

File NTS - 93A *Kaiser*

STEINER, ROBERT N.T.S. 93 A

GEOLOGICAL & GEOPHYSICAL DATA

840033

From Kaiser 249-7244

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PLACER MINING LEASES 7052, 6852, 6853, 7053
ANTLER CREEK PLACERS LTD.
NUGGET GULCH
QUESNEL MINING DIVISION

October 20, 1975

INTRODUCTION:

The writer recently examined the lease area, for the purpose of formulating a work proposal for the 1976 season.

All workings were in good order. The entire Gulch area, is, in its present condition, capable of supporting a large scale placer mining operation.

Nugget Gulch is a small, trough-like valley hosting Nugget Creek. This westerly flowing creek enters Antler Creek some 14 miles south of Barkerville, B.C. The Barkerville area produced about 2,000,000 ounces of gold between 1860 and 1940. Antler Creek, its tributary Nugget Creek and such creeks as Williams, Sawflat and Victoria produced most of the gold.

The Gulch was covered by leases staked by a succession of operators from 1906 to 1940. The leasers extended the previous workings up the creek for just a few hundred feet. Near the boundary between P.M.L.'s 7052 and 6852 they began to follow a post glacial course of Nugget Creek. The values here were much lower than in the previous section [upstream from the Antler-Nugget Creeks junction]. The initial section is reported to have produced about 83,000 ounces of gold.

After the old channel was lost the production dropped to less than 12,000 ounces between 1906 and 1940. No gold mining was allowed between 1940 and 1945, due to WW II. After the War only sporadic mining was carried out. And, since the leasers were working tailings and parts of the post glacial channel, with increasingly lower values, interest dwindled to just holding the leases, in the hopes that sufficient funds could be raised to renew development activities.

The present company acquired two leases by purchase and staked two more. Mr. G. E. Midgley, P.Eng., Alberta, helped the company find the extension of the pre-glacial Nugget Creek channel. The writer does not know the exact location of

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the rediscovery of the old channel. However, the company collected some 35 ounces from about six feet of bedrock [approximately 12 cubic yards] of gravel, upon entry into the pre-glacial channel in 1973. Shortly after this the government caused suspension of operations pending construction of two settling ponds and a dam.

From 1973 to the present no work has been done. This is because a number of changes have taken place in the B.C. Department of Mines. These technological and administrative changes resulted in a reassessment of operating techniques. Although former operators never polluted the area waters, and the present operators used similar methods, such procedures as hydraulicking and ground sluicing are no longer permitted.

Hence additional funds must be expended for mechanized recovery of gold from the gravels.

General:

The writer is very familiar with the Antler-Nugget Creeks area. In consulting on various placer operations the writer gained considerable knowledge regarding the auriferous gravels and their non-gold contents. Midgley estimated about \$500 per lineal foot of channel, based on work done to 1906. The basis for this estimate was gold at \$35 per ounce. The present price hovers between \$150 - \$160 per ounce.

The geology of the bedrock is such that it formed a good host rock for gold and silver deposition. A great amount of metallic mineralization took place during Jurassic times, with a lesser amount in late Cretaceous-early Tertiary. The orogeny responsible for the emplacement of copper minerals in the McLeese Lake area, [Gibraltar Mines and possibly Boss Mountain] probably also affected gold deposition in the Barkerville-Antler Creek area.

In late Tertiary the first of a series of glacial activity took place. The initial stages eroded the gold out of the host rocks and concentrated the gold in Tertiary channels, such as Antler and Nugget Creeks. Several periods of Vulcanism covered these channels with ash and lava. Recent glaciation, [5,000 to 10,000 years ago] eroded the lava and redistributed some of the Tertiary channels.

It is one of these redistributed or disturbed Tertiary channels that were followed before the present operators took over. The values here were not as high as those where the old, undistributed channel existed. The present operators just started into the old channel in 1972.

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Contemporaneous with the deposition of gold in the slates, argillites and quartzites was the deposition of abundant pyrite. This iron sulfide carries considerable quantities of gold in solid solution. In working the gravels some effort will have to be made to recover the gold from the pyrite. Some platinum, associated mainly with black sand, is also present.

Summary:

Nugget Gulch was ably reported on by G. E. Midgley, P.Eng., Alberta. The writer can't add more to his report than to point out that gold is now at least \$150 per ounce, vs \$35 in 1969-1971.

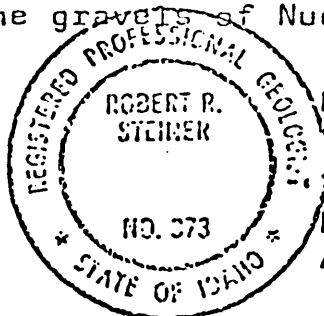
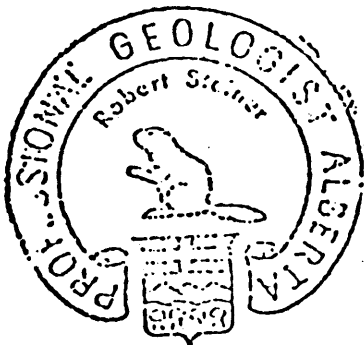
Recent changes in mining regulations necessitate the use of mechanized equipment, rather than the use of hydraulicking and sluice boxes. The writer recommends the use of screens, jigs and chemical recovery of all the values in the gravels. Recovery in this manner will be more efficient and less expensive.

There are no royalties on placer gold.

The old channel has been traced for about 7,900'. It is at least 150' wide and some 20' to 35' deep. It is estimated that there are at least 880,000 cubic yards. This volume, based on previous [1800's] work, should have a gross value of about 2,600,000 ounces of gold.

The present operators have spent over \$70,000 rehabilitating the old workings. Some considerable work was necessary to dig through barren tailings in order to start working on the true Tertiary channel. The work done has opened up ground which, in view of present world conditions, could be one of the richest auriferous gravel deposits in the world.

It is recommended that an early start be made on the exploitation of the gravels of Nugget Gulch.



Respectfully submitted,

Robert Steiner
Robert Steiner, P. Geol.
Alberta and Idaho

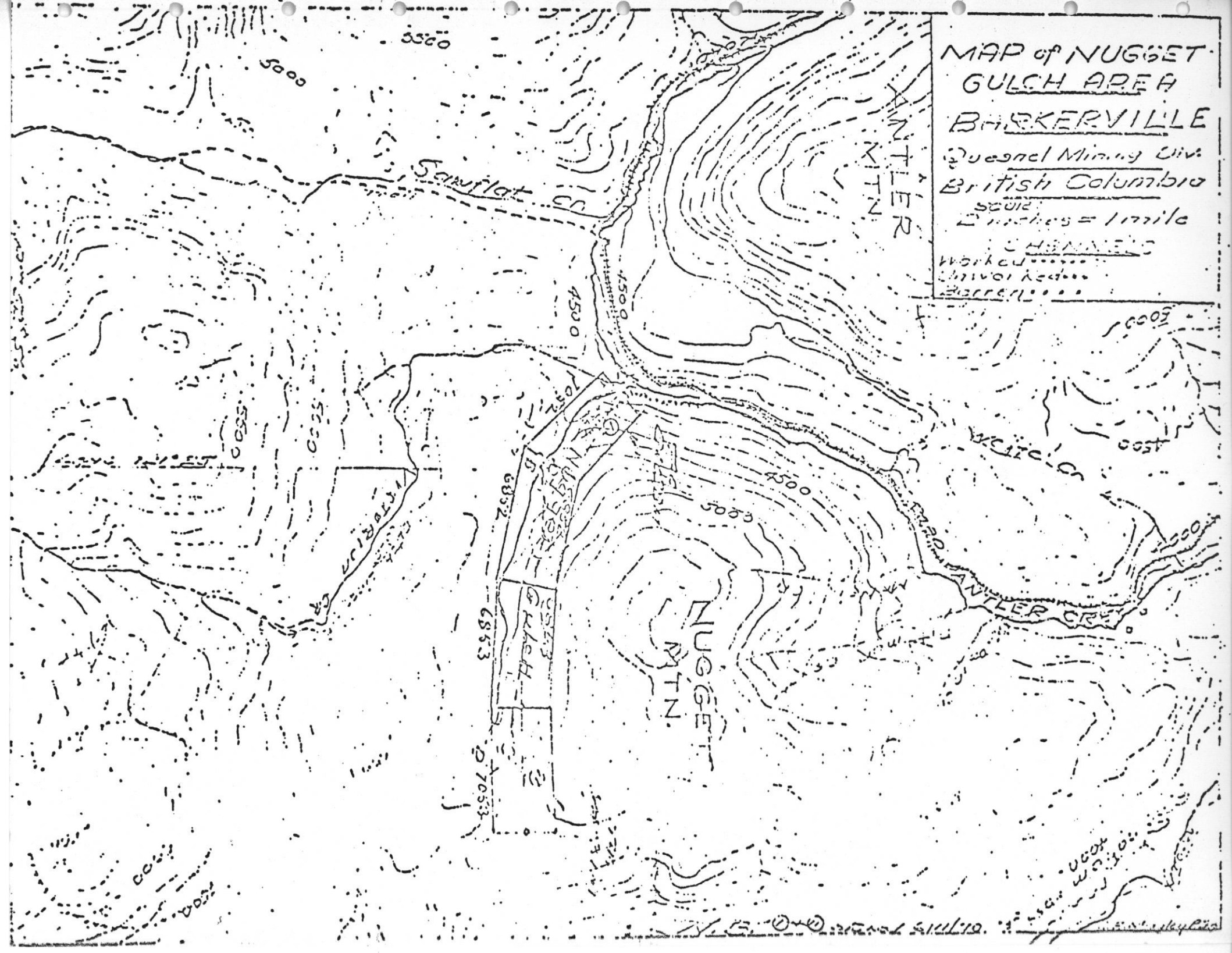
MAP of NUGGET
GULCH AREA
BARKERVILLE

Queen Mining Div.
British Columbia

SCALE
2 inches = 1 mile

CHANNALS
Worked
Control Areas
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V. G. ① ② Queen Mining Div.

ROBERT STEINER, B.A., PROFESSIONAL GEOLOGIST

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C E R T I F I C A T E

I, Robert R. Steiner, of 371 - 56th Street, Delta, B.C., Canada, do hereby certify that:

I am a 1950 graduate of the University of British Columbia, graduated with a B.A. degree in geology.

I am a member, in good standing, of the Association of Professional Engineers, Geologists and Geophysicists of Alberta, registered as a Professional Geologist; and further, that I am registered as a Professional Geologist, State of Idaho, U.S.A.

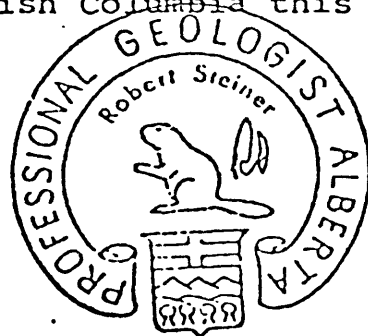
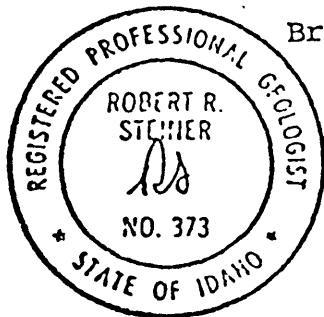
I have practised as a consulting geologist since 1957.

I have no interest in the property:

of Antler Creek Placers

I do not express any guarantee or warranty. The report is based on facts resulting from personal investigations, and that opinions expressed are my own, unless otherwise so noted.

DATED at the City of Vancouver in the Province of British Columbia this *21* day of *October* 1975.



