9258	grab	0.190	-	Debris at 9255
9268	12"	0.140	-	Main shear
9274	32"	0.100	-	End of 2900 level
8614	grab	0.170	-	2975 stope SW end

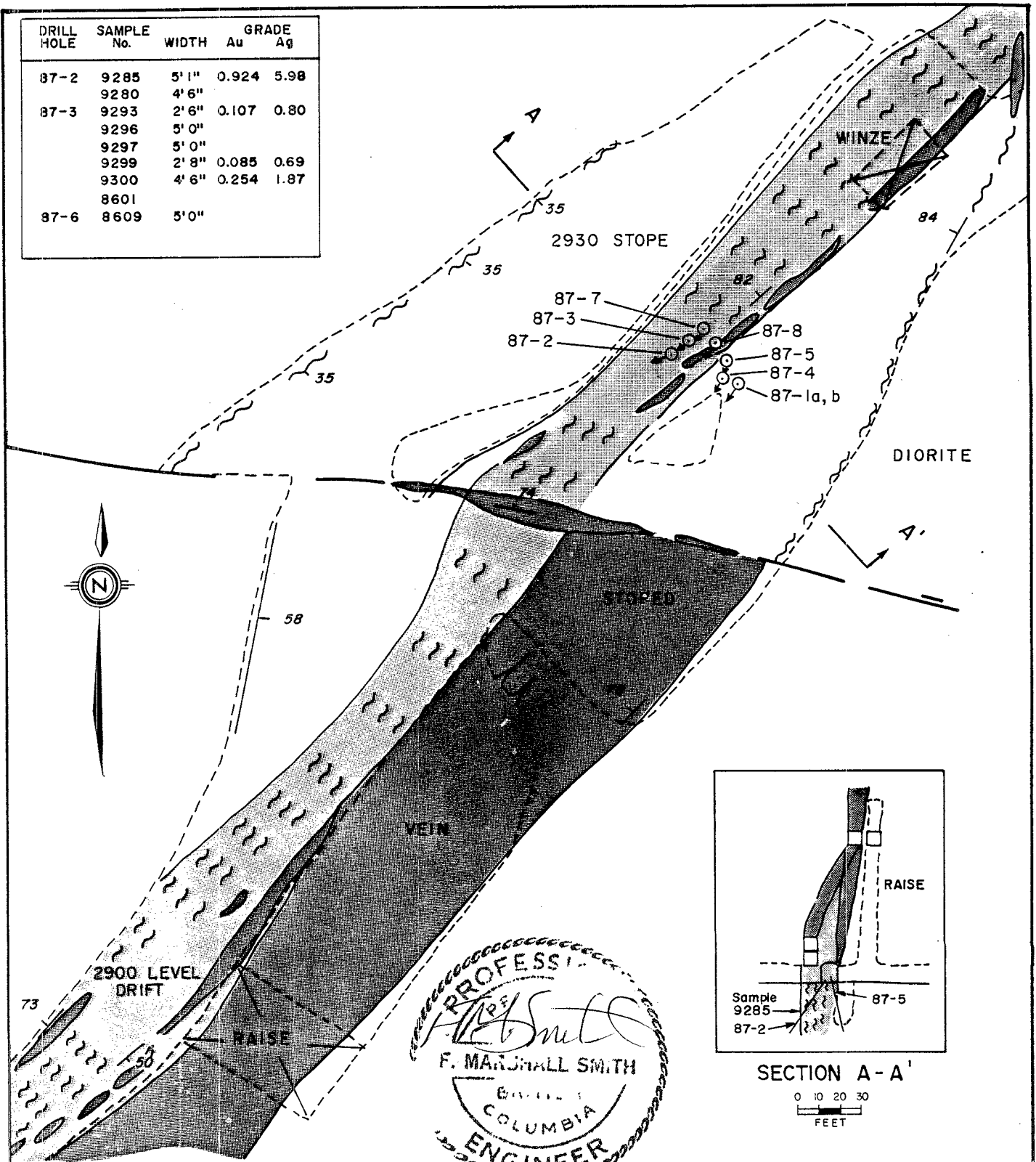
In addition to the samples collected as above, Mr. Penney has retained two excellent samples obtained from the workings of the No.1 open cut, which show spectacular free gold, and these have been offered to the author for further examinations.

The author is particularly interested in excavating the No.1 open pit, and to drilling the extensions of the mineralized zone shown there. The extremely high gold values reported for vein samples in this area and the geometry of the vein indicate the existence of a major ore shoot.

Similar high gold (1.6 opt) was obtained from a sample taken at the intersection of the 2975 crosscut and drift (see 1934 sampling, #19), and at this location the author noted a secondary quartz vein in an oblique shear. This shear trends toward the quartz float noted on surface to the southwest, and may represent a further shoot. Surface excavation will assist in this determination.

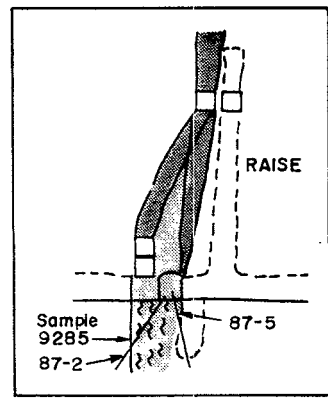
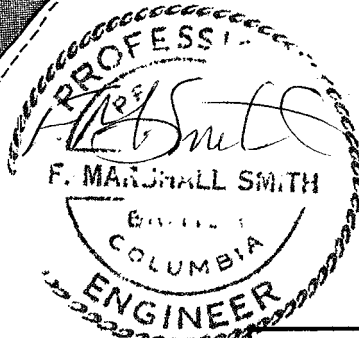
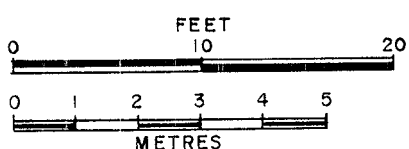


DRILL HOLE	SAMPLE No.	WIDTH	GRADE	
			Au	Ag
87-2	9285	5' 1"	0.924	5.98
	9280	4' 6"		
87-3	9293	2' 6"	0.107	0.80
	9296	5' 0"		
	9297	5' 0"		
	9299	2' 8"	0.085	0.69
	9300	4' 6"	0.254	1.87
87-6	8601			
	8609	5' 0"		



**LEGEND**

- CHLORITIC SHEAR ZONE
- WORKINGS
- QUARTZ VEIN
- DIAMOND DRILL HOLE
- FAULT



TRIPLE STAR RESOURCE CORP.

**KALAMALKA PROPERTY**  
VERNON MINING DIVISION, B.C.

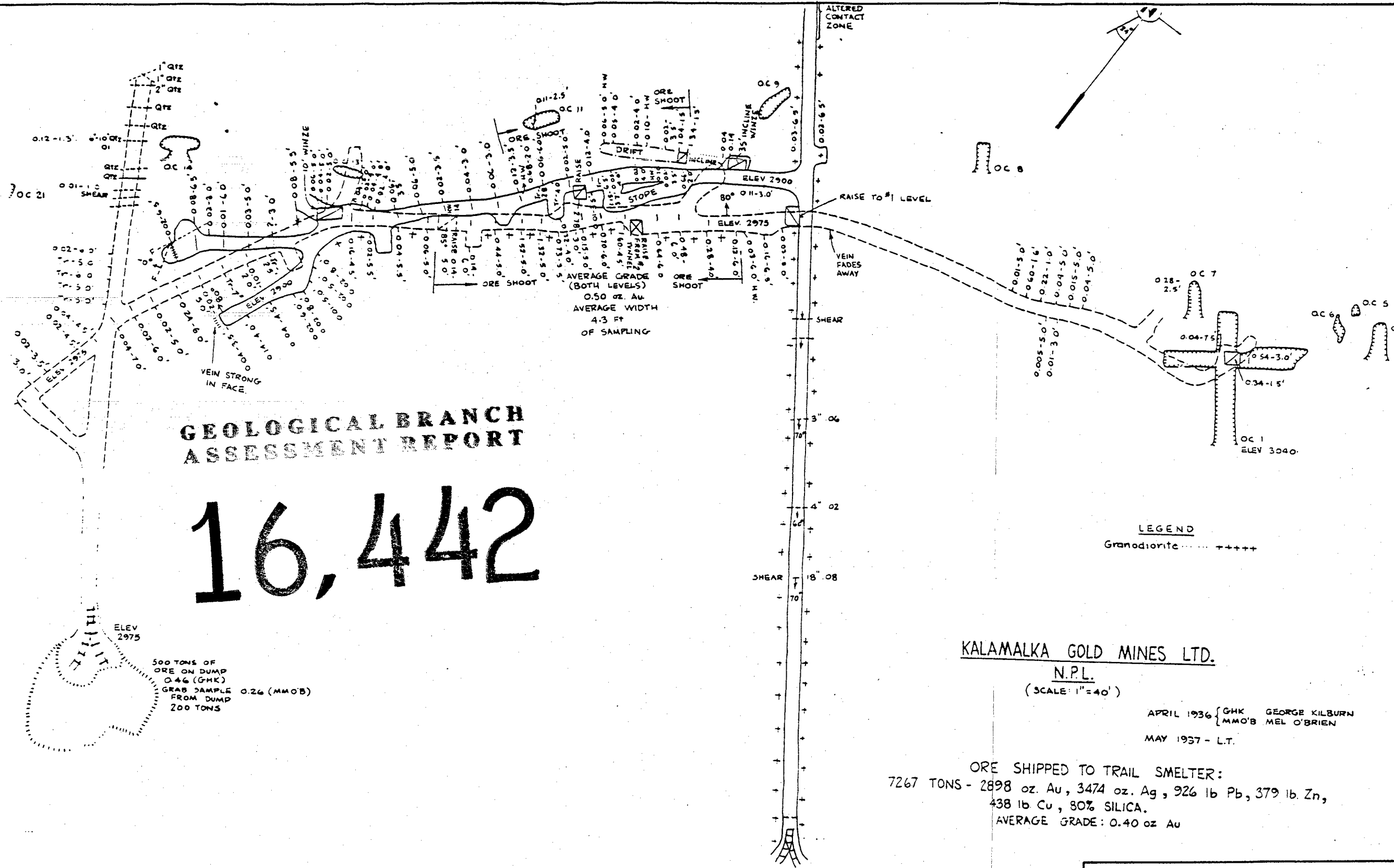
**GEOLOGY AND DRILL HOLES**  
AT 2900 LEVEL DRILL STATION

SEARCHLIGHT RESOURCES INC.