Respectfully submitted,

Robert Steiner

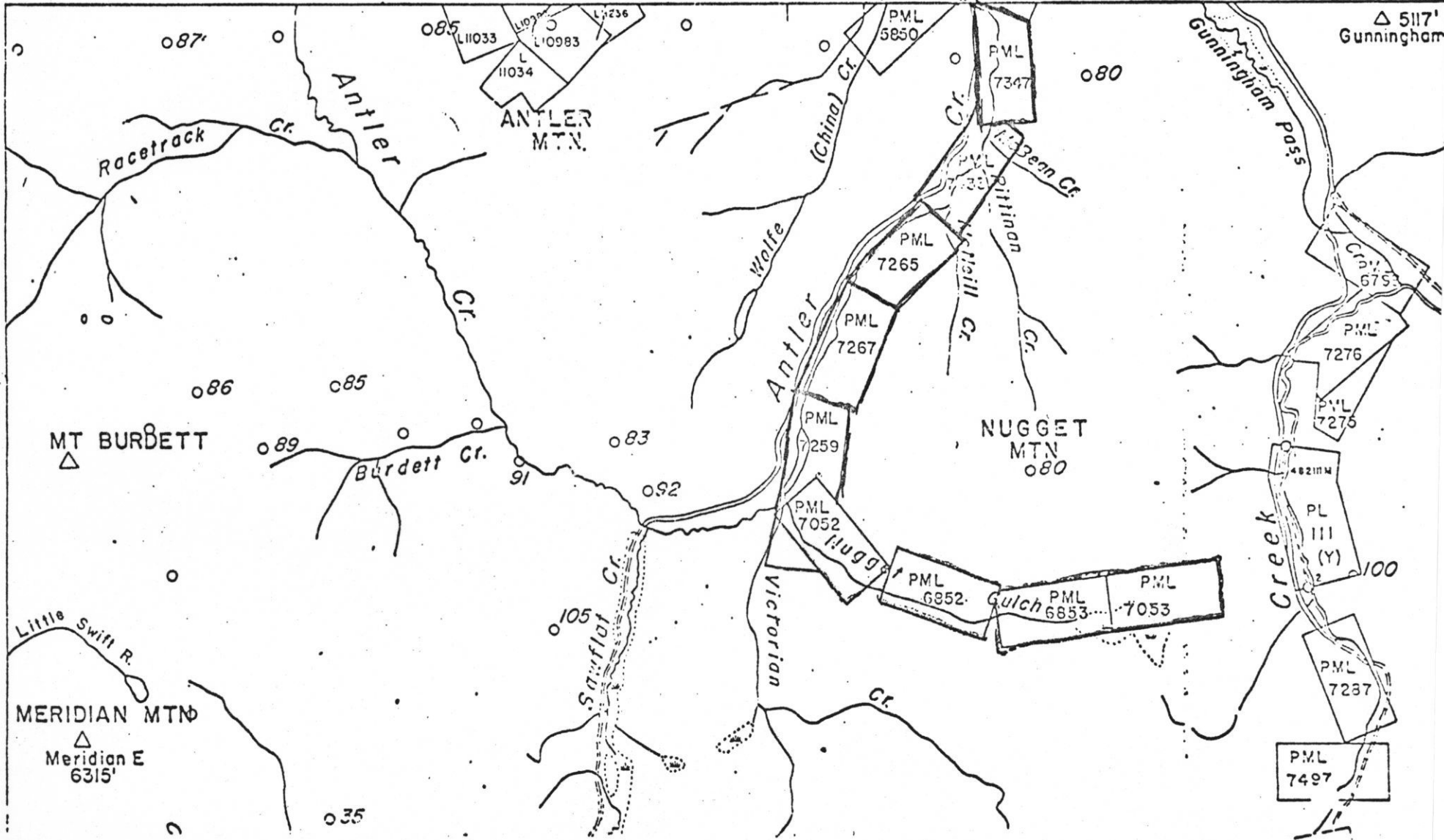
Robert Steiner, P. Geol.
Alberta and Idaho.

RS

P 93A/14W

TO NORTH SEE MAP 93H/3W

121° 30'
53° 00'



Ruskin Developments plans placer output

VANCOUVER — Ruskin Developments expects to commence placer gold production by the end of September at Christmas Creek, a tributary of Matson Creek, 10 miles southwest of Dawson City, Yukon. The company holds 16 leases on the Ladue River and Matson Creek.

It will be using on a rental basis from J & B Gold Placer Services, a large capacity sluice box and attendant equipment. It is designed to handle 800 to 1,000 cu. yd. of gravel per hour. D-9 Caterpillar tractors will be employed loading the sluice box.

The company plans to install two more of these sluice box facilities five miles apart for commencement of placer mining next spring.

Recent financing has been obtained through the private placement of 100,000 shares at \$1 a share and the sale of 151,800 shares in a best efforts offering which netted \$182,581.

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EXPLORATION DRILLING OF NUGGET GULCH PLACER MINING LEASES ANTLER CREEK PLACERS LTD. QUESNEL MINING DIVISION, B.C.

November 18-22, 1975

INTRODUCTION

The writer was requested by Antler Creek Placers Ltd., to conduct a small exploratory drilling program on their leases on Nugget Gulch. A Becker Drill was engaged to attempt to drill about 500', at depths to 30' over as much area as possible. The Becker Drill is the most efficient gravel sampling drill known. It is also the fastest.

Nugget Gulch is the valley of Nugget Creek. This creek and Victoria Creek join about 200' upstream of where the drilling was done. The merged creeks flow into Antler Creek at a point 11.2 road miles southerly of Barkerville, B.C.

The programme was carried out at 0°F and in about one foot of snow.

GENERAL PROCEDURE

A D-7 Cat was employed to snow plow the road to the site. It was also used to ford the ice-choked Antler Creek and to prepare drill sites. At times it was used to tow the drill, because the drill truck was equipped with highway tires and no chains.

The drill site was about 200' downstream of the junction of Nugget and Victoria Creeks. Five holes were drilled as follows:

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KCT

Hole 1	-	0 - 18'	gravel;	18 - 19'	bedrock, (chlorite schist)
" 2	-	0 - 17	"	17 - 18	" " "
" 3	-	0 - 13	"	12 - 14	" " "
" 4	-	0 - 13	"	13 - 14	" " "
" 5	-	0 - 11	"	11 - 12	bedrock and gravel

Holes 1 and 2 encountered water at 6' below surface. The writer believes that these holes were drilled in buried tailings, in a side channel of Nugget Creek.

Holes 3 to 5 indicate that bedrock was rising. In particular, Hole 5 appeared to be on the southerly edge of a buried channel. This was indicated by the fact that the bottom foot was a mixture of bedrock (chlorite schist) and bouldery material.

All holes were on the north side of Nugget Creek.

While Hole 5 was being drilled the writer began digging in the gravels immediately north of Hole 5. Catwork here had exposed a buried stream channel. The writer cut a sample of about $\frac{1}{2}$ cubic feet out of this channel. An attempt was made to bring the drill closer to the hand-sampled location. However, the weather began closing in. Therefore the writer ordered the drilling terminated and the crew returned to Wells.

ECONOMICS

All holes had some gold in the cores. Hole 5 encountered a significant amount of gold in the bottom foot. There were 1.1856 grams of gold in about 212.646 cubic inches. (Core size was 4.75 inches, 12" long). By calculation this would indicate the potential presence of about 260.13 grams, or 8.4 ounces of gold per cubic yard. The above weighed gold does not include gold too small to be picked out by tweezers. It is probable that at least another 0.5 ounces per cubic yard were present. The writer could not at present afford the time needed to run assays on the fine gold (colours). An assay would take at least 14 days.

The hand cut trench, located some 10' north of Hole #5, resulted in 1 cubic foot of gravel containing 3.2089 grams. It is probable that this sample comes from the southern and upper edge of the Tertiary channel. Hole 5 probably

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was positioned exactly over the bedrock edge. Hence its recovered values were not as great as that in the trench.

The 5' cut more than represents an average of the values potentially present in the Tertiary channel. By calculation, the recovered 3.2089 grams of gold in one cubic foot, represent a potential value of $3.2089 \times 27 = 86.64$ grams per cubic yard. This works out to about 2.8 ounces gold per cubic yard.

Hole 5 may be considered a bedrock sample and the trench a general gravel sample. Obviously, if the greatest concentration of gold is near bedrock, then Hole 5 should represent a truer potential value than the trench. However, since only a small portion of the Tertiary channel was explored it is wiser to average the two samples. The resulting average potential value is about 3.9 ounces gold per cubic yard. This value apparently correlates with that recovered prior to 1973.

The gold appears to be fresh and haggly. It has not travelled far. Thus no great amount of fines should be expected.

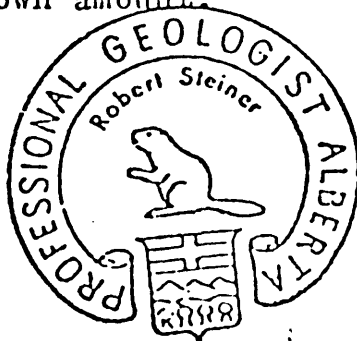
CONCLUSION

The writer initially did not advise the company to drill and explore the leases now. This is because the weather conditions were not conducive to the efficient prosecution of any exploration at present.

However, in view of the good luck (or good management of all concerned, the writer was able at least to confirm the presence of a Tertiary channel. The fact that this channel had been lost, and now rediscovered further downstream is significant. The new location can conceivably add several million highly valuable yards of auriferous gravel to the known amount.

Respectfully submitted,

Robert Steiner
Robert Steiner, P.Geol.
Alberta and Idaho



SUMMARY

The writer, in directing a winter exploration program on P.M.L.'s 7052, 6852, 6853 and 7053, discovered an extension to the highly productive Tertiary channel worked many years ago.

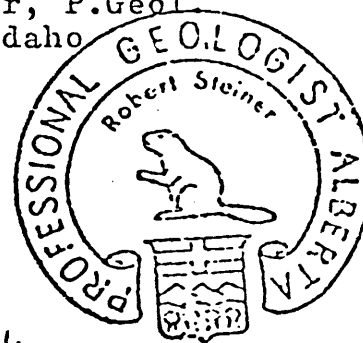
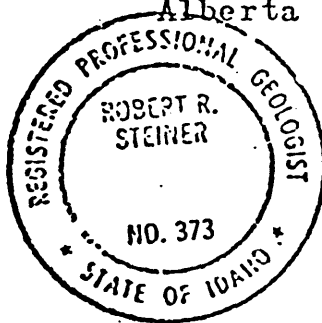
Further, the resulting average value of about 3.9 ounces gold per cubic yard tallies with the 3 ounces plus that previous operators encountered. The new location is some 8,000' downstream of where the channel was lost. It is the writer's opinion that the channel exists over this entire length. The apparent termination of the channel in previous work was probably an illusion, most likely instigated by poor engineering, a land slide or inattention as to where the channel was trending.

The channel is definitely at the point presently located. Gravels above the channel, to a height of more than 300', also carry values exceeding \$10 per cubic yard. Therefore the entire Gulch could be processed.

Respectfully submitted,



Robert Steiner, P.Geol.
Alberta and Idaho



Mr. R. Steiner
 371 56th Street,
 Delta, B.C.

Certificate of Assay

File No.

Date Nov. 27, 1975.

We hereby Certify that the following are the results of assays made by us upon submitted Gold Nuggets samples.

Sample Identification	GOLD	SILVER						
	Ounces Per Ton	Ounces Per Ton	Percent	Percent	Percent	Percent	Percent	Percent
New discovery Tertiary Channel	3.2089	grams						
Hold @ 5 Bed Rock	1.1856	grams						

Note: Pulps retained three months.

Rejects retained two weeks.

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CAN TEST LTD.

C.K. Gull

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S U M M A R Y

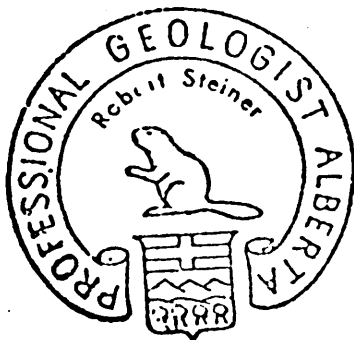
A stratigraphic depth of about 250 feet of bedded gravels in Nugget Gulch was tested. The test pits were dug by a 1 yard Massey-Ferguson front-end loader-backhoe. Roads for the hoe were cut by a D-8 Cat.

Field exploration indicates a probable volume of 38 million cubic yards. This volume appears to carry about 3.007 grams of gold per cubic yard. Some barren sections exist. These are mainly clay seams.

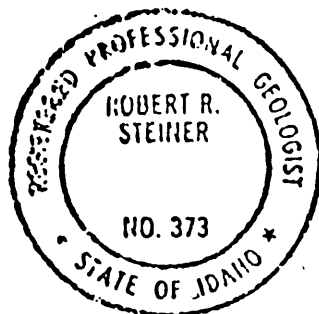
A large volume of gravel is present south of the Gulch. A bedrock sample of 1.5 cubic yards resulted in the recovery of 10.457 grams. Both the sampling [by dozer blade], and recovery [20 foot steel box with rails for riffles, and the entire Nugget Creek flowing through the box] were highly inefficient.

Good gold values are present at both the top and bottom of the Gulch walls.

Respectfully submitted,



Robert H. Steiner
Robert Steiner, P.Geol.,
Alberta and Idaho.



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EXPLORATION OF P.M.L.'s 7052, 6852, 6853, 7053

NUGGET GULCH

QUESNEL MINING DIVISION, B. C.

November 23, 1976

INTRODUCTION

The writer conducted a small exploration and sampling program in Nugget Gulch during the period August 28th to September 17th. A D-8 Cat and a Massey-Ferguson One Yard Loader/Backhoe were used for sampling the gravel. The samples were processed with a Ditta screen concentrator. Concentrates were then hand-panned at the writer's facilities in Delta, B.C.

GENERAL STATEMENT

Nugget Gulch is the former bed of Nugget Creek. The Gulch is a huge cut in Tertiary gravels deposited on the west flank of Nugget Mountain. The cut, representing a volume of about 80,000,000 cubic yards, was made by former operators between 1880 and 1938. During the period 1940-1953 very little work was done, due to WW II.

Sporadic mining, using hydraulicking methods, was carried out between 1953 and 1973. Several hundred ounces of gold were recovered from the processing of about 50,000 cubic yards of gravel.

There has been no production since 1973. The main reason for this is that conservation regulations have placed restrictions on some of the placer mining methods, such as hydraulicking. This particular method of high-volume gravel transportation is now rarely used because of the tendency to produce large volumes of silt and mud in streams.

In November, 1975, the writer, using a Becker drill, rediscovered a Tertiary channel formerly worked in 1927. This channel, reported to have carried values of up to 3 ounces gold per cubic yard, was apparently partially worked in 1970-1973 by G.E. Midgley, P.Eng.

The present report concerns itself with the exploration of both walls of the Gulch. The reader is referred to the writer's reports dated October 20, 1975 and November 18-22, 1975 for a more detailed discussion of the geologic history of the Gulch.

PROGRAM

A D-8 cat was used to cut a road on each side of the Gulch. It was also used to expose the bedrock-gravel contact a few feet west of Nugget Creek. A Massey-Ferguson 1 yard bucket-backhoe was used to sample the north wall of the Gulch over a distance of about 3,000 feet. It was also used to random sample the south wall for some 500 feet west of the Creek.

Former operators built a dam, [out of sluice box tailings], at the top of the Gulch. Nugget Creek drains a large swamp at this point. The swamp is the summit area between the Antler Creek and Cunningham Creek drainage systems. The dam is now broken and no longer holds back much water.

At some previous time a ditch had been dug on the north side of the dam. This ditch now drains water from the northern half of the swamp. Nugget Creek drains the southern half. The present channel of Nugget Creek is new, and was created by the overflow from the dam. It is probable that the ditch is pre-1906 and the new channel is post 1927.

No samples were dug in the swamp area because neither the D-8 nor the loader could navigate the soft ground. The writer hand-panned samples dug over an area of about 12 acres. A total volume of 20 cubic feet was panned. The recovery was 308 milligrams of gold. Much of the gold was of less than 40 Tyler mesh. The gold was found mainly in layers of 5-10 mm angular gravel sandwiched between clay layers varying from 1 foot to 14 feet. At some points angular pebbles of quartz and chlorite or sericite schists were distributed heterogeneously throughout the clay. The clay layers exhibited varving.

Sampling carried out by the loader covered a distance of about 3,000 feet on the north wall of the Gulch. Vertical cuts were made by the backhoe at eight points along a road constructed by the D-8 Cat. The cuts sampled various horizons of gravels over a stratigraphic depth of about 250 feet, [75 meters], along a horizontal distance of about 3,000 feet or 1,000 meters. Five samples were collected along a

road cut up the north wall of the Gulch. One bedrock sample near the Becker drill site was processed. Another sample was collected from the bottom of the Gulch, just above Nugget Creek. A total of about 3.8 cubic yards, [2.91 cubic meters], was processed [through the Ditta concentrator.] A small road was constructed along the south wall of the Gulch. The 500 foot road started at Nugget Creek and traversed westerly over the bedrock-gravel contact. About 1.5 cubic yards were processed through a steel sluice box. The box, used by previous operators, had only railway steel riffles. Its recovery efficiency was therefore limited.

The concentrates were amalgamated with mercury. A sample, collected near the swamp, was submitted for assay at another facility, and reportedly weighed 0.437 grams. The amalgam was treated with hot 6 N HNO_3 and the buttons weighed at Can Test Ltd. Certificates are enclosed.

The petrology of the Gulch is unique. There is very little rounded gravel present. Most particles are metamorphosed rock types common in that part of the Cariboo. Angular quartz fragments are abundant. The western portion of the Gulch, downstream of Nugget Creek, appears to have more rounded gravels.

Coarse gold is found as the usual flattened flakes. However, the very fine gold occurs as crystals. It is therefore probable that there are two types of gold deposition present in the Gulch gravels. The fact that the gravels are not highly water-worn indicates that part of the gold occurs in situ. The fine particle size of the gold suggests that the clay layers may carry significant amounts of gold.

EVALUATION

The region explored is about 3,000 feet or 1,000 meters long, E-W, by about 1,400 feet or 420 meters wide. Bedrock was found at about 1,500 feet, or 450 meters, north of the Gulch and along the south wall of the Gulch. A rock ridge, 350 feet wide and 1,600 feet long separates the Gulch from the present course of Nugget Creek. South of Nugget Creek no rocks were found over a distance of 500 feet.

From the above it is assumed that on the north side of the Gulch gravels exist over an area: $3,000' \times 1,400' = 4,200,000$ square feet or about 96 acres. The rock ridge between the Gulch and Nugget Creek covers an area of $350 \times 1,600' = 560,000$ square feet, or about 13 acres. South of this ridge the gravels occur over an area of $3,000' \times 500' = 1,500,000$ square feet, or about 35 acres. The depth of gravel

[Handwritten mark]

north of the Gulch is about 250 feet, while to the south it is about 200 feet. Only the north wall was tested. [It is also that portion of the Gulch that was previously hydraulicked.] The south portion was not tested. However, west of Nugget Creek, on the south wall of the Gulch, cat-work tested those gravels.

The estimated volume of gold-bearing gravels on the north wall is thus: $3,000 \times 1,400 \times 250' = 1,050,000,000$ cubic feet, or 38,000,000 cubic yards.

The estimated volume of the area tested west of Nugget Creek appears to be $200' \times 500 \times 700 = 70,000,000$ cubic feet or about 2.6 million cubic yards.

The values recovered totalled 14.6539 grams of gold, plus 0.437 grams of gold submitted to another laboratory.

Sample #3 is the sluicibox recovery.

Sample #5 is the bedrock recovery at the Becker drill site.

Sample numbers refer to similarly numbered locations on the enclosed map. All samples except #3 were derived from backhoe cuts averaging 0.475 cubic yards. #3 sample was derived from about 1.5 cubic yards run through the sluicibox.

The gravels processed in the sluicibox are due south of the Becker drill site. Faulting has raised the south side about 50 feet above the bedrock at the drill site. Therefore these gravels are included in volume and value calculations.

The bedrock ridge between the Gulch and Nugget Creek comprises a volume of about 4,000,000 cubic yards. Prospecting and random sampling indicates that gold distribution is similar in the gravels north and south of the ridge, with a possible uniform depth to bedrock of 200-250'.

Since there is indicated uniformity of gold deposition, with a probable Tertiary channel near the bottom of the Gulch, then this channel, plus the gravels above it have been bulk sampled both areally and stratigraphically. There are two low sections, #4 representing silt and fine gravel at the Gulch bottom, about 500' west of Nugget Creek; and #6 derived from a clay seam about 50' above the Becker drill site [sample #5].

The average value is about 3.0017 grams of gold per cubic yard, [5.3 cu. yds. = 15,909 grams].

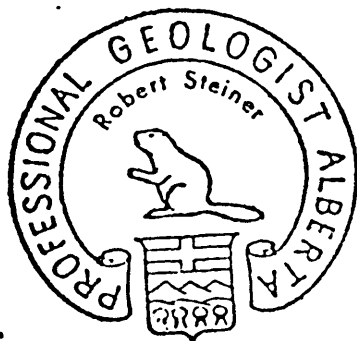
70.0

Due to various governmental regulations a much larger bulk sampling program couldn't be set up in the allotted time. However, the writer feels that further testing is unwarranted. The recent work verifies what was done in 1970-1973. Historical records show a recovery of about 1.6 grams per yard. Hence a small operation, processing not more than 500 cubic yards per day is recommended.

INTERPRETATION OF ASSAY WEIGHTS

Although the backhoe dug fairly uniform cuts on a vertical face, [see photos], some cuts were more than one-half cubic yard and some were less. The average cut was about 12' high, 1' wide and 1' deep. The sluice box cut was about 13' x 1' x 1', and was at the bedrock-gravel contact.

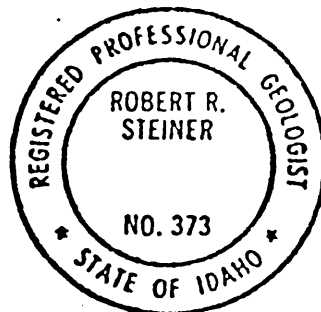
- #1 - 0.435 grams per cubic yard
- #2 - 1.298 " " " "
- #3 - 19.30 " " " "
- #4 - 0.017 " " " "
- #5 - 5.176 " " " "
- #6 - 0.020 " " " "
- #7 - 0.242
- #8 - 0.236 [sample wt = .437 gm; not submitted to Can Test.]