DATE: FEB., 1987

FIGURE No 6





**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**16,442**

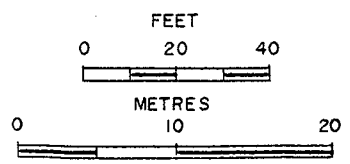
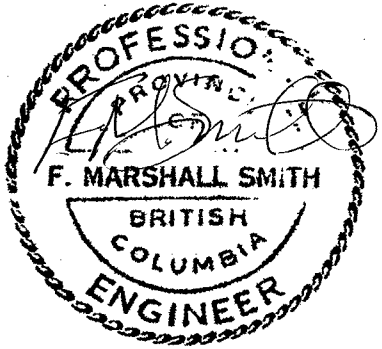
ELEV 2975  
500 TONS OF ORE ON DUMP  
0.46 (GHK)  
GRAB SAMPLE 0.26 (MMO'B)  
FROM DUMP  
200 TONS

**LEGEND**  
Granodiorite +++++

**KALAMALKA GOLD MINES LTD.**  
N.P.L.  
(SCALE: 1"=40')

APRIL 1936 { GHK GEORGE KILBURN  
MMO'B MEL O'BRIEN  
MAY 1937 - L.T.

ORE SHIPPED TO TRAIL SMELTER:  
7267 TONS - 2898 oz. Au, 3474 oz. Ag, 926 lb Pb, 379 lb Zn,  
438 lb Cu, 80% SILICA.  
AVERAGE GRADE: 0.40 oz Au



TRIPLE STAR RESOURCE CORP.	
KALAMALKA PROPERTY VERNON MINING DIVISION, B.C.	
<b>WORKINGS PLAN 1937</b>	
SEARCHLIGHT RESOURCES INC.	
DATE: FEB., 1987	FIGURE No. 8

## CONCLUSIONS

1.0 The Kalamalka Mine produced more material from the mine stopes than was accounted for by the official records, (7267 tons compared with our 12,250 tons). The records show that processing equipment was set up at the mine in the late 1930's, and this equipment was probably used to process the material within the shear zone. The massive quartz appears to have been the only product sent to the smelter, as returns indicate that this had a silica content of 80%.

2.0 The mine was closed because of "low grades and faulting". This is realistic in light of the economic conditions in 1944, and the moderate amount of development required to extend the mining operation deeper on the main shoot. The detailed vein geometry is shown in figure 6, and this shows the "fault-offset" of the vein. The author considers that this is not a true vein offset, but rather a vein fill in offset dilatent zones. Similar "off-sets" were mapped along the length of the main shear zone, and because of their relationship to high gold values, or to high gold-silver ratios in the assays, the author considers there to be a number of other ore bearing shoots in the vicinity of the workings.

3.0 Drill holes were targeted below the 2900 level drift to intercept the shear zone and the quartz vein down the anticipated plunge of the "shoot". The drilling intercepted very high gold grades in the silicified shear zone, indicating the shoot does continue to depth. Two holes which would have passed through the quartz vein shown on the southeast side of the 2900 drift encountered a backfilled stope. The drill information was used to determine the dip of the vein below the 2900 level, but the vein grade could not be determined. This vein assayed 0.393opt across 80 inches at the 2900 level. Further holes were not possible in this area because of unstable ground conditions and rubble.

4.0 Discussions with Mr. Aubrey Penney, the owner of the property from 1952-1967, assisted in locating the collar of the drill hole completed in 1967, and determining its orientation. In a report by Mr. L. B. Halferdahl, Ph.D., P.Eng.<sup>8</sup>, hearsay reports of this drilling indicate a vein intercept at about 450 feet, but assays of less than 0.5 opt. The author has concluded that this hole intercepted the main shear below the junction of the 2975 crosscut and drift, at a depth of at least 218 feet below the 2900 mining level. This is consistent with a vein dip of 85 degrees to the northwest. According to Mr. Penney the hole showed between 12 and 20 feet of quartz.

5.0 In the course of the inspection of the claim posts, the author noted float of red quartz within outcrops of diorite. This area is over 400 meters southwest of the main workings, and on strike with the main shear zone. This float is a significant indicator for further mineralization similar to that mined in the past. Silicified sediments in a road cut north of this area is also another indicator of potential vein mineralization.

6.0 The gold mineralization within the mine is consistent with a several stages of mesothermal vein formation, filling tension gashes within a diorite intrusive. The solution path for the gold mineralization in the central part of the mine plunges south east from the drill station on the 2900 level, and was intercepted in drill holes K-87-2 , K-87-3, and K-87-6. This style of mineralization is known to extend to depths of over 500 ft, eg. at the Bralorne Camp.

7.0 Further drill programmes will define the dimensions of the ore shoot, and determine the existence of geometrically related ore shoots.

## RECOMMENDATIONS

- 1.0 Construct a drill station off the 2900 level access to enable underground drilling to continue to trace the mineralized zone to depth. This drill station and access can also be used to develop a by-pass of the 2900 level drift stoping, and to allow drilling from the south west extremity of the 2900 level drift.
  
- 2.0 Re-excavate the old trenches above the mine workings to determine the orientation of possible sub-parallel ore shoots. Continue these excavations to the north east and south west, at least to the extent of the quartz float noted near the Gus 3 final claim post.
  
- 3.0 Establish a surveyed mine grid, and in areas of minimal outcrop soil sample on a staggered grid pattern with 50 meter spacing. Soil sample for gold, including plus 80 mesh gold. Resample all anomalous areas on a 25 meter staggered spacing, and excavate remaining anomalies.
  
- 4.0 Establish an orientation IP geophysical survey over the known mineralization, for possible future exploration use of "Resistivity Profiles" to target diamond drilling.
  
- 5.0 Surface drill all quartz filled shear zones discovered during exploration. Surface drill the high grade veining in the vicinity of the No.1 open cut.

## BUDGET

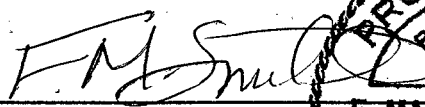
The following is a budget for the project to carry out the programmes described in this report.

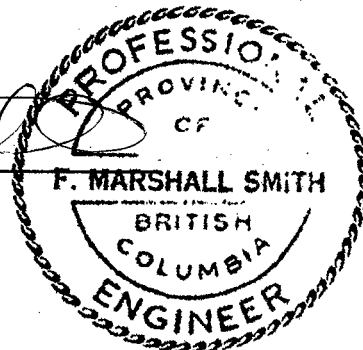
## Phase I

Geophysical Survey	\$5,000
Geochemical Survey	\$10,000
Assays	\$6,000
Trenching	\$15,000
Underground development	\$35,000
Drilling	\$40,000
Room and Board	\$4,500
Travel	\$2,500
Salaries	\$15,000
Support and Supervision	<u>\$12,000</u>
Sub Total	\$145,000
Contingencies	<u>\$5,000</u>
Total Phase I	\$150,000

The following is the expected Phase II budget which will be carried out if the results of the first phase as detailed above results in the definition of significant mineralization on the property.

Geophysical /Geochemical Survey	\$10,000
Geology	\$10,000
Assays	\$10,000
Trenching	\$15,000
Room and Board	\$5,000
Travel	\$2,500
Salaries	\$15,000
Support and Supervision	\$4,000
Drilling	\$30,000
Mill testing	<u>\$8,000</u>
Total	\$109,500
Contingencies	<u>\$5,500</u>
Total Phase II	\$115,000
Total Phase I & II	\$265,000

  
 F. Marshall Smith, P.Eng.  
 February 27, 1987.



## COST STATEMENT

The following expenses were made in the course of the rehabilitation, mapping, drilling and reporting of the Kalamalka Mine Property up to July 1987.