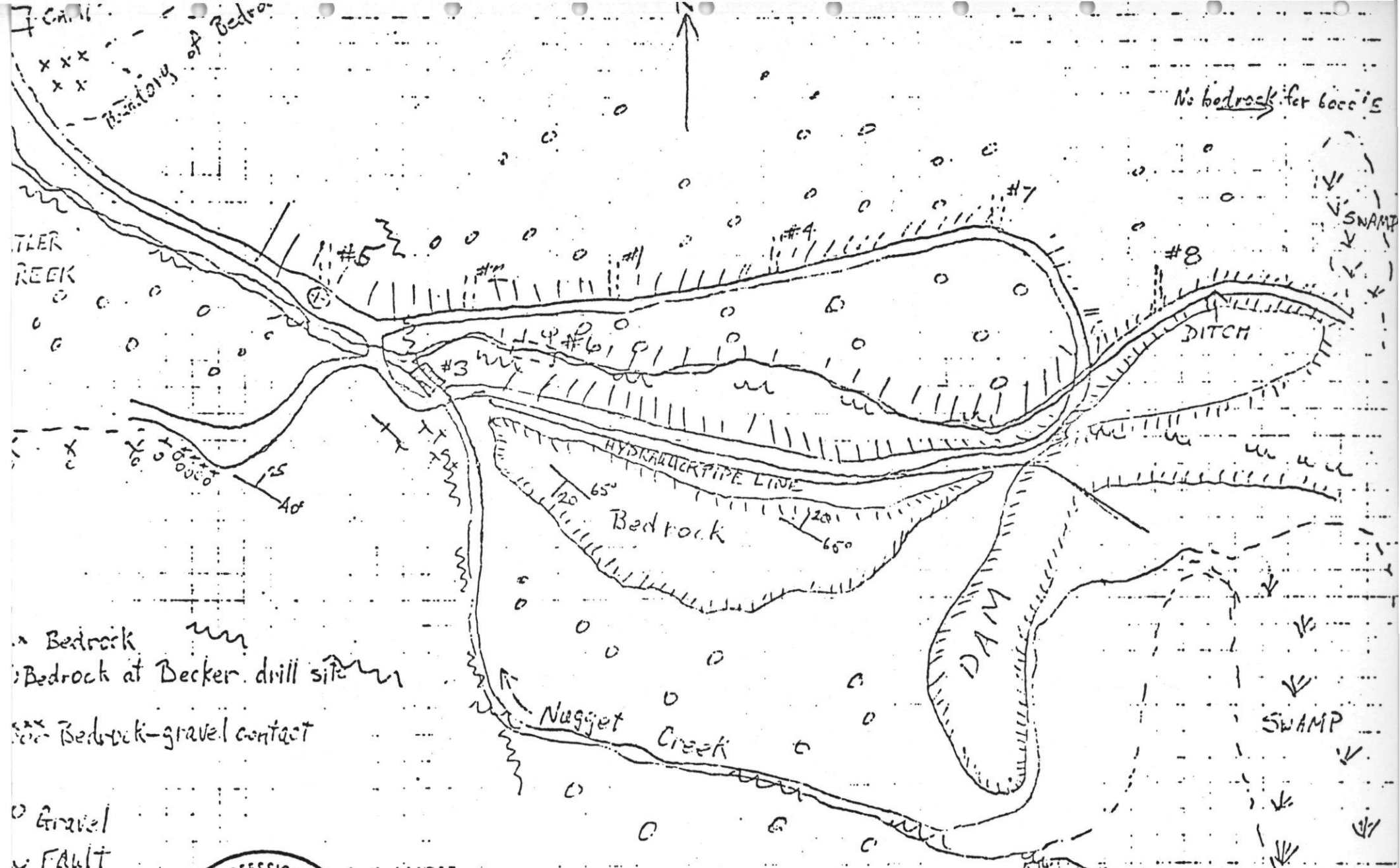


Respectfully submitted,

Robert Steiner

Robert Steiner, P.Geol.,
Alberta and Idaho





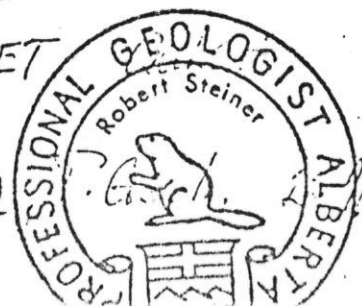
* Bedrock
 ~ Bedrock at Becker drill site
 --- Bedrock-gravel contact

○ Gravel
 - - - Fault
 cuts



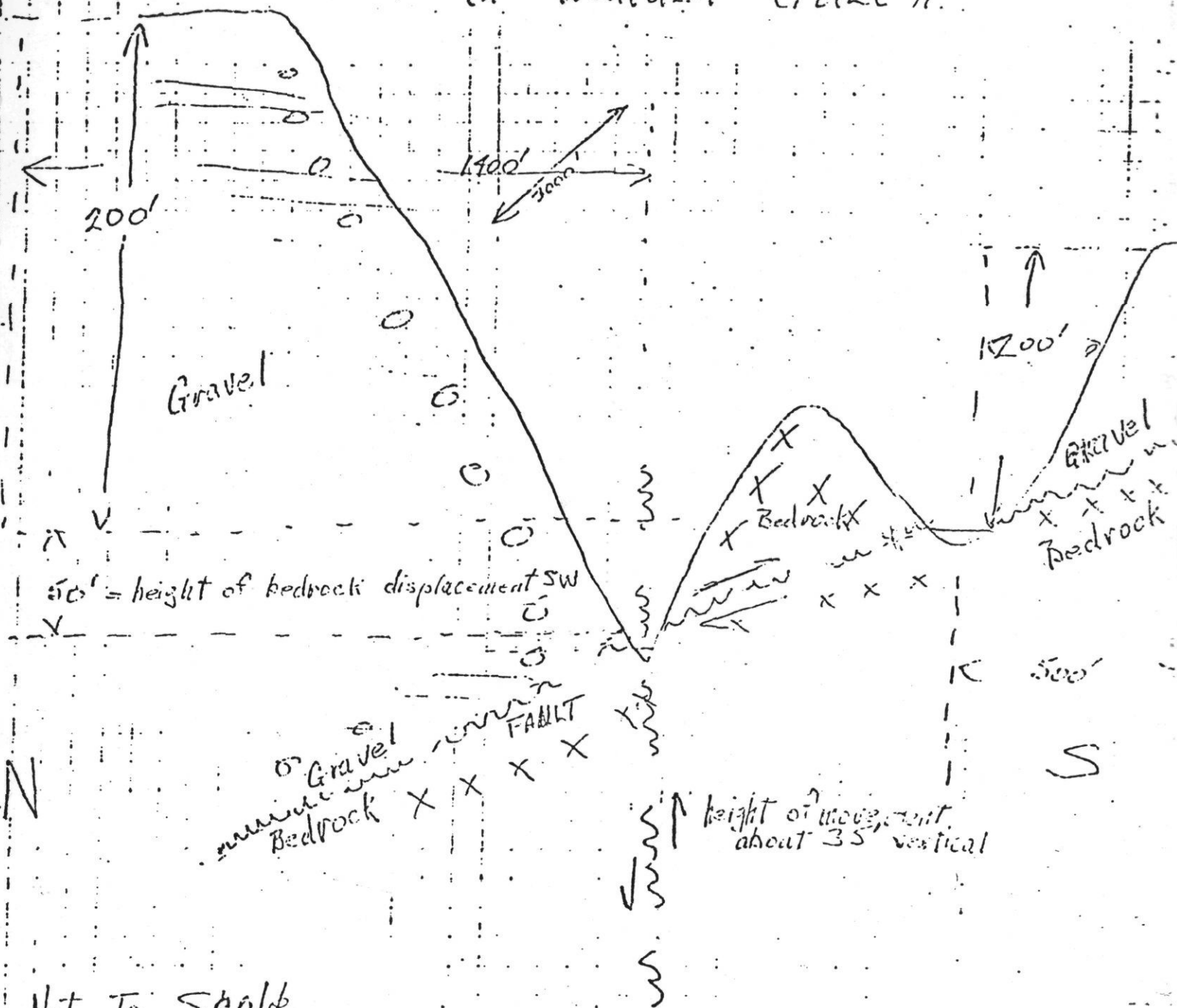
PLAN OF NUGGET

Robert Steiner



Nov-76

CROSS-SECTION SKETCH OF MUGGET GULCH.



Not To Scale.

Height of Gravel to bedrock: N = 250'

S = 200'

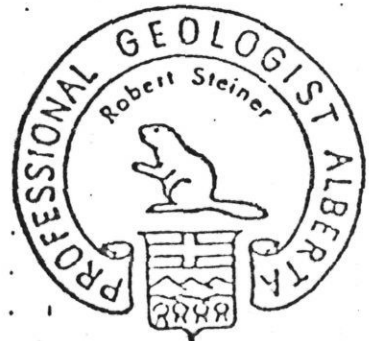
N = 1400 x 3000'

S = 500 x 700'

Area



Robert Steiner, P. Geol.
25 Nov-76



Mr. R. Steiner,

371 - 56th Street,

Delta, B.C.

1650 PANDORA STREET, VANCOUVER, B.C. V5L 1L6

Certificate of Assay

File No. 221 C

Date Nov. 25, 1976.

We hereby Certify that the following are the results of assays made by us upon submitted.....samples.

Sample Identification	GOLD	SILVER						
	Ounces Per Ton	Ounces Per Ton	Percent	Percent	Percent	Percent	Percent	
# 1	0.2349		Total weight of Gold (grams)					
# 2	0.7009							
# 3	10.4570							
# 4	0.0092							
# 5	2.7949							
# 6	0.0085							
# 7	0.4485							
Specimens from Nugget Gulch.								

Note: Pulps retained three months.

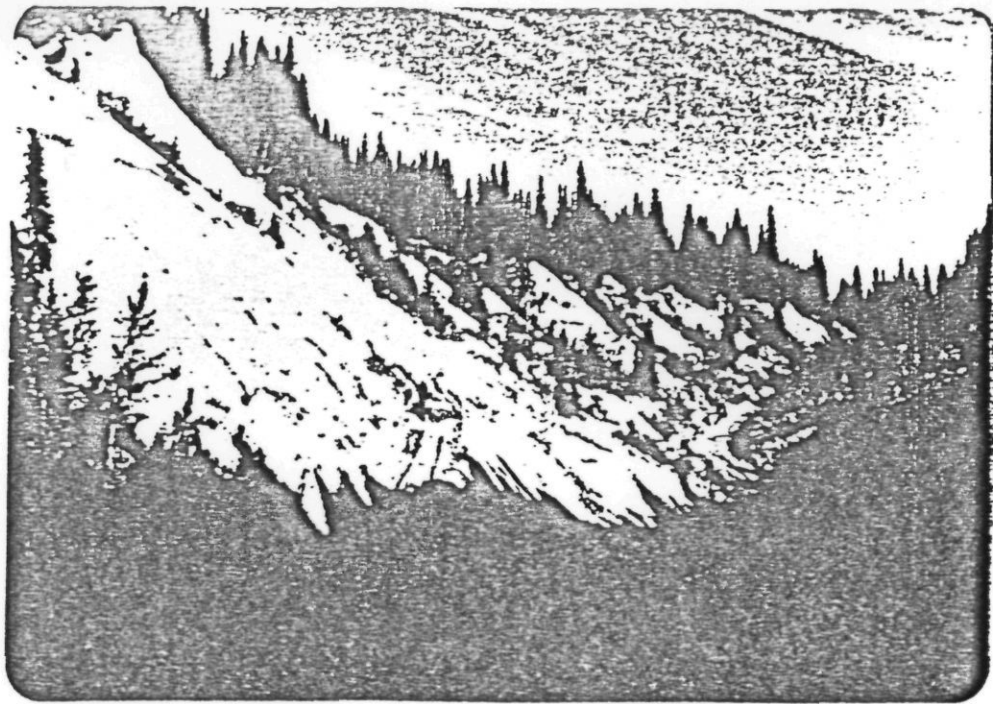
Rejects retained two weeks.

CAN TEST LTD.

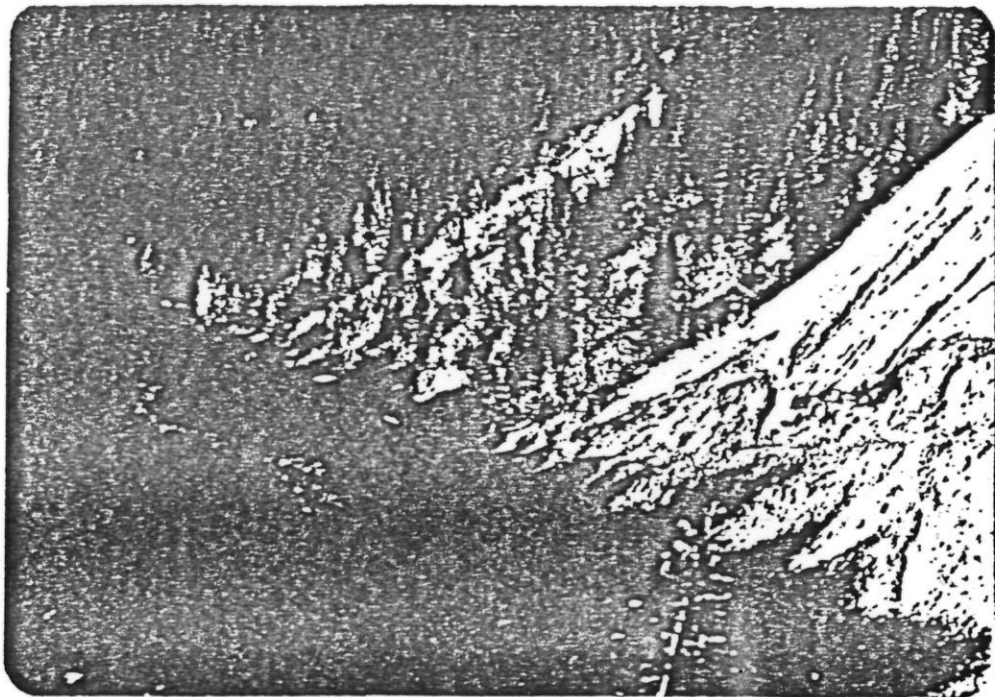
ALL REPORTS ARE THE CONFIDENTIAL PROPERTY OF CLIENTS. PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS NOT PERMITTED WITHOUT OUR WRITTEN APPROVAL. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED.

Sandhu

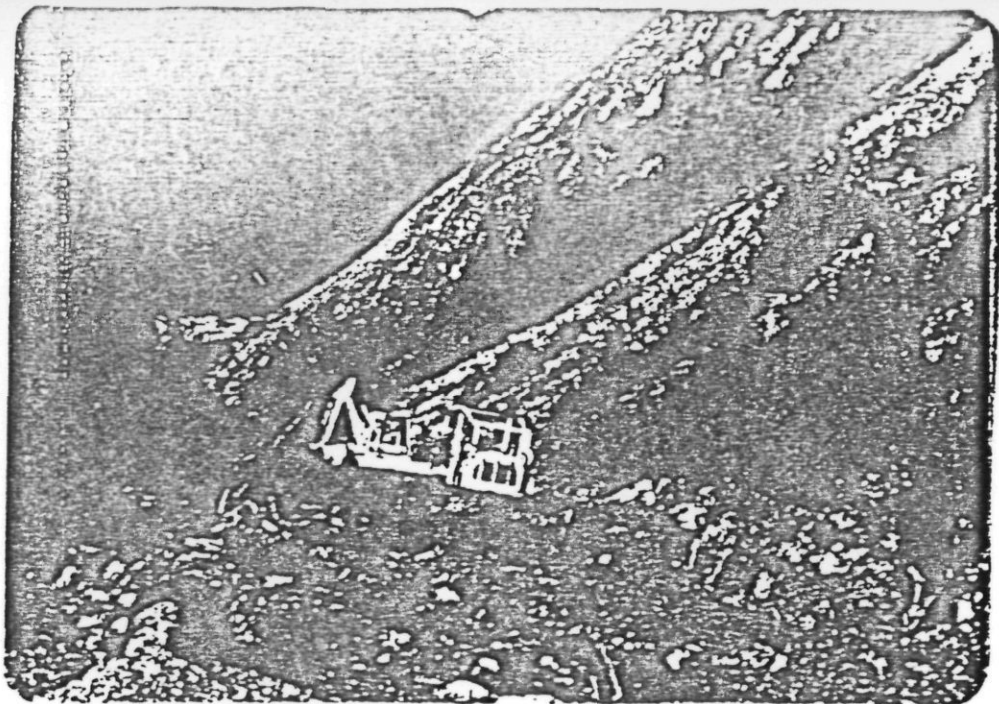
Provincial Assayer



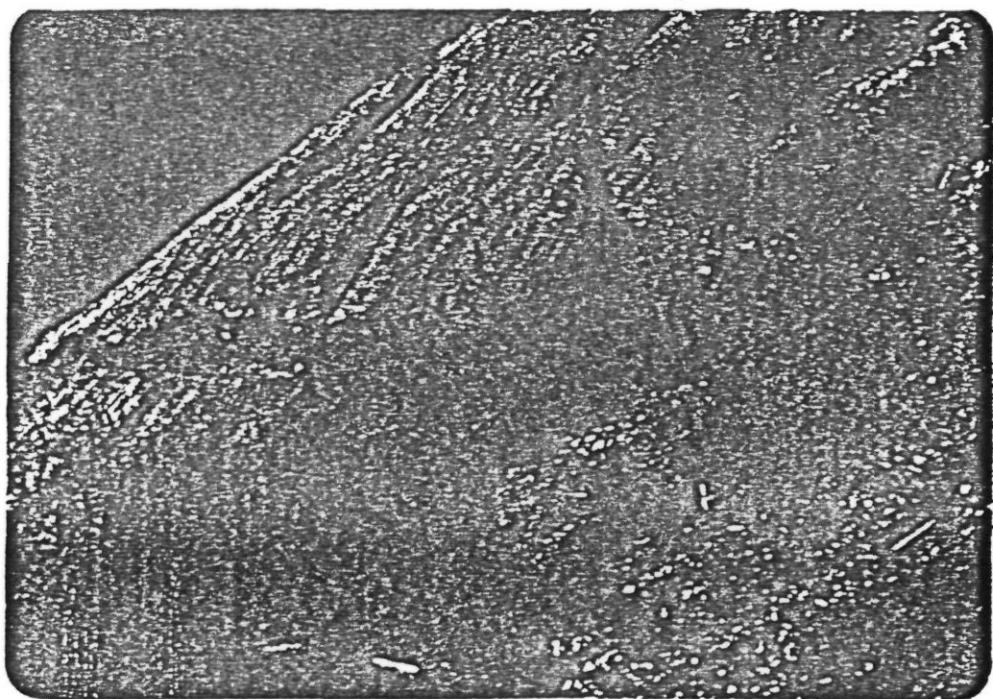
Looking easterly up Nugget Gulch. To the right is bedrock. On the left is the gravel bank that has always been worked. Hydraulicking equipment was set up on the right. Gravel was washed into a sluiceway set up in the bottom of the Gulch. Some 80 million cubic yards were removed. Water at the bottom of the picture is from Nugget Creek, entering from the right (south). The dam is at the top of the Gulch. Elevation difference is $250' \pm 50'$. Gravel bank is north wall of Gulch.



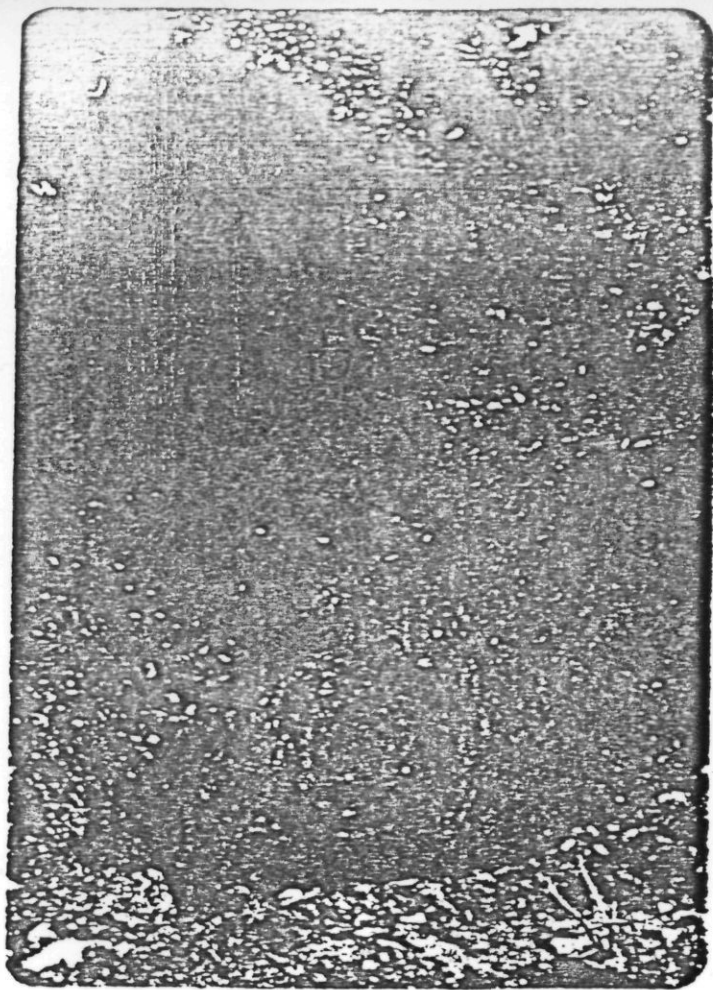
View southerly. On the right is the north wall of the Gulch. Nugget Creek comes in from the bottom of the picture.



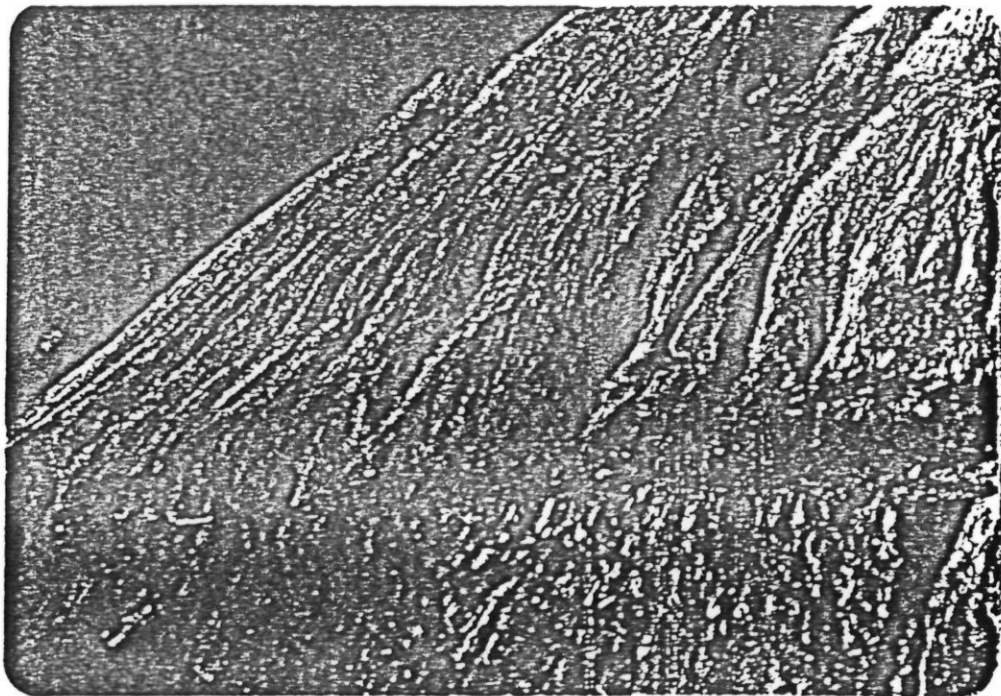
D8 Cat and Massey-Ferguson 1-yard loader/backhoe coming up old pipeline trail. It was easier to cut the road down the Gulch wall. Just above the cat is the portal of an inclined shaft to a Tertiary channel. The writer got in about 10' to a caved section. Sample #6 came from where the loader is.



The old portal is at the right. The cat cut the road along the north slope of the Gulch. Bedding is prominent. Two of the backhoe cuts can be seen along the road. This point is about 150' above the Becker drill site.