Underground Rehabilitation & Drilling:

Nemo Resources	\$31,434.97	
Bridesvale Drilling	\$8,250.00	\$39,684.97

Room and Board:

43 nights @ \$42.10		\$1,810.51
---------------------	--	------------

Transport:

4x4 plus fuel etc. 5 wks.		\$2,524.68
---------------------------	--	------------

Supplies:

Timber and underground supplies		\$7,781.79
---------------------------------	--	------------

Equipment Rental:

Compressors	\$4,050.00	
Mining Equipment	\$2,352.00	
Truck, MOB.	\$972.00	
Misc.	\$30.00	\$7,404.00

Wages:

P.G.Dasler 42.6 days @ \$240.00	\$10,224.00	
17.35 days @ \$225.00	\$3,903.75	
D. Nelles .35 days @ \$187.5.00	\$65.62	
T. Nielsen 3hr @ \$22.50	\$67.50	\$14,260.87

Consultants:

F.M.Smith, P.Eng.	\$2,327.40	
P.G.Dasler, M.Sc.	\$938.99	
Y. Hashimoto, Miner.	\$288.00	
R.C. Power, Surveyor.	\$192.00	
A. Usher, Accountant.	\$700.00	\$4,446.39

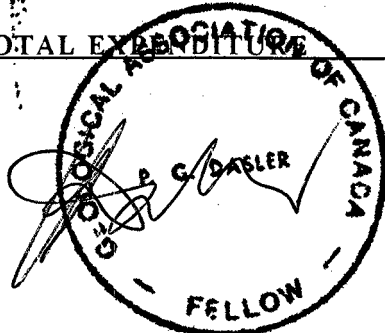
Assays:

Kamloops Research Laboratories, Water Sample	\$21.60	
5 Au fire assays @ \$13.50	\$67.50	
Chemex Labs. 19 Au. geochem. assays @ \$11.10	\$210.90	
39 Fire assays @ \$18.84	\$734.76	
1 Au, Ag, geochem. assay @ \$13.62	\$13.62	
Tags, bags, freight etc	\$160.91	\$1,209.29

Drafting:

Maps, plans etc.		\$1,332.56
Office Expenses:		
Telephone, supplies, etc		\$485.46

<b>TOTAL EXPENDITURE</b>		<b>\$80,939.77</b>
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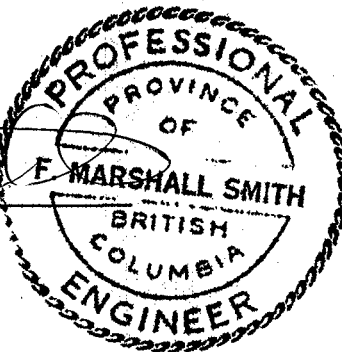
## CERTIFICATE

I, F. Marshall Smith, do hereby certify that:

1. I am a consulting geologist and geochemist with offices at 218-744 West Hastings Street, Vancouver, British Columbia.
2. I am a graduate at the University of Toronto with a degree of B.Sc., Honors Geology.
3. I am a member in good standing of the Association of Professional Engineers of the Province of British Columbia.
4. I have practiced my profession continuously since 1967.
5. This report is based on reports by Professional Engineers and others working for the previous owners and operators of the property and an examinations of the claims in January of 1987.
6. I have no interest in the property or shares of Triple Star Resource Corp. or in any of the companies with contiguous property to the Kalamalka Project claims.

*F. Marshall Smith*

F. Marshall Smith, P.Eng.  
September 23, 1987.



## CERTIFICATE

I, Peter G. Dasler, do hereby certify that:

1. I am a geologist for Searchlight Resources Inc. with offices at 218-744 West Hastings Street, Vancouver, British Columbia.

2. I am a graduate at the University of Canterbury, Christchurch, New Zealand with a degree of M.Sc., Geology.

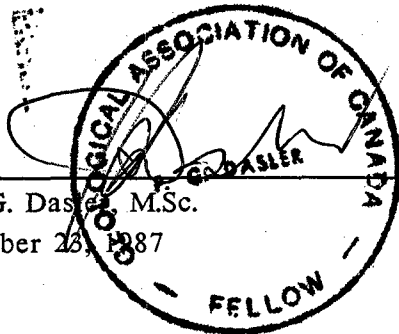
3. I am a Fellow of the Geological Association of Canada, an Associate Member in good standing of the Australasian Institute of Mining and Metallurgy, and a Member of the Geological Society of New Zealand.

4. I have practiced my profession continuously since 1975.

5. This report is based on information received from old mine records, the writers personal fieldwork, and reports by Professional Engineers and others working for the previous owners and operators of the property.

6. I have no interest in the property or shares of Triple Star Resources Corp., nor in any of the companies with contiguous property to the Kalamalka Project claims.

Peter G. Dasler, M.Sc.  
September 28, 1987



**BIBLIOGRAPHY**

1. Gilmour W. Nov. 6, 1979: Geological geochemical and geophysical Assessment report on the Channel Property, Vernon Mining District for Banquest Resources Ltd.
2. Hedley M. S., Watson K. DeP. 1945: Lode Gold Deposits Of Central British Columbia. B.C. Dept of Mines Bulletin No. 20, Pt. #3.
- 3 ----- Geological Survey of Canada Memoir 296-145,153.
- 4 BCDM report 1934 ppD32
5. BCDOM, Bureau of Economics and Statistics: File Kalamalka
8. Halferdahl L. B. 1980: Report to Mr. Nywening, owner of Mineral Claim 5393, Vernon Mining Division, (Kalamalka Mine)
9. A. Penney Pers. Comm.

**APPENDIX 1**  
**Assay Certificates**  
&  
**DRILL LOGS**



# Chemex Labs Ltd.

Analytical Chemists • Geochemists • Registered Assayers  
 212 BROOKSBANK AVE., NORTH VANCOUVER,  
 BRITISH COLUMBIA, CANADA V7J-2C1  
 PHONE (604) 984-0221

## CERTIFICATE OF ANALYSIS A871047

To: SEARCHLIGHT RESOURCES INC.

218 - 744 W. HASTINGS ST.  
 VANCOUVER, B.C.  
 V6C 1A5

Page No. : 1  
 Tot. Pages: 1  
 Date : 4-FEB-87  
 Invoice #: I-8710497  
 P.O. #: NONE

Project : KALAMALKA  
 Comments :

SAMPLE DESCRIPTION	PREP CODE		Ag FA	Au FA								
			oz/T	oz/T								
9251 G	207	231	0.09	0.136								
9252 G	207	231	0.07	0.086								
9253 G	207	231	0.13	0.260								
9255 G	207	231	0.08	0.376								
9257 G	207	231	0.03	0.014								
9258 G	207	231	1.98	0.190								
9259 G	207	231	0.03	0.078								
9261 G	207	231	0.06	0.012								
9262 G	207	231	0.07	0.006								
9263 G	207	231	0.01	0.062								
9264 G	207	231	0.05	0.008								
9265 G	207	231	0.05	0.016								
9267 G	207	231	< 0.01	< 0.002								
9268 G	207	231	0.55	0.140								
9269 G	207	231	< 0.01	0.002								
9270 G	207	231	0.06	0.004								
9271 G	207	231	0.08	0.008								
9273 G	207	231	0.21	0.018								
9274 G	207	231	0.05	0.100								
9275 G	207	231	0.01	0.042								
9276 G	207	231	0.01	0.014								
9277 G	207	231	0.02	0.016								
9278 G	207	231	0.03	0.004								
9279 G	207	231	0.01	< 0.002								
9280 G	207	231	0.01	0.002								
9281 G	207	231	0.02	0.006								
9283 G	207	231	0.08	0.068								
9284 G	207	231	0.67	0.082								

ALL ASSAY DETERMINATIONS ARE PERFORMED OR SUPERVISED BY B.C. CERTIFIED ASSAYERS

CERTIFICATION : W. N. Spasini



# Chemex Labs Ltd.

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 212 BROOKSBANK AVE., NORTH VANCOUVER,  
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Page No. : 1  
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 Date : 4-FEB-87  
 Invoice # : I-8710497  
 P.O. # : NONE

Project : KALAMALKA

Comments:

SAMPLE DESCRIPTION	PREP CODE		Ag FA	Au FA								
			oz/T	oz/T								
9251 G	207	231	0.09	0.136								
9252 G	207	231	0.07	0.086								
9253 G	207	231	0.13	0.260								
9255 G	207	231	0.08	0.376								
9257 G	207	231	0.03	0.014								
9258 G	207	231	1.98	0.190								
9259 G	207	231	0.03	0.078								
9261 G	207	231	0.06	0.012								
9262 G	207	231	0.07	0.006								
9263 G	207	231	0.01	0.062								
9264 G	207	231	0.05	0.008								
9265 G	207	231	0.05	0.016								
9267 G	207	231	< 0.01	< 0.002								
9268 G	207	231	0.55	0.140								
9269 G	207	231	< 0.01	0.002								
9270 G	207	231	0.06	0.004								
9271 G	207	231	0.08	0.008								
9273 G	207	231	0.21	0.018								
9274 G	207	231	0.05	0.100								
9275 G	207	231	0.01	0.042								
9276 G	207	231	0.01	0.014								
9277 G	207	231	0.02	0.016								
9278 G	207	231	0.03	0.004								
9279 G	207	231	0.01	< 0.002								
9280 G	207	231	0.01	0.002								
9281 G	207	231	0.02	0.006								
9283 G	207	231	0.08	0.068								
9284 G	207	231	0.67	0.082								

ALL ASSAY DETERMINATIONS ARE PERFORMED OR SUPERVISED BY B.C. CERTIFIED ASSAYERS

CERTIFICATION : W. N. Marinini





# Chemex Labs Ltd.

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BRITISH COLUMBIA, CANADA V7J-2C1  
PHONE (604) 984-0221

## CERTIFICATE OF ANALYSIS A8711256

To : SEARCHLIGHT RESOURCES INC.

218 - 744 W. HASTINGS ST.  
VANCOUVER, B.C.  
V6C 1A5

Page No. : 1  
Tot. Pages : 1  
Date : 20-FEB-87  
Invoice # : I-8711256  
P.O. # : NONE

Project : KAIAMAIIKA  
Comments :

SAMPLE DESCRIPTION	PREP CODE	Au ppb FA+AA																		
8601	208	---	660																	
8602	208	---	< 5																	
9288	208	---	< 5																	
9289	208	---	120																	
9290	208	---	920																	
9291	208	---	950																	
9292	208	---	70																	
9294	208	---	20																	
9295	208	---	60																	
9296	208	---	3000																	
9297	208	---	330																	
9298	208	---	145																	

CERTIFICATION :

*Heath Buchler*







# Chemex Labs Ltd.

Analytical Chemists \* Geochemists \* Registered Assayers  
212 BROOKSBANK AVE., NORTH VANCOUVER,  
BRITISH COLUMBIA, CANADA V7J-2C1  
PHONE (604) 984-0221

## CERTIFICATE OF ANALYSIS A8711325

To : SEARCHLIGHT RESOURCES INC.