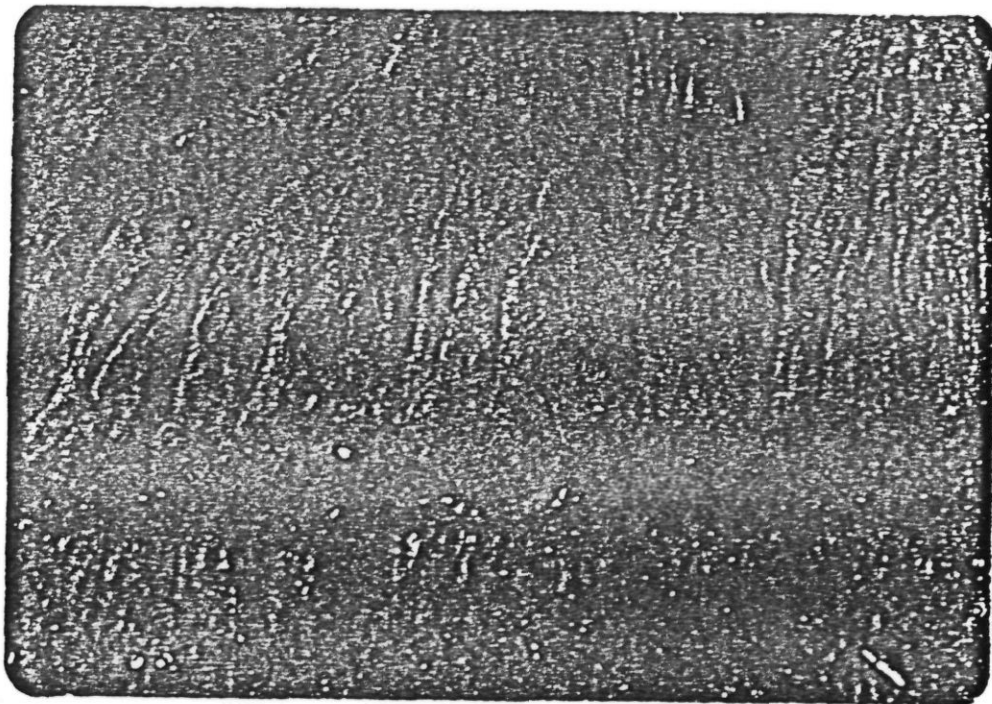
The cut is the Becker drill site. Bedrock begins at the bottom of the cut.
Sample #5.



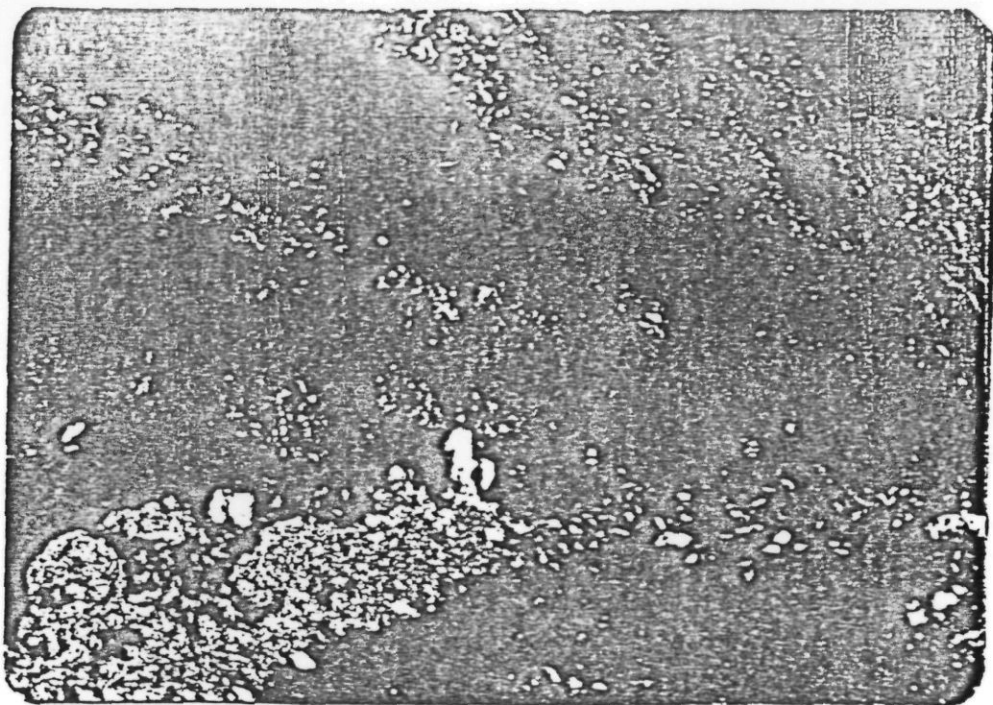
Just under tree is cut 4, sample #4.



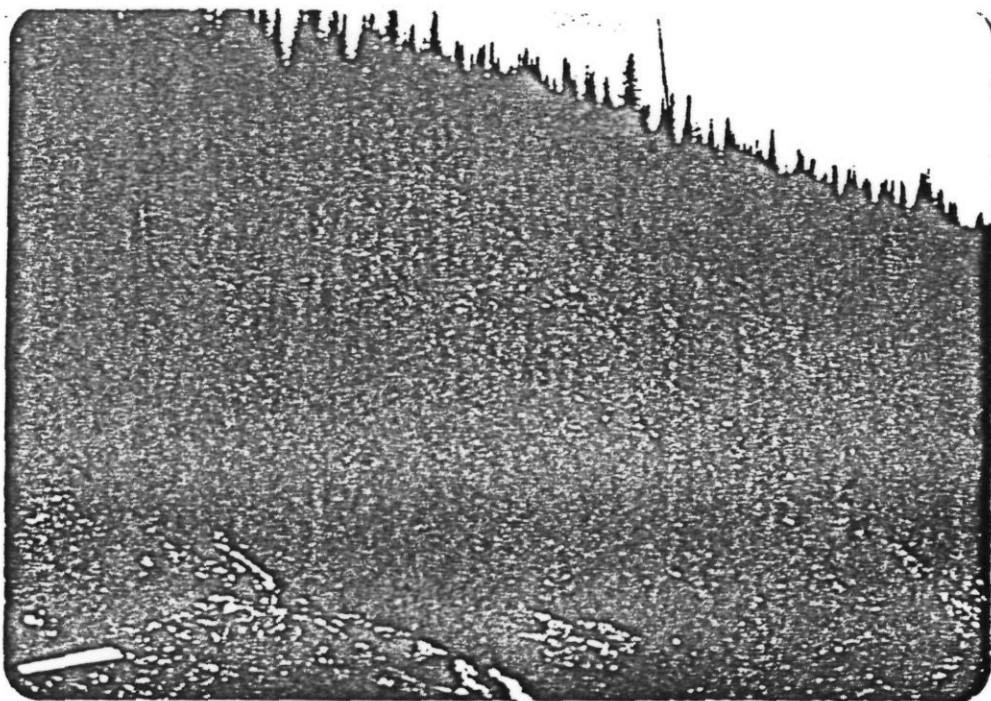
Cut on road, about 100' above drill site. The rusty sections are decomposed pyrite. Very little black sand (magnetite) was present. Small garnets occurred throughout section. The pyrite has gold in solid solution and is released when the pyrite decomposes. Sample #1 came from this cut.



Cut to the right (east) of cut under the tree is Sample#7.



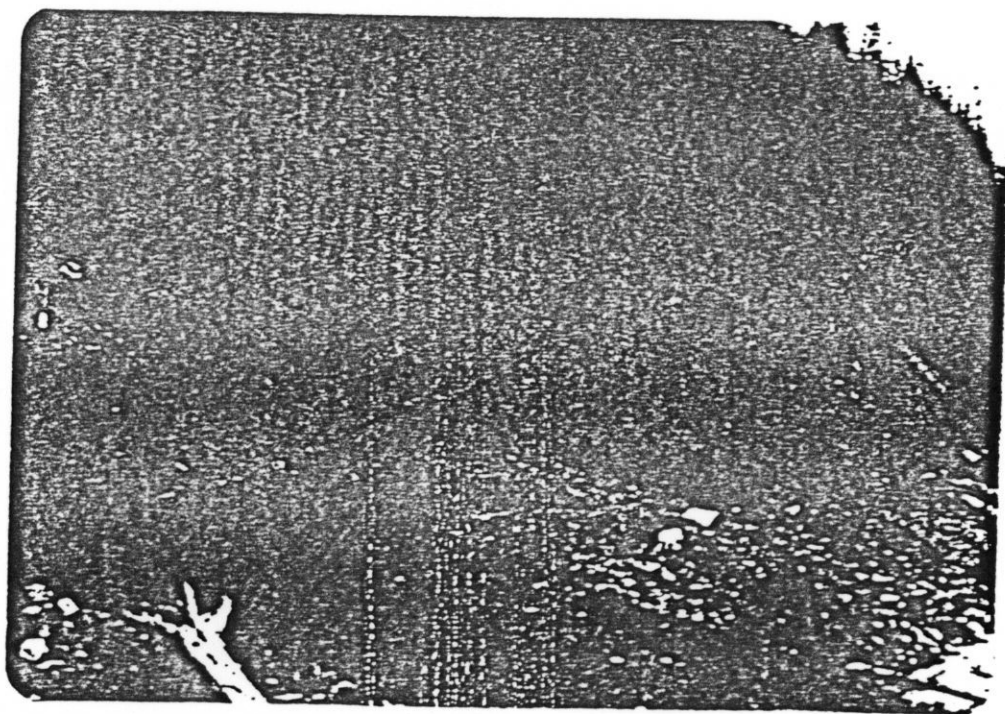
Cut #8 is near the top of the Gulch and about 100' west of the dam. This section is 250' above the drill site. Gold was found some 50' higher, in the swamp area. This cut was not sampled because the entire section caved some 80 minutes after it was made. A cut, #9, was made, sampled and abandoned in a few minutes because of caving. It is represent by Sample 437 milligrams.



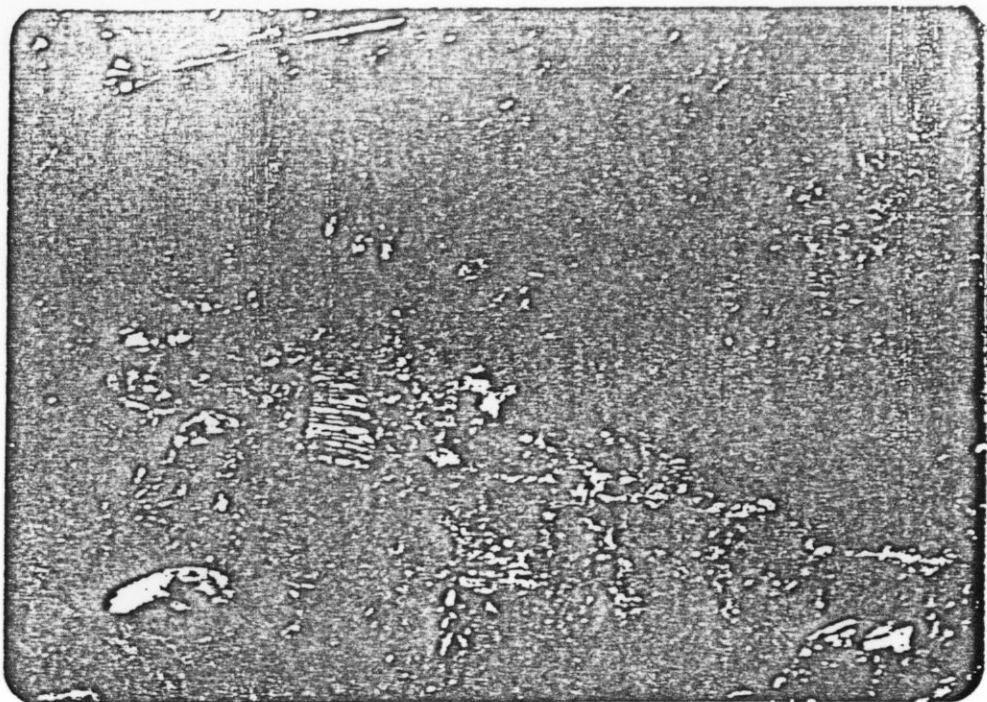
View of of south wall, west of Nugget Creek. The trees are about 200' higher than the road. Nugget Creek is in the foreground. Only the bottom of the cut was sampled. The slope is the remnant of the 1970-1973 hydraulicking operation.