218 - 744 W. HASTINGS ST.  
VANCOUVER, B.C.  
V6C 1A5

Page No. : 1  
Tot. Pages: 1  
Date : 26-FEB-87  
Invoice # : I-8711325  
P.O. # : NONE

Project : KALAMALKA  
Comments :

SAMPLE DESCRIPTION	PREP CODE		Ag FA	Au FA							
			oz/T	oz/T							
8610	207	231	0.67	0.316							
8611	207	231	0.03	0.015							
8612	207	231	< 0.01	0.025							
8613	207	231	0.01	0.006							
8614	207	231	1.02	0.170							

ALL ASSAY DETERMINATIONS ARE PERFORMED OR SUPERVISED BY B.C. CERTIFIED ASSAYERS

CERTIFICATION :

*B. Swales*





# Chemex Labs Ltd.

Analytical Chemists \* Geochemists \* Registered Assayers  
212 BROOKSBANK AVE., NORTH VANCOUVER,  
BRITISH COLUMBIA, CANADA V7J-2C1  
PHONE (604) 984-0221

## CERTIFICATE OF ANALYSIS A8711689

To : SEARCHLIGHT RESOURCES INC.

218 - 744 W. HASTINGS ST.  
VANCOUVER, B.C.  
V6C 1A5

Page No. : 1  
Tot. Pages: 1  
Date : 3-MAR-87  
Invoice # : I-8711689  
P.O. # : NONE

Project : KALMALKA  
Comments :

SAMPLE DESCRIPTION	PREP CODE		Au FA									
			oz/T									
8601	214	231	0.019									
9290	214	231	0.018									
9291	214	231	0.032									
9296	214	231	0.076									
9297	214	231	0.007									
8607	214	231	0.052									
8609	214	231	0.026									

ALL ASSAY DETERMINATIONS ARE PERFORMED OR SUPERVISED BY B.C. CERTIFIED ASSAYERS

CERTIFICATION : *W. Stenman*



# KAMLOOPS RESEARCH & ASSAY LABORATORY LTD.

912 - 1 LAVAL CRESCENT — KAMLOOPS, B.C.  
V2C 5P5

PHONE: (604) 372-2784 — TELEX: 048-8320

## CERTIFICATE OF ASSAY

**B.C. LICENSED ASSAYERS  
GEOCHEMICAL ANALYSTS  
METALLURGISTS**

TO Searchlight Resources Inc.  
218-744 West Hastings St.,  
Vancouver, B.C. V6C 1A5

Certificate No. K 7848

Date January 26, 1987.

**I hereby certify** that the following are the results of assays made by us upon the herein described \_\_\_\_\_ samples

Kral No.	Marked	Au							
		ozs/ton							
1	9254 G	.177							
2	9256 G	.223							
3	9260 G	.063							
4	9266 G	.014							
5	9282 G	.008							

*NOTE:  
Rejects retained three weeks.  
Pulps retained three months  
unless otherwise arranged*



Member  
Canadian Testing  
Association

# KAMLOOPS RESEARCH & ASSAY LABORATORY LTD.

912 - 1 LAVAL CRESCENT — KAMLOOPS, B.C.  
V2C 5P5

PHONE: (604) 372-2784 — TELEX: 048-8320

## CERTIFICATE OF ASSAY

B.C. LICENSED ASSAYERS  
GEOCHEMICAL ANALYSTS  
METALLURGISTS

TO Mr. P.G. Dasler  
C/o Westgate Motor Inn  
4204 32nd. St.,  
Vernon, B.C.  
V1T 5P4

Certificate No. K 7831

Date January 12, 1987

I hereby certify that the following are the results of assays made by us upon the herein described \_\_\_\_\_ samples

Kral No.	Marked	As						
		ppm						
1	Kalamalka  L means "less than"	L 0.03						

NOTE:  
Rejects retained three weeks  
Pulps retained three months  
unless otherwise arranged.

David A. Bunker  
Registered Assayer, Province of British Columbia

## SAMPLE COLLECTION

In the course of mapping, a total of 30 lithochemical samples were taken from the mine workings. Samples were collected using pneumatic hammer and chisel and were shipped in 12 x 20 inch pvc bags for shipment to Chemex Labs in North Vancouver, B.C. with check samples to Kamloops Research and Assay Laboratory. Sample locations are plotted along with geology on figure 4. A further 29 samples were taken from splits of AQ drill core, these were all analysed by Chemex Labs either for trace gold values or for gold/silver assay.

Gold analysis required samples to be crushed to -100 mesh after being dried for three hours. In the sample preparation stage the screens are checked for metallics which, if present, are assayed separately and calculated into the results obtained from the pulp assay. Ten gram subsamples were then fused in litharge, carbonate and siliceous flux with the addition of ten milligrams of gold-free silver metal. The fusion was then cupelled and parted with dilute nitric acid and treated with aqua regia. The remaining salts were then dissolved in dilute HCl and analyzed for gold and silver via atomic absorption spectrophotometer with a five parts per billion detection limit.

For gold values reported in parts per billion only were geochemically analyzed. A description of the technique used is as follows:

A 1.0 gram sample is digested in a concentrated nitric acid-aqua regia solution for approximately two hours. The digested sample is cooled and made up to 25 mls with distilled water. The solution is mixed and solids are allowed to settle. Gold is determined by atomic absorption technique using background correction on analysis. The detection limit is 0.1 ppm.





# DRILL HOLE RECORD

Property KANAMAKA Location U/GROUND 20' NT OF VEIN District VERNON Hole No. K-87-2 Length 119' 36.27 METRES  
 Commenced FEB 9/87 Location 33' SOUTH OF VEIN IN District VERNON Hole No. K-87-2 Length 119' 36.27 METRES  
 Completed FEB 10/87 - 6:30pm Core Size AW True Bearing 252° Corr. Dip -30°  
 Lat. \_\_\_\_\_ Dep. \_\_\_\_\_ Elev. 2900 LEVEL Hor. Comp. 103.06' Vert. Comp. 59.5'  
 % Recovery \_\_\_\_\_ Collar Dip \_\_\_\_\_ Date \_\_\_\_\_ Objective TEST VEINING ON WEST SIDE OF DRIFT

METRES	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS	
	from	to		run	%				Au-oz/ton	Ag-oz/ton
0 - 2.7	0	9	DARK CHLORITIZED DIORITE ROCK VERY BROKEN FROM BLASTING. SOME SMALL QTZ VEINLETS TO 1/2" (4/6") BUT NO HEAVY SULPHIDES SHEARS AT 20° TO CORE AXIS	0-5	16"					
				5-9	2"					
				9-14	-					
2.7 - 4.26	9	14	DIORITE MORE COMPETENT. SOME MINOR QTZ VEINING (10") AT 20° AND SMALL QTZ FILLED SHEAR AT 13' (20° TO CORE AXIS) SOME SULPH, BUT MINOR.	14-20	-					
				20-24	1"					
				24-29	-					
				29-34	-	16'9"-21'10"	9285	5'1"	0.924	5.98
4.26 - 5.1	14'0"	16'9"	CHLORITIZED - LIGHT TALC FILLED SHEAR	34-39	-					
5.1 - 6.6	16'9"	21'10"	QUARTZ - CHLORITE FILLED SHEAR ZONE WITH UP TO 10% PYRITE, BUT OCC. FINE DK SULPHIDE (GALENA @ 18'6")	39-44	-					
				44-49	-					
6.6 - 7.6	21'10"	25'	SLIGHTLY BLEACHED DIORITE	49-54	-					
7.6 - 15.1	25'	49'6"	SLIGHTLY CHLORITIZED HORNBLLENDE DIORITE OCC. QTZ FILLED FRACTURES WITH PYRITE TO 10% BUT FRACS < 2" MAXIMUM. ALL AT 20°	54-59	-					
			NOTE: FRACS AT 27'0", 27'6", 28'10", 33'6", 34'0", 36'3", 40'10"	59-64	-	49' - 54'	9286		0.005	0.17
				64-69	-					
15.1 - 16.2	49'6"	53'3"	CHLORITIZED FRACTURE ZONE WITH QTZ FILL, + SOME REPRECIPITATION < 10% SULPHS, BUT NOTE FRACS AT 40° TO AXIS							
16.2 - 19.6	61'0"	64'2"	MORE DK. CHLORITE ALT AROUND SHEARS AT 40° - 45° TO CORE							
			NOTE: 1" EPIDOITE AT 61'8"							
19.6 - 20.7	64'2"	68'0"	MED. GRAINED DIORITE. 2" DARK CHLORITIC(?) PATCH AT 64'2" ~ 45° TO AXIS							
20.7 - 21.0	68'0"	69'	3" MOTTLED DK CHLORITIC ZONE AT START BOUNDED BY 2 1/2" QTZ FRACTURE FILLS. THEN GRADUAL LESSENING OF CHLORITIC ALT. MINOR PYRITE ON			68' - 69'	9287		0.007	0.52

NOTE:

All angles measured from core axis

Logged by D. G. DASLER

Date FEB. 11/87

Checked by \_\_\_\_\_

Date \_\_\_\_\_

Hole No. K-87-2

Page 1 of 2

# DRILL HOLE RECORD

	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS			
	from	to		run	%				Au-oz/ton	Ag-oz/ton	Au ppt	
			FRACTURES, VEINING AT 80° TO AXIS.									
21.0-22.6	69'0"	74'1"	MED GRAINED DIORITE - OCC. CHLORITIC ALT. AT 72'4" SMALL QTZ VEINLETS WITH SOME PYRITE - MATRIX DARKER.									
22.6-22.7	74'1"	74'4"	QTZ VEINLET WITH 7.5-10% SULPH AT 35° TO AXIS									
22.7-25.6	74'4"	84'0"	MED GRAINED DIORITE. DARKENING AT 79'8" AND 82'6" WITH 6" CHLORITIC FRACTURES ZONES - MINOR SULPH. FRAC. GEN 45° TO AXIS									
25.6-28.6	84'	93'10"	INCREASING BLEACHING OF DIORITE FROM 84'-86'6" WITH CHLORITIC			84'0"-86'6"	9288	-		<5		
			DK BANDING AT 40° TO CORE. SMALL 1/4" VEINLET AT 85' WITH			86'6"-93'10"	9289	-		120		
			ROUNDED PYRITE SPOTS IN QTZ VEIN. MINOR QTZ VEINING (HITCHING) AT 91' AND 93'10". CORE GOOD + COMPETENT.									
28.6-31.2	93'10"	102'5"	SLIGHTLY BLEACHED MED GRAINED DIORITE									
31.2-31.4	102'5"	103'0"	BANDED TEXTURE IN DIORITE AT 35° TO CORE			102'-106'6"	9290		0.018		920	
31.4-31.7	103'0"	104'	POOR RECOVERY VERY BRECCIATED DARK ZONE WITH SOME QTZ. NO VIS. SULPHIDES									
31.7-32.4	104'	106'4"	CORE BROKEN WITH QTZ ZONES 1/2"-1" PIECES DIORITE WITH									
			CHLORITIC ALT. AT 104'-106'4" VIS QTZ REBRECCIATION WITH SOME PYRITE.									
32.4-36.3	106'4"	119'	MED GRAINED DIORITE OCC. BLEACHING (SUBTLE) e.g. 112° SMALL									
			VEINLET AND OCC. SMALL PYRITE FILLED FRACTURES e.g. 109' 60°									
			TO CORE. OCC. XFRAC (FINE) AT 40° ± 15°									

Project KALAMAKA Logged by P. G. DASLER Checked by \_\_\_\_\_ Hole No. K-87-2  
 Location 2900' DRIFT 33' STH OF WINZE Date FEB 11 1987 Date \_\_\_\_\_ Page 2 of 2

# DRILL HOLE RECORD

Property KALAMAKA Location UNDERGROUND 30'S OF WINZE District VERNON Hole No. K-87-3 Length 75' 22.86 METRES  
 Commenced 7.30pm FEB. 10/87 Completed NOON FEB. 11/87 Core Size AQ True Bearing 238° Corr. Dip -36°  
 Lat. \_\_\_\_\_ Dep. \_\_\_\_\_ Elev. 2900 Hor. Comp. 60.68 Vert. Comp. 44.08  
 % Recovery \_\_\_\_\_ Collar Dip \_\_\_\_\_ Date \_\_\_\_\_ Objective INTERCEPT 7' VEIN AT 24' UNDER CENTRE OF DRIFT

METRES	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS		
	from	to		run	%				Au-oz/ton	Ag-oz/ton	Al <sub>2</sub> O <sub>3</sub>
0.6-4.2	2	13'10"	ALTERED MED GRAINED DIORITE. DK MATRIX WITH FSP SPECKLES ZONES OF DARKER CHLORITIC ALTERATION WITH SULPHIDE (PYRITE) ON FRACTURES (ESP 5') ALSO MINOR QUARTZ VEINING W/ PYRITE - 6'6" FRACTURE VEINS AT 5'(40°), 7-8'(40°), 9.5'(10°), 12'(30°). ROCK REASONABLY COMPETENT, BUT AT 13'10" GRADUES INTO REBRECCIATED QUARTZ ZONE.			4'0"-7'0"	9291	0.032		950	
						10' -12'6"	9292			70	
4.2-4.9	13'10"	16'0"	REBRECCIATED SILICA FLOOD ZONE - PYRITE TO 10% IN FRAC			13'6"-16'0"	9293	0.107	0.80		
4.9-5.5	16'0"	18'0"	DK. GREEN FINE GRAINED CHLORITIC ALT. (DYKE??)								
5.5-7.6	18'0"	25'0"	COMPETENT. QTZ FLOODED CHLORITIZED DIORITE - OBVIOUS REBRECCIATION/HEALING. OCC. SULPH (PYRITE) IN MATRIX. FRAC FROM 45-80°.			19'0"-23'0"	9294			20?	
7.6-14.4	25'0"	47'4"	CHLORITIZED BRECCIA SUMP IN FRAC, BUT <10% FRAC //EL TO CORE (29') BUT CORE BADLY BROKEN FROM 45-47'4" MORE CLAY ALTERATION WITH THE CHLORITIC BRECCIA.			25'0"-30'0"	9295			60	
						30'0"-35'0"	9296	0.076		3000	
						40'0"-45'0"	9297	0.007		330	
4.4-16.6	47'4"	54'6"	SULPHIDE - QUARTZ VEIN. START 20° TO AXIS. FINISH 20° TO AXIS (DRILLING DOWN VEIN). SULPH GENERALLY PYRITE, BUT CRY, PYRR APPEAR AS FINE GRAINS. ZONE IS BRECCIATED WITH SULPHIDE INFILL - EST 10-20% SULPHIDE. ZONE CHLORITIC IN PLACES => GREEN QTZ. CORE GENERALLY COMPETENT.			45'0"-47'4"	9298			145	
						47'4" - 50'0"	9299	0.085	0.69		
						50'0"-54'6"	9300	0.254	1.87		
6.6-17.2	54'6"	56'6"	CHLORITIC BRECCIA ZONE SIMILAR TO 25-47'4"			54'6"-56'6"	8601	0.019		660	
17.2-18.6	56'6"	61'0"	SILICIFIED CHLORITIZED BRECCIA - MORE COMPETENT - LIGHT COLOUR			56'6"-61'0"	8602			<5	

NOTE:

Logged by P. G. DASLER

Checked by \_\_\_\_\_

Hole No. K-87-3

All angles measured from core axis

Date

FEB 11/87

Date

Page

1

of

2



# DRILL HOLE RECORD

Property KALAMAKA Location 2900 LEVEL 33'S OF WINZE District VERNON Hole No. K-87-4 Length 55' 16.76 METRES  
 Commenced FEB. 11/87 NOON Completed FEB. 12/87 N/S Core Size AQ True Bearing 210° Corr. Dip -30°  
 Lat. \_\_\_\_\_ Dep. \_\_\_\_\_ Elev. 2900 Hor. Comp. 47.63 Vert. Comp. 27.50  
 % Recovery \_\_\_\_\_ Collar Dip \_\_\_\_\_ Date \_\_\_\_\_ Objective DRILL THRU STOPE TO GET WEIN WIDTH + DIP

METRES	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS		
	From	to		run	%				Au-oz/ton	Ag-oz/ton	
0 - 1.53	0	5'1"	MED GRAINED HORNEBLENDE DIORITE. MINOR CHLORITIC AT 2'6"	0-5	+						
			610 TO AXIS + 1/2" QUARTZ WEINLET AT 3'0" AT 60°. SMALL SAMPLE OF	5-23	18'						
			HEAVY PYRITE MIN. IN WHITE QUARTZ WITH GREEN CHLORITIC FRACS.	23-24	+						
			HOLE BROKE INTO STOPE FILLED WITH RUBBLE. CASED HOLE WITH FT OF	24-30	2'						
			CASING.	30-35	+						
1.53-6.1	5'1"	20' approx	STOPPED.	35-36	+						
6.1-7.0	20'	23'	RED-BROWN ALTERED DIORITE - BIOTITE REPLACEMENT. QUARTZ WEINING	36-40	+						
			TO 1" WITH SEVERAL DISLOCATIONS. MAIN FRACTURES CONTIGUATE SET AT 40°	40-45	+						
			TO AXIS. VERY LITTLE SULPHIDES. NOTICEABLE INCREASE IN BANDING	45-50	+						
			22'6"-23' AT 40° TO CORE.	50-55	+						
7.0-7.2	23'0"	23'5"	WHITE QUARTZ WEINLET. SOME PYRITE CONTACT IS BROWN ALT. DIORITE								
			AT 45° TO CORE IN 2 CONTIGUATE SETS.								
7.2-7.3	23'5"	24'0"	GREEN CHLORITIC ALTERATION OF SILICIFIED BRECCIA.								
7.3-8.5	24'0"	28'0"	BROKEN RUBBLE, SOME QUARTZ FRAGMENTS, POOR RECOVERY.								
8.5-9.1	28'0"	30'0"	BLEACHED DIORITE BECOMING MORE COMPETENT AT 30.0'								
9.1-9.8	30'0"	32'0"	MED GRAINED DIORITE. FRACTURES AT 15°. EVIDENCE OF SHEARING								
			AND SILICIFICATION.								
9.8-10.7	32'0"	35'0"	CHLORITIC ALT. DIORITE WITH SILICEOUS ZONES + SIL BRECCIA								
			MIN SULPHIDES AT 34' FRAC AT 5-10° TO AXIS								
10.7-15.2	35'0"	55'0"	MED GRAINED HORNEBLENDE DIORITE MINOR FRAC-WEINING AT								
			42', 47' + 49' (30° TO AXIS)								

NOTE:

Logged by P.C. DASLER

Checked by \_\_\_\_\_

Hole No. K-87-4

All angles measured from core axis

Date

FEB. 13/87

Date

Page 1 of 1

# DRILL HOLE RECORD

Property KALAMAKKA Location 2900 LEVEL 33'S OF WINZE District VERNON Hole No. K-87-5 Length 50' 15.2 METRES  
 Commenced FEB 12/87 N/S Completed FEB 12/87 2.30 pm Core Size AQ True Bearing 210° Corr. Dip -45°  
 Lat. \_\_\_\_\_ Dep. \_\_\_\_\_ Elev. 2900 Hor. Comp. 35.36 Vert. Comp. 35.36  
 % Recovery \_\_\_\_\_ Collar Dip -45° Date \_\_\_\_\_ Objective WIDTH & DIP OF QUARTZ VEIN

METRES	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS		
	from	to		run	%				Au-oz/ton	Ag-oz/ton	ppb Pt
0 - 1.68	0	5'6"	COMPETENT CHLORITIZED DIORITE. GENERALLY GREEN, FINE GRAINED	0-4	1'	2'6"-5'0"	8603			80	
			QUARTZ VEINLETS AT 2'3' & 3'11" UP TO 1/2" & 40° TO AXIS, ALL SHOW	4-9	-						
			V FINE PYRITE MIN IN FRAC.	9-10	-						
1.68 - 3.7	5'6"	12'0"	LIGHT GREEN MOTTLED DIORITE. CONTACT AT 5'6" SHOWS SOME	10-12							
			STEEPENING AT 15° BUT GEN SHARP. SMALL 1/2" QTZ VEINLETS AT	12-19	NIL						
			7' AT 20° TO CORE.	19-22	6"						
3.7 - 5.8	12'	19'0"	NO CORE CASING THROUGH OLD STOPE.	22-26	1'6"						
5.8 - 6.7	19'	22'0"	FINE HARD DARK BROWN (DYKE?) SOME CHLORITE ON FRAC. - BUT	26-30	-	19-22	8604			200	
			VERY BROKEN, NO SULF	30-35	+						
6.7 - 9.1	22'	30'	MOTTLED REHEALED SHEAR ZONE. FRACTURED, BUT GENERALLY	35-40	+	25-30	8605			65	
			SILICIFIED & COMPETENT. MINOR WHITE QTZ. VEINLETS AT	40-45	+						
			22'6", 23' (OH50), 25' (OT00), 25'6" (OH50), 26-28 GENERAL QTZ	45-50	+						
			FLOOD FRACS IN CORE, GEN AT 45° REHEALED SHEAR WITH								
			PYRITE (10%) AT 28'-29'.								
9.1 - 15.2	30'0"	50'0"	LIGHT GREEN, MASSIVE DIORITE. SOME FINE FRACS AT 41° TO			30-35	8606			<5	
			AXIS - E.G. 3'5"-33', 34'-35', 37'-39', 40'-41' WITH V. FINE PYRITE								
			IN ZONES - NO BLEACHING.								

NOTE: Logged by P.C. DASLER Checked by \_\_\_\_\_ Hole No. K-87-5  
 All angles measured from core axis Date FEB 13/87 Date \_\_\_\_\_ Page 1 of 1

# DRILL HOLE RECORD

Property KALAMAKA Location 2900 LEVEL, 33' S. OF WIND District VERNON Hole No. K-87-6 Length 71' 21.6 M  
 Commenced FEB. 12/87 Completed NS FEB. 13/87 Core Size AQ True Bearing 219° Corr. Dip -45°  
 Lat. \_\_\_\_\_ Dep. \_\_\_\_\_ Elev. 2900 Hor. Comp. 50.20 Vert. Comp. 50.20  
 % Recovery \_\_\_\_\_ Collar Dip -45° Date \_\_\_\_\_ Objective INTERCEPT VEIN & POSSIBLE PARALLEL VEINS

METRES	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS		
	from	FEET		run	%				Au-oz/ton	Ag-oz/ton	Au ppb
0 - 6.1	0	2'0"	CASING	0-5	2'6"						
6.1 - 2.4	2	8'0"	GREEN ALT. DIORITE FINE GRAINED CHLORITIC TERMINATED BY 2"	5-7	-						
			QTZ. VEINLET AT 45° TO AXIS (NO PY)	7-12	-						
2.4 - 6.1	8'0"	20'0"	BLEACHED, SHEARED & REVEALED DIORITE. QTZ. VEINLET AT	12-17	-						
			8'10" (U40)	17-19	2"						
			11-13 BRECCIATED QUARTZ FLOOD WITH BLEBS PYRITE & 15'6"-16'	19-19.6	-	11'10"-13'0"	8607	0.052		1650	
			15'6"-16'	19.6-25	-						
			16'6"-18' DK. GREEN CHLORITIC ZONE	25-28	2'						
			19'6" - BECOMING MORE TALCY WITH BRECCIATED TEXTURES	28-31	-						
6.1 - 10.1	20'0"	33'0"	TALCY, LIGHT GREEN CHLORITIC SHEAR IN DIORITE. BRECCIATED	31-33	6"	20-25	8608			240	
			FRAGMENTS COMMON. FRACTURES AT ~045°	33-35	3'4"	28'0"-33'0"	8609	0.026		1550	
0.1 - 10.7	33'0"	35'0"	PYRITE VEINED RESILIFIED CHLORITIC SHEAR BRECCIA - PYRITE	35-35.8	7"	33'0"-35'0"	8610	0.316			
			VEINLETS RANDOM - CORE LOSS	35.8-36	+1"						
10.7 - 10.9	35'0"	35'8"	4 FRAGMENTS OF WHITE QTZ WITH GREEN CHLORITIC STAINING	36-36.10	-6"						
			- CORE LOSS	36.10-36.14	+4"						
0.9 - 11.2	35'8"	36'10"	WHITE QTZ WITH ONE NARROW PYRITE VEINLET TO 36'0" AND	36.14-40.6	-	35'1"-35'2"	8611	0.015			
			WHITE QTZ FOR REMAINDER - NO SULPH.	40.6-45.6	+						
1.2 - 13.7	36'10"	45'	BRECCIATED DIORITE BLEEDING IN TO BROWN STAINING ZONE. WELL	45.6-47	-	36'10"-40'6"	8612	0.025			
			BANDED OLD - 045° QUARTZ FLOOD 39'-40'	47-51	-	40'6"-44'	8613	0.006			
			ROCK COMPETENT	51-56	-						
1.3 - 14.2	45'0"	46'6"	CHLORITIC SHEAR	56-6'	-						

NOTE: Logged by P. G. DASLER Checked by \_\_\_\_\_ Hole No. K-87-6  
 All angles measured from core axis Date FEB 14/87 Date \_\_\_\_\_ Page 1 of 2





# DRILL HOLE RECORD

Property KALAMAKA Location 2900 LEVEL District VERNON Hole No. K-87-7 Length 47' 14.3 METRES  
 Commenced NIS FEB 13 1987 Completed NOON FEB 13 1987 Core Size AQ True Bearing 227 Corr. Dip -50°  
 Lat. \_\_\_\_\_ Dep. \_\_\_\_\_ Elev. 2900' Hor. Comp. 30.21 Vert. Comp. 3600  
 % Recovery \_\_\_\_\_ Collar Dip -50° Date \_\_\_\_\_ Objective TO INTERCEPT VEIN AT 30'-50'

METRES	DEPTH		DESCRIPTION	RECOVERY		Sample Interval	Sample No.	Length	ANALYSIS	
	from FEET	to		run	%				Au-oz/ton	Ag-oz/ton
0 - 0.6	C	2'0"	CASING	2-7	-					
0.6 - 5.8		2'0" - 19'0"	DIORITE, SLIGHTLY CHLORITIZED & SHOWING REHEALING OF FRACTURES	7-12	+					
			NUMEROUS SMALL PYRITE FILLED STRINGERS (1 PER 6"), BUT < 1/10"	12-17	-					
			FRACTURES & MINOR QUARTZ FILLS AT 40°, BUT AT 19'0" STRINGER SET AT	17-22	-					
			020°	22-27	-					
5.8 - 14.3		19'0" - 47'0"	BLEACHED AND IN PATCHES, SOFT TALCY DIORITE, MOST BLEACHING	27-32	-					
			19-21, 23-25 AND VERY CHLORITIC, 46-47 (NEAR VEIN??)	32-37	-					
			CORE GENERALLY COMPETENT, EXCEPT FROM 4'0" ONWARDS -	37-42	-					
				42-47	-					
			HOLE FINISHED AS BUDGET FINISHED							
			NOTE: EXPECTED TO HIT VEIN 30' - 60'. SEE K-87-5							

NOTE:

All angles measured from true axis

Logged by P. G. DASLER

Date \_\_\_\_\_

Checked by \_\_\_\_\_

Date \_\_\_\_\_

Hole No. K-87-7

Page 1 of 1

FIRE ASSAY METHOD - GOLD

Please note that this is a general outline only.

1. Weigh between 10gms and 29.167 grams of sample depending on the sample matrix. (See note a )
2. Flux in crucible using litharge, silica, soda ash and borax. Amounts used will vary with sample matrix.
3. Add flour or potassium nitrate depending on whether the ore is oxidising or reducing. (See note b).
4. Mix well and add a silver inquart.
5. Fuse @ 1900 degrees F for 25 minutes to one hour depending on sample type. (See note c).
6. Pour, cool, remove lead button and hammer slag off. Resulting button should be free from slag and square.
7. Charge furnace with cupels 10-15 minutes prior to adding the lead buttons.
8. Cupel @ 1650 degrees to blick (Cupel absorbs approx. 1gm PbO per minute).
9. Remove cupels from furnace, cool.
10. Remove foreign matter from bead, place bead in test tube, dissolve in aqua regia, bulk to 10ml and read on atomic absorption spectrophotometer.