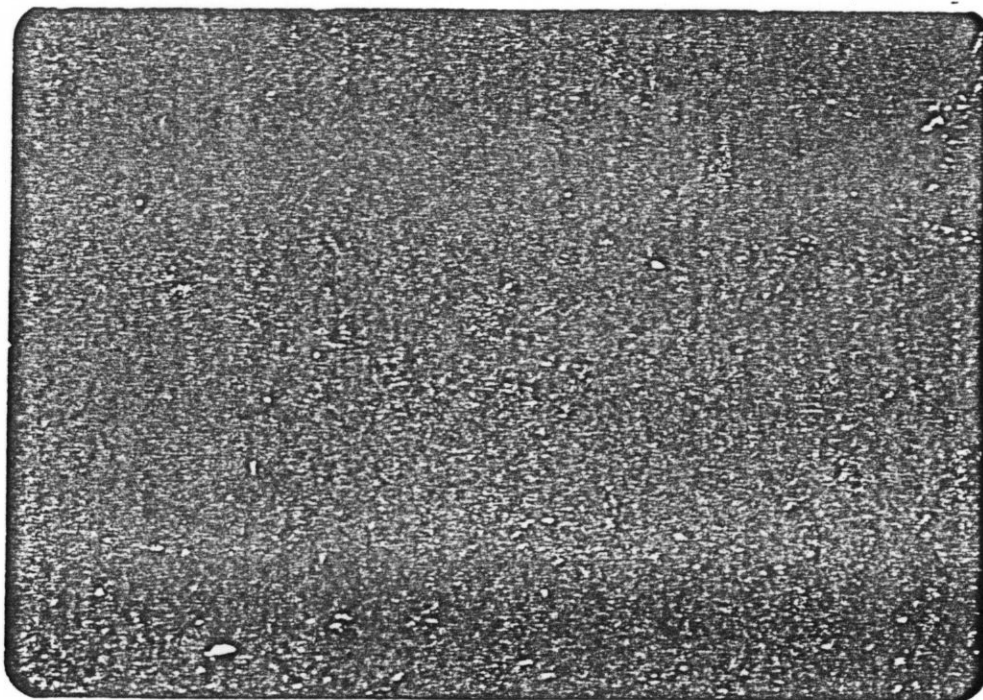
Nugget Creek flowing from the south. The creek follows a southerly trending fault. East is to the left. The west side is bedded gravel. This point is about 75' above the drill site.



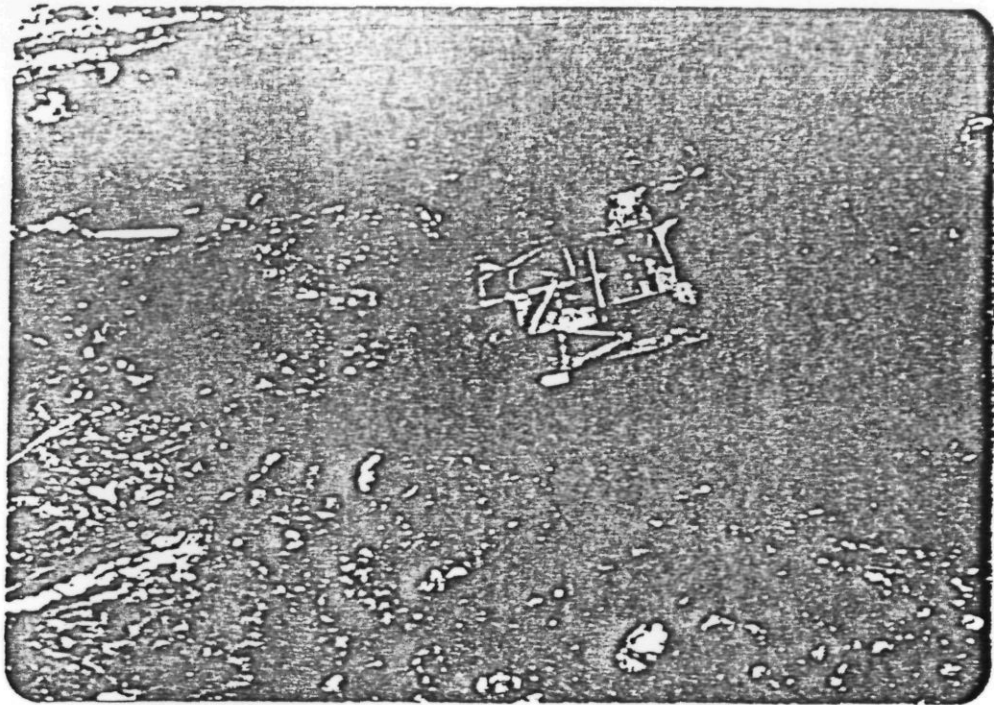
Road cut to bedrock-gravel contact on south wall of Gulch. It is just east of the preceding picture of Nugget Creek. Gravels persist to the tree line about 200' above drill site.



Road cut to bedrock-gravel contact. The bedrock is very decayed at this point. Sample #3 came from here.



Bedrock-gravel contact. Yellow rock is mixture of bedrock and clay.



Cat pushing Sample #3 into sluicebox. Entire Nugget Creek flowed through the box. A few lengths of 12 pound railway steel were the only riffles. Efficiency was not great.



The writer and Joe Thompson, his assistant, processing gravel through the Ditta screen concentrator. Recovery was probably better than 98%.

R E P O R T

NUGGET GULCH PLACER POTENTIAL

PLACER MINING LEASES
6852 & 6853

BARKERVILLE AREA, QUESNEL MINING DIVISION,

BRITISH COLUMBIA, CANADA

G. E. Midgley, P.Eng., M.E.I.C.
September 21, 1969

Nugget Gulch is a stream tributary of Antler Creek and Antler Creek was the site of the first discovery of gold in the fabulous Barkerville area in 1861. At that time miners spilled over the ridge from Quesnel Forks to the south. The Fraser River waterway with its sporadic gold and then the Quesnel tributary river brought the Quesnel Forks - Keithly Creek deposits to fruitful production. Historically, "Dutch Bill" Witz is recorded as the leader in the van of the Barkerville discoverers. Billy Barker who gave his name to the new town on Williams Creek that became the largest town in Canada west of Lake Ontario. This was in the years 1861 - 2.

Referring the reader to the accompanying map of Nugget Gulch and surrounding area, the channel between points "a" and "b" was first worked by hand along the open stream. Coarse gold studded the open stream - dubbed by the miners at that time as "Sun Burned Gold". The benches shrouding the old preglacial channel which wound back and forth across the present stream and confined with it in the rock declivity between points "A" and "B" yielded similar coarse and profuse gold along the bed rock by hydraulic methods.

Exact records of production do not exist of much of the gold produced in the early Barkerville days. Officialdom as we know it today had not even been born. However, some records do exist of the early days' production, which, if added to that of later years up to 1950 state a production of 1,934,355 ounces. At today's prices that would represent the amount of \$67,702,425.00. A glimpse of the setting that was created in the "Sixties" in the Barkerville area is found in "Canada and Its Provinces" by Dr. G. M. Dawson who was Director of the Geological Survey of Canada during the latter part of the last Century. Herewith is an extract from his writing (Vol. 22p. 561) :

"Williams Creek has yielded more gold than any other stream in British Columbia. As examples of it's yield in early years, Steele's claim gave a yield of 409 ounces a day. Gold was \$17.05 per oz. More than \$100,000.00 in all was taken from this # claim of 85 ft. by 25 feet. In 1862 Cunningham's claim produced to the value of nearly \$2000.00 per day for the season, while on several days as much as 52 pounds weight of gold was taken out. The Adams claim yielded to each of the three partners \$40,000.00 clear. These claims were above the canyon in shallow ground. The deep ground below the canyon was first bottomed in 1861 by the Barker Company (whence the name of the town of Barkerville). The Miller Company was the next successful in this, and it is creditably stated that here on one occasion, 200 pounds of gold was obtained in one day. In 1863 three claims below the canyon yielded \$300,000.00 and 20 claims were steadily producing 70 to 400 ounces per day."

About the best illustration of the importance of Barkerville at the time was the then current philosophy regarding the start of the new town, Vancouver was ".... it can never amount to much... too far from Barkerville!"

The original production of the early pioneers came principally from creek beds out of and under the shallow gravels along the present day water course. Most of this gold represented a resorting and re-concentration of the pre glacial stream gravels that had been cut by the post glacial drainage. From these sources, ideas were got as to locations of rich gravels in and underlying deep bank deposits and buried channels that were topographically obscure old pre glacial channels. These deposits were inaccessible to sorting and stacking as done by hand in the shallow present stream alluvials and required other methods. The two commonly used in order of importance, prevalence, and material moved were:

- 1) The use of a monitor under high pressure water head (piping) which transported tremendous volumes of gravel from higher locations to lower delta (tailings) areas through sluice boxes. In many instances, long trains of sluice line construction was (is) required. A water head of an excess of 30 pounds per square inch is required and an adequate supply of water pounded to supply a 4" or more monitor nozzle for the duration of each working day.

With reference to the two large scale plan and profile maps attached, the section between stations 6 and 13 are reported to have yielded some ten thousand ounces of gold. This would work out at about \$500.00 per lineal foot of channel. The last work performed (1906) included an attempt to work up the old channel as shown on the plan. A great deal of material was sluiced out at this junction, but the gradient of the bed of the old channel was found to be much less than that established by the section worked out up to this point. As the height of the intake of the box line and the wings were very definitely governed by the height of the amassed tailings behind, it was impossible to lower this to a point where the continuing old channel pay dirt could be moved. Only a small section of rim at the junction was cleanable, that being shown on the plan in the exposed bedrock about station 14, which is quite some elevation above channel bottom. The operators at this time had been led into a technical trap by their assumption that the pre and post glacial channels of Nugget Creek would continue to more or less coincide as they had done to this point.

Station 14-00 on the plan shows the absolute and final divergence of the two channels. Rock exposure at the foot of the steep pitch in the grade of the present course about Station 14 had led the operators to believe that the rising end of the sluice line was well within the limits of requirements of the future for both grade and disposal. When realizing that on the left was the true old channel, much below their intake level, an attempt was made to follow along the rim on the inside of the fork with the hope that a sudden rise in grade would rectify matters (thereby necessarily missing an inestimable length of rich bottom) and bring the elevations together to a workable point again. This did not occur. Consequently, a realignment from about station 3-00 would be necessary. Thereat, operations were transferred to Wolfe Creek, another rich gulch owned by the same operators and waiting to be hydraulicked. The operation on Nugget Gulch was never resumed, litigation over ownership being one of the main factors in prevention during the

the early years of the century. Plan and profile drawings show Locations of small shafts sunk by leaseholders during the intervening years. In all cases, interstitially flowing water forced work stoppage before bedrock or it's vicinity was reached. The purpose of attempting to sink these shafts was twofold - assessment work necessary and the hope that the rich bottom could be reached. Naturally, about one third of the flow of Nugget Creek is made up of the flow referred to through this gravel. The source of the waters of both forks is the swampy tableland at the head of the creek.

Any kind of "testing" of this old channel is out except that of "piping" with the object production. From the history of the gulch below and considering the physical characteristics now described, it is reasonable to assume that the \$500.00 per lineal foot will continue. How far remains to be seen. On this basis upwards of \$1,500,000.00 in gold remains to be washed down and out. With the proper setup, this could be accomplished in two seasons. Should the channel extend beyond 3000 feet which is the figure used in the above, then recovery would be proportionately greater and more time used in the operation.

As stated, hydraulic mining is the only feasible method for production (or testing) in Nugget Gulch. To implement this, two approaches are available:

- 1) Rehabilitation of the old ditch line from Victorian Creek and establishing a new penstock at the old location as shown on the plan. This on the westerly rim of the Gulch.
- 2) Construction of a new ditchline following along contour 4700 feet which would terminate as shown on the plan on the easterly side of the Gulch.

In either alternative the estimated cost of this capital outlay would be \$25,000.00 which would include pipe and monitor, all of which could be acquired locally (used).

Construction of new sluice line and box line and attendant cleaning out of old tailings is estimated to represent the balance of the ground preparation capital outlay at \$11,000.00, thus making a total of \$36,000.00.

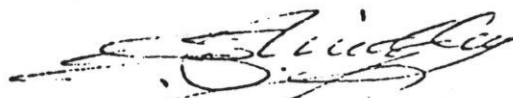
With commencement of the set up program as early as conditions permit, production could start in August 1970. This would allow 6 to 8 weeks of operation during the first season.