Notes

- |    |               |                |
|----|---------------|----------------|
| a. | Ore Type      | Weight         |
|    | Class I ore   | 1 A.T.         |
|    | Class II ore  | 10gm -.5 A.T.  |
|    | Class III ore | 10gm - .5 A.T. |
- b. Class I & III ores add flour.  
Class II ore add potassium nitrate
- c. Class I & III ores fuse for 30 min. to one hour  
Class II ore fuse for 25-35 minutes

**APPENDIX 2**  
**Sample Descriptions**

Table of Drill Samples and Results

DRILL HOLE	INTERVAL	DESCRIPTION	SAMPLE	Oz/T Au	Oz/T Ag
K-87-2	16'9"- 21'10"	Qtz-Chlorite	9285	0.924	5.98
K-87-2	49'0"- 54'0"	Chlor. frags	9286	0.005	0.17
K-87-2	68'0"-69'0"	Bleached Diorite	9287	.007	.052
K-87-2	84'0"-86'6"	Bleached Diorite	9288	<5ppb	-
K-87-2	86'6"-93'10"	Bleached Diorite	9289	120ppb	-
K-87-2	102'-106'6"	Banded Chlor. Dior.	9290	0.018	-
K-87-3	4'0"-7'0"	Alt. Diorite	9291	0.032	-
K-87-3	10'0"-12'6"	Alt. Diorite	9292	70ppb	-
K-87-3	13'6"-16'0"	Breccia Si. Flood	9293	0.107	-
K-87-3	19'0"-23'0"	Chlor. Diorite	9294	20ppb	-
K-87-3	25'0"-30'0"	Chlor. Breccia	9295	60ppb	-
K-87-3	30'0"-35'0"	Chlor. Breccia	9296	0.076	-
K-87-3	40'0"-45'0"	Chlor. Breccia	9297	0.007	-
K-87-3	45'0"-47'4"	Chlor. Breccia	9298	145ppb	-
K-87-3	47'4"-50'0"	Qtz Vein	9299	0.085	0.69
K-87-3	50'0"-54'6"	Qtz Vein	9300	0.254	1.87
K-87-3	54'6"-56'6"	Chlor. Breccia	8601	0.019	-
K-87-3	56'6"-61'0"	Si. Chlor Brecc.	8602	<5ppb	-
K-87-5	2'6"-5'0"	Chlor. Diorite	8603	80ppb	-
K-87-5	19'0"-22'0"	Fine Dk Dyke?	8604	200ppb	-
K-87-5	25'0"-30'0"	Shear zone	8605	65ppb	-
K-87-5	30'0"-35'0"	Diorite	8606	<5ppb	-
K-87-6	11'10"-13'0"	Brecc Qtz Flood	8607	0.052	-
K-87-6	20'0"-25'0"	Chlor. Shear	8608	240ppb	-
K-87-6	28'0"-33'0"	Chlor. Shear	8609	0.026	-
K-87-6	33'0"-35'0"	Sil. Chlor Breccia	8610	0.316	-
K-87-6	35'1"-35'2"	Qtz Vein	8611	0.015	-
K-87-6	36'10"-40'6"	Brecc. Diorite	8612	0.025	-
K-87-6	40'6"-44'0"	Brecc. Diorite	8613	0.006	-

ASSAY REPORT - Chip Sample

Property KALAMALKA

Date	Working Place	Location	Sample No.	Width	Au.	Ag.	Cu.	Pb.	Zn.	Remarks
23 JAN 87	2900 LEVEL DRIFT	AT WINZE	9251	8"	.136	.09				SMALL X CUTTING VEIN
"	"	30' SOUTH OF WINZE	9252	10"	.086	.07				ACROSS MAIN SHEAR
"	"	35' SOUTH OF WINZE	9253	10"	.260	.13				HEAVY SULPHIDE X CUTTING VEIN
"	"	35' SOUTH OF WINZE	9254	10"	.177					SAME AS 9253. KAMLOOPS LAB.
"	2900 STOPE	35' SOUTH OF WINZE	9255	80"	.376	.08				MAIN VEIN - ALL QUARTZ
"	"	"	9256	GRAB	.223					DEBRIS AT BASE OF STOPE SEE 9255
"	2900 LEVEL	BELOW RAISE	9257		.014	.03				QUARTZ VEIN
"	"	BROW PAST RAISE	9258		.190	1.98				MAIN QUARTZ VEIN IN SHEAR
"	"	SHEAR ZONE	9259	18"	.078	.03				SHEAR ZONE SAMPLE
"	"	"	9260		.063					SAME AS 9259
"	"	"	9261	14"	.012	.06				RUSTY QUARTZ SHEAR
"	2900 LEVEL	JUNCTION AT Y.	9262		.006	.07				QUARTZ VEIN X CUTTING JUNCTION
"	2900 LEVEL	SW DRIFT	9263	36"	.062	.01				QUARTZ VEIN W. SIDE
"	"	SW DRIFT	9264	34"	.008	.05				QUARTZ VEIN N. SIDE
"	"	SW DRIFT	9265	45"	.016	.05				REST OF ADIT OF 9264
"	"	SW DRIFT END	9266		.014					SAME AS 9265
"	"	SW DRIFT END	9267	42"	2.002	<.01				WHITE QUARTZ MIN SULPH
"	"	SW DRIFT END	9268	12"	.140	.55				SMALL SHEAR ZONE
"	"	SE DRIFT START	9269	18"	.002	<.01				QUARTZ VEIN
"	"	SE DRIFT MID.	9270	57"	.004	.06				ACROSS SE DRIFT
"	"	FACE OF SE FORK	9271	25"	.006	.08				FACE QUARTZ VEIN
"	2975 LEVEL	NORTH END	9272	GRAB	1ppm					SAMPLE OF DIORITE NO SULPH.
"	"	NORTH STUB.	9273	8"	.018	.21				SHEAR ZONE
"	"	NORTH STUB	9274	32"	.100	.05				
"	"	SHEAR	9275	20"	.042	.01				VERY CHLORITIC



**APPENDIX 3**  
**Metallurgical Report**

Energy, Mines & Resources  
Mines Branch, Ottawa: Rpt # 771-19\*81-86

### Ore Dressing and Metallurgical Investigation No. 646

GOLD ORE FROM THE KALAMALKA MINE, SITUATED ABOUT SEVEN MILES SOUTHWEST OF VERNON, BRITISH COLUMBIA

*Shipment.* A shipment of two sacks of ore, net weight 150 pounds, was received on September 6, 1935. The shipment was submitted by William Warner, Secretary, Kalamalka Gold Mines, Limited, 102-106 Pacific Building, Vancouver, B.C.

*Characteristics of the Ore.* Specimens were selected and six polished sections were prepared and examined microscopically for the purpose of determining the character of the ore.

The *gangue* is white translucent quartz, locally stained by iron oxides.

The *metallic minerals* comprise an appreciable proportion of the ore, perhaps from 15 to 20 per cent. They occur chiefly as masses and coarse to fine irregular stringers forming a network in the quartz. In their order of abundance in the polished sections, they are as follows:

Pyrrhotite.....	} Major metallic minerals.
Marcasite.....	
Pyrite.....	
"Limonite".....	} Minor metallic minerals.
Chalcopyrite.....	
Unknown No. 4...}	} Accessory metallic minerals.
Galena (?).....	
Sphalerite.....	
Unknown No. 1...}	
Native gold.....	
Unknown No. 2...}	
Unknown No. 3...}	

The tests on the unknown minerals are given below:

#### *Unknown No. 1:*

Tentative identification: Nagyagite (?).

Formula: Doubtful, (Pb, Au, Te, S).

Colour: Galena-white.

Hardness: Very soft, A. Scratchy surface, probably sectile. No apparent cleavage.

Crossed nicols: Moderate to strong anisotropism; colours, light blue-grey to dark brown-grey.

Etch tests: HNO<sub>3</sub>—Slowly differentially grey; pitted surface. Action on some surfaces is rapid.

HCl, KCN, FeCl<sub>3</sub>, KOH, HgCl<sub>2</sub>—Negative.



*Unknown No. 2:*

Tentative identification: Unknown.  
 Colour: Light bluish grey.  
 Hardness: C.  
 Crossed nicols: Questionable; possibly faintly anisotropic.  
 Etch tests: HNO<sub>3</sub>—Rapidly differentially black to iridescent.  
 HCl—Slowly tarnishes to dark grey.  
 FeCl<sub>3</sub>—Tarnishes iridescent.  
 KCN, KOH, HgCl<sub>2</sub>—Negative.

*Unknown No. 3:*

Tentative identification: Native bismuth (?)  
 Colour: Brassy-yellow with a rough surface which takes a poor polish and which appears to be iridescent. The grains are exceedingly small.  
 Hardness: Soft, A.  
 Crossed nicols: Difficult to determine with such tiny grains, but possibly strongly anisotropic (?).  
 Etch tests: HNO<sub>3</sub>—Instantly blackens.  
 HCl—Instantly blackens.  
 FeCl<sub>3</sub>—Stains iridescent.  
 KCN—Negative.  
 KOH, HgCl<sub>2</sub>—Action undetermined.

*Unknown No. 4:*

Tentative identification: Cosalite (2PbS · Bi<sub>2</sub>Se<sub>3</sub>).  
 Colour: Galena-white.  
 Hardness: B.  
 Crossed nicols: Moderately anisotropic.  
 Etch tests: HNO<sub>3</sub>—Rapidly blackens.  
 HCl—Tarnishes iridescent to dark grey.  
 FeCl<sub>3</sub>—Instantly tarnishes iridescent to dark grey.  
 KCN, KOH, HgCl<sub>2</sub>—Negative.

*Occurrence of Metallic Minerals.* Pyrrhotite is abundant and occurs chiefly as masses and irregular stringers. Marcasite masses are common, but the relationships indicate that this mineral has partly replaced the pyrrhotite; it occurs as areas and replacement veinlets in pyrrhotite, and the structure is typically colloform as revealed under the microscope. Pyrite occurs as coarse to fine disseminated grains, which are veined by pyrrhotite, and as narrow veinlets in pyrrhotite; this indicates two generations of pyrite.

"Limonite" occurs as rusty stains in the quartz and as films along narrow fractures that traverse both quartz and sulphides; it is present only in small amounts. Chalcopyrite is present in small quantity as irregular patches and grains in quartz, usually associated with pyrrhotite stringers.

The accessory metallic minerals occur in amounts ranging from very small to bare traces represented by rare tiny grains. Unknown No. 4 (cosalite) occurs as small grains usually associated with pyrrhotite but rarely isolated in the quartz. A few grains of a mineral, thought from etch tests to be galena, occur in the same relationship. Rare grains of sphalerite are associated with chalcopyrite. Unknown No. 1 occurs almost solely in the pyrrhotite as small elongated grains having the appearance of flakes which are curved slightly; rarely it occurs with chalcopyrite and in one case with a grain of native gold in quartz. Unknown No. 2 occurs as tiny irregular grains in pyrrhotite and contains extremely small irregular inclusions of Unknown No. 3; both are so rare and so finely divided as to be extremely difficult to determine.

The modes of occurrence of the *native gold* are very varied. Small grains occur along the borders of pyrrhotite stringers and occasionally within the pyrrhotite. Another mode of occurrence is as small grains

isolated in the quartz. Rarely thin films of gold are present along tiny fractures in the quartz, usually very close to and radiating from pyrrhotite masses. The proportions of each mode of occurrence as determined microscopically are shown in Table I.

TABLE I  
Modes of Occurrence of the Native Gold

Mode of occurrence	Gold, per cent
Along borders of pyrrhotite.....	46
Within dense quartz.....	31
Within pyrrhotite.....	15
As veinlets in quartz.....	8
	<u>100</u>

The grain size of the native gold, as determined microscopically, is shown in Table II.

TABLE II  
Grain Size of the Native Gold

Mesh	Gold, per cent
+ 200.....	9.5
- 200 + 280.....	14.7
- 280 + 400.....	15.0
- 400 + 560.....	18.0
- 560 + 800.....	24.0
- 800 + 1100.....	12.0
- 1100 + 1600.....	4.2
- 1600 + 2300.....	2.1
- 2300.....	0.5
	<u>100.0</u>

*Character of the Native Gold.* Several hundred grammes of the ground feed sample was panned in a special panner and the gold was examined under the binocular microscope. With the exception of two grains, which were over 200 mesh in size, all of the panned gold was very fine. When examined under fairly high power, the grains are seen to be irregular and ragged in outline and coated with rust. A few grains had the appearance of tiny rust wheat grains.

*Sampling and Analysis.* The shipment was crushed and sampled according to standard practice and the feed sample thus obtained assayed as follows:

Gold.....	0.545	oz./ton
Silver.....	0.23	"
Copper.....	0.02	per cent
Iron.....	7.90	"
Sulphur.....	5.61	"
Arsenic.....	Nil	

#### EXPERIMENTAL TESTS

The work done on this ore consisted of tests by cyanidation, amalgamation, and concentration, both alone and in combination.

By straight cyanidation of the raw ore, 98 per cent of the gold can be extracted in 48 hours when the ore is ground 79 per cent through 200 mesh. By aerating the ore in lime pulp before it comes in contact with the cyanide solution, the same extraction can be obtained in 24 hours.

When the ore is ground 52 per cent through 200 mesh and the sulphides concentrated out on a table and reground by themselves, 97.2 per cent of the gold can be extracted by cyanidation.

With the ore ground 79 per cent through 200 mesh, 77 per cent of the gold can be recovered by barrel amalgamation.

Details of the tests follow:

#### CYANIDATION

##### Tests Nos. 1 to 8

Samples of the ore were ground 52, 65.5, 78.9, and 85 per cent through 200 mesh in ball mills and agitated in cyanide solution, 1.0 pound of potassium cyanide per ton, for periods of 24 and 48 hours. The cyanide tailings were filtered, washed, and assayed for gold. Protective alkalinity was maintained by the addition of lime.

##### Summary:

Test No.	Grinding, per cent -200 mesh	Agitation, hours	Tailing, Au, oz./ton	Extraction, per cent	Reagents consumed, lb./ton	
					KCN	CaO
1.....	52.0	24	0.045	91.7	0.70	15.3
2.....	65.5	24	0.05	90.8	0.70	15.4
3.....	78.9	24	0.03	94.5	0.70	15.5
4.....	85.0	24	0.025	95.3	0.82	15.6
5.....	52.0	48	0.015	97.2	1.34	15.5
6.....	65.5	48	0.015	97.2	1.34	15.6
7.....	78.9	48	0.01	98.2	1.59	15.7
8.....	85.0	48	0.01	98.2	1.59	15.8

#### BARREL AMALGAMATION AND CYANIDATION

##### Tests Nos. 9 and 10

Samples of the ore were ground 65.5 and 78.9 per cent through 200 mesh in ball mills and amalgamated with mercury in jar mills for one hour. The amalgamation tailings were sampled and assayed and portions of each agitated in cyanide solution, 1.0 pound of potassium cyanide per ton, for 24 hours. The cyanide tailings were also assayed for gold.

##### Summary:

Test No.	Grinding, per cent -200 mesh	Amalgamation tailing, Au, oz./ton	Extraction, per cent	Cyanidation tailing, assay, Au, oz./ton	Extraction, per cent	Reagents consumed, lb./ton	
						KCN	CaO
9.....	65.5	0.155	71.5	0.025	23.8	0.30	14.50
10.....	78.9	0.125	77.0	0.015	20.2	0.30	14.50

CYANIDATION WITH PRE-AERATION

*Tests Nos. 11 and 12*

Samples of the ore were ground 65.5 and 78.9 per cent through 200 mesh in ball mills and aerated in lime pulp for 22 hours. The pulps were then thickened and made up to 2.5 : 1 dilution with cyanide solution, 1.0 pound of potassium cyanide per ton, and agitated for 24 hours. The cyanide tailings were assayed for gold.

*Summary:*

Test No.	Grinding, per cent -200 mesh	Tailing assay, Au, oz./ton	Extraction, per cent	Reagents consumed, lb./ton	
				KCN	CaO
11.....	65.5	0.02	96.4	0.30	1.80*
12.....	78.9	0.01	98.2	0.30	1.90*

\*In addition to each of the above, 12 pounds of lime per ton of ore was used in the aerator.

CYANIDATION WITH TABLE CONCENTRATION AND REGRINDING  
OF THE SULPHIDES

*Test No. 13*

A sample of the ore was ground 52.0 per cent through 200 mesh in a ball mill and agitated in cyanide solution, 1.0 pound of potassium cyanide per ton, for 24 hours. The cyanide tailing was then passed over a small concentrating table where a sulphide concentrate was taken off. The concentrate was reground 97.4 per cent through 325 mesh and re-agitated in cyanide solution, 1.0 pound of potassium cyanide per ton, for 24 hours. The table tailing and the cyanide tailing from the reground concentrate were assayed for gold.

*Summary:*

Product	Weight, per cent	Assay, Au, oz./ton	Extraction, per cent	Reagents consumed, lb./ton	
				KCN	CaO
Table concentrate.....	11.0	0.02	.....	.....	.....
Table tailing.....	89.0	0.015	.....	.....	.....
Average tailing (cal.)...	100.0	0.016	97.2	0.93	1.84

FLOTATION AND BLANKET CONCENTRATION

*Test No. 14*

A sample of the ore was ground 65.5 per cent through 200 mesh in a ball mill and floated. The flotation tailing was passed over a corduroy blanket set at a slope of 2.5 inches per foot. The flotation concentrate and the blanket tailing were assayed for gold. The gold recovered in the blanket concentrate was calculated by difference.

*Charge to Ball Mill:*

Ore.....2,000 grms. at -14 mesh  
 Water.....1,500 c.c.  
 Soda ash.....4.0 lb./ton

*Reagents to Cell:*

Potassium amyl xanthate.....0.10 lb./ton  
 Pine oil.....0.05

*Summary:*

Product	Weight, per cent	Assay, Au, oz./ton	Distribution, per cent
Flotation concentrate.....	12.4	3.60	82.0
Blanket concentrate (cal.).....	0.6	11.35	12.5
Blanket tailing.....	87.0	0.035	5.5
Feed.....	100.0	0.545	100.0

## PLATE AMALGAMATION AND FLOTATION

*Test No. 15*

A sample of the ore was ground 65.5 per cent through 200 mesh in a ball mill and passed over an amalgamation plate. The plate tailing was then conditioned with soda ash, 4.0 pounds per ton, and floated with potassium amyl xanthate 0.10 pound per ton and pine oil 0.05 pound per ton. The flotation concentrate and tailing were assayed and the amalgamation tailing was calculated from them.

*Summary:*

Product	Weight, per cent	Assay, Au, oz./ton	Distribution, per cent
Flotation concentrate.....	16.9	1.67	85.0
Flotation tailing.....	83.1	0.06	15.0
Plate tailing (cal.).....	100.0	0.33	100.0

Recovered by amalgamation.....39.1 per cent total gold  
 Recovered in flotation concentrate.....51.8 " "  
 Total recovery.....90.9 " "

## CONCLUSIONS

The results of test work carried out on this ore show that it should be treated by cyanidation.

Because the ore contains considerable pyrrhotite it should be ground in water and aerated in lime pulp before it comes in contact with the cyanide solution. This will prevent the formation and accumulation of fouling matter in the mill solutions and keep extraction up.

Some advantage may also be gained by grinding the ore rather coarsely, as was done in Test No. 13, and tabling out and regrinding the sulphides to nearly all through 325 mesh in a separate circuit, after which they could be reunited with the table tailing and the whole aerated and cyanided.