Operational costs following set up would approximate \$250.00 per day. This would include 2 monitor operators, 1 nipper, 1 dozerman, 1 cook and an overseer. Dozer and vehicle operation is also included in these figures. Thus, a season's operating cost on a basis of 4 months would approximate \$28,000.00. Expectations of profit, based on the indicated gold potential are from 400% up.

In conclusion, it would seem elementary that Nugget Gulch remains as a placer proposition of most unusual nature. The continuation of the gold bearing characteristics found ~~at~~ checkpoint "B" would yield fabulous returns on investment. This old channel of virgin ground was unquestionably the gold run down which came the riches of that which was worked below and by all the laws of gravity and origin that accompany auriferous alluvia, should be richer and coarser than that found below.

The old town of Barkerville has been created an historic site by the Government of British Columbia and now for the past several years has been under a program of rehabilitation to portray the Barkerville of the eighteen and sixties... buildings restored... appurtenances being attended by wax figures etc. Tourism is becoming voluminous and during July and August 1969 over 70,000 people visited the scene where the "beginnings of British Columbia" were enacted. To the placer operator in the area this brings a most attractive picture. Coarse gold is readily saleable to tourists at a price of \$100.00 per ounce which enhances the economic value of an operation in relationship to the number of tourists visiting the place and which is growing phenomenally.

My opinion of a gamble in Nugget Gulch is only one as to how MUCH profit can be made.



George E. Midgley, P.Eng., N.E.I.C.
November 1969



The University of Western Ontario, London, Canada

School of Business Administration

TO: Nugget Mountains Mining Ltd.

FROM: Mr. Rashid Maqsood, Consultant
Small Business Assistance Program
University of Western Ontario

DATE: May 20, 1977

SUBJECT: A financial analysis of the Nugget
Gulch gold bearing deposits in
British Columbia.

Introduction

This circular has been prepared with the intention of providing a financial analysis of the prospects for mining the gold bearing deposits at Nugget Gulch, B.C. The objective of this analysis is to project the profitability of the gold mine for evaluation by potential investors in the company.

The author claims no accuracy for the assay data or its sources.

Background

The gold bearing gravel deposits are located at Nugget Gulch, Antler Creek near Barkerville, British Columbia.

The technical data have been provided by Mr. Robert Steiner, P. Geol. He conducted an exploration program on the Nugget Gulch Placer gold property in 1975-76. The author assumes neither responsibility for the validity of the basic data, nor how representative was the black sand sample used by Mr. Steiner.

Technical Data

Mr. Steiner's field results indicated the following:

- (i) Dimensions of Placer: 3000 feet long by 1400 feet wide by 250 feet deep.
- (ii) Gross Volume: 38,900,000 cubic yards of recoverable gold deposits.
- (iii) Ore Reserves: Average concentration of gold in these deposits was 3.007 grams (0.106 oz.) per cubic yard.
- (iv) By-product: Precious metal values found in the black sands, average 4.3 lbs. of black sand per cubic yard of washed gravel, containing 11,634 oz. of gold per short ton and 4.62 oz. of silver per short ton.
- (v) Characteristics of Placer: Gold bearing gravel beds compacted by barren clay seams.
- (vi) Mining Conditions: The deposit lies in a steep, narrow gulch on even bedrock. There are no large boulders.
- (vii) Availability of Water: Adequate supply could be assured from a nearby creek.

Assumed Parameters

The following conditions are assumed for the purposes of undertaking the financial analysis:

a) Overburden

It is assumed that the barren overburden and clay seams will have to be removed at a proportion of 0.25 cubic yards waste per cubic yard of gold bearing gravel.

b) Mining Method

The placer may be worked by using open pit mining methods, as dragline or simple use of bulldozers, scrapers, to mine and dump the overburden. The same equipment will feed the washing plant and dispose of the barren oversize and tailings. Eventual use of backhoe-loader and truck for haulage is also considered.

c) Mine Production

Due to climatic conditions, the mine will be operated for the duration of five summer months in the year.

Volume per operating day	4,000 cu. yd.
Operating days per year	125
Volume per year	500,000 cu. yd.

These are average figures and a sensitivity analysis is included to assess the effect of changes in these parameters.

d) Economic Life of the Mine

Although the existence of 38 million cubic yards of ore reserve is estimated by Mr. Steiner, and even if this is verified, only sectors of easy access should be considered in this project. Thus 25 years are estimated to be the economic life of the mine (additional data is provided assuming different lives).

At a production rate of 500,000 cubic yards per year, in 25 years, about 12.5 million cubic yards will have been worked or about 32% of the ore reserves originally estimated by Mr. Steiner.

e) Environmental Control

Due consideration will have to be given to all the regulations of environmental control. As no direct discharge from placer operations is permitted, settling ponds will have to be built and a system for the recirculation of wash water will be installed.

f) Method of Gold Concentration

A typical, conventional semi-portable gold washing plant will be installed, consisting of a vibrating screen or trommel sluice boxes, conveyor belt.

The coarse gold will be retreated in a separate plant.

The black sand will be stockpiled. A percentage of the precious metal content will be extracted by sophisticated metallurgy in Vancouver or the U.S.

Proposed Method of Production

It is proposed that the mining operations should be placed in the hands of an experienced earth moving contractor. A contract should be let on a per cubic yard basis for

- a) removing overburden
- b) for the entire operation of excavating, hauling and feeding the washing plant
- c) treatment of gravels, and disposal of oversize material and testings.

The cleanup, any amalgamation of the concentrate and handling of black sands should be carried out by the staff of the company.

This recommendation is based on the comparison of large capital outlay and seasonal nature of the operations versus a contractor who can utilize his equipment during the winter on other earth moving or construction jobs in the province.

This way the company would:

- a) minimize its investments
- b) be able to negotiate its direct operational costs from season to season or for a long term
- c) still maintain full control over the recovery of gold, engineering and administration
- d) have no labour, staff disputes
- e) have flexibility in redesign and of setting up their own bigger plant and of purchasing equipment once operating experience has been gained on this particular property.

Preproduction Expenses and Capital Outlay

	\$
Exploration, mapping, drilling, testing	240,000
Road building, clearing, site preparation	45,000
Settling ponds, water supply	150,000
Amalgamation plant	25,000
Trailer camp	55,000
Laboratory, instruments	20,000
Field vehicle	5,000
Investigation of treatment of black sand	50,000
Engineering and office work	60,000
Legal expenses for obtaining permits and overhead	<u>100,000</u>
Capital Investment	750,000
Working Capital (estimated at 2 months of operating expenses)	<u>250,000</u>
TOTAL INITIAL INVESTMENT	<u>1,000,000</u>

Revenue Estimates

Only 50% credit will be given for the precious metal content in the black sand, estimating that the balance will be absorbed by the cost of concentration and metallurgical losses in the recovery.

Fineness of gold recovered	750
Gold Price	\$140/fine oz.
Silver Price	\$ 4.5/ oz.
Refining charge (estimate)	\$ 2/oz.

$$\begin{aligned} \text{Gold Value per cubic yard} &= .106 \text{ oz./cu. yd.} \times .75 \times \$140/\text{oz.} \\ &= \$11.13/\text{cu. yd.} \end{aligned}$$

$$\begin{aligned} \text{Refining Charge} &= .106 \text{ oz./cu. yd.} \times \$2.0/\text{oz.} \\ &= \$.212/\text{cu. yd.} \end{aligned}$$

Black Sand Revenue

$$\begin{aligned} \text{From Gold:} \quad & \frac{4.3 \text{ lbs.}}{\text{cu. yd.}} \times \frac{11.634 \text{ oz.}}{2000 \text{ lbs.}} \times 0.5 \times \frac{\$140}{\text{oz.}} \times 0.75 \\ &= \$1.313/\text{cu. yd.} \end{aligned}$$

$$\begin{aligned} \text{From Silver:} \quad & \frac{4.3 \text{ lbs.}}{\text{cu. yd.}} \times \frac{4.62 \text{ oz.}}{2000 \text{ lbs.}} \times 0.5 \times \frac{\$4.5}{\text{oz.}} \\ &= \$0.022/\text{cu. yd.} \end{aligned}$$

Operating Costs Estimate

	<u>\$/cu. yd.</u>
Mining and washing (contracted out)	1.20
Moving overburden 0.25 waste/ore x \$1.20	0.30
Tailings Disposal	0.20
Cost of Amalgamation	<u>0.045</u>
 Total Variable Costs	 <u>1.745</u>

Indirect Costs

	<u>\$/yr.</u>
Water Recirculation	55,000
Mine office, laboratory and overhead	45,000
Freight, communications, travelling, etc.	25,000
Head office and overhead	<u>180,000</u>
	305,000
Contingencies - 15% approx.	<u>45,000</u>
 Indirect Yearly Operating Cost	 <u>350,000</u>

Projection of Net Annual Cash Flow

	<u>\$/cu. yd.</u>	<u>\$/yr. (in thousands)</u>
Gold value		
from ore	11.130	
from black sands	1.313	
Silver value	<u>0.022</u>	
Total Value	12.465	
less: Refining charges	.212	
Variable costs	<u>1.745</u>	
Contribution Margin Per Cubic Yard	10.508	
Annual mining rate	500,000 cu. yds.	
Net Revenue Before Indirect Costs		5,254
less: Indirect Cost		350
Allowable Capital Write-off (see Note 1)		<u>100</u>
Taxable Profit		4,804
Federal and Provincial Income tax of B.C. Mining Tax (57.5%) - See Note 2		<u>2,762</u>
Net Income		2,042
Add Back Non-Cash Expenses (Depreciation)		<u>100</u>
Net Yearly Cash Flow		<u><u>2,142</u></u>

Notes to Cash Flow

(1) Although exploration expenses can be written off at any time and capital costs can be written off at a maximum rate of 30% in a year on a diminishing balance basis, to simplify the calculations, the amount of \$100,000 was considered as allowable capital write off every year. This capital allowance is maintained during the entire life of the project as a provision for refurbishment costs.

(2) The effective tax rate which would apply to the operation would be less than the maximum 57.5% taken in the calculations.

(3) No provisions were made for escalation in operating costs as it is assumed that increased efficiencies and/or gold price will balance inflationary factors.

Net Present Value of the Project

The net present value of the project equals the discounted value of the future stream of net cash flows less the initial investment. The discount rate used depends on the riskiness of the project and the financing means being employed to fund the project. Since this rate is unknown, the net present value is calculated below at three varying discount rates, ie. 15, 20 and 25% per year.

Discount Rate Per Year	Annuity Factor	Net Present Value (\$ millions)
15%	6.46	12.8
20%	4.95	9.6
25%	3.98	7.5

Impact of Various Factors on Profitability of the Project

A summary of these factors is tabulated in Exhibit 1. The details of the calculations are shown here, using the average estimate and 20% discount rate per year.

1) Economic Life

With decreasing life of the project, the net cash flow benefits in future years will stop, thus reducing the net present value.

Productive Life in Years	% of Reserves Exhausted	Net Present Value (\$ millions)
15	19.3	9.0
20	25.7	9.4
25	32.1	9.6
30	38.6	9.7

2) Haulage Rate

Every additional 100 cubic yards mined per day above the projected 4000 cubic yards per day will yield an additional after tax income of:

$$\begin{aligned}
 & \$ \frac{10.508}{\text{cu. yd.}} \times 100 \text{ cu. yd./day} \times 125 \text{ day/year} \times .425 \\
 & = \$56,000/\text{year}
 \end{aligned}$$

3) Number of Days in Season

For every extra day the mine is operated above the projected 125 days, another 4000 cubic yards could be mined yielding an increase in annual after-tax income of:

$$\begin{aligned}
 & \$ \frac{10.508}{\text{cu. yd.}} \times 4000 \text{ cu. yd.} \times .425 \\
 & = \$18,000/\text{year}
 \end{aligned}$$

4) Gold Prices

For every \$1/oz. increase in gold prices the after-tax income on an annual basis would increase by:

Gold value: oz./cu. yd. = 0.089

Increase in Annual After-tax Income

= 0.089 oz./cu. yd. x 500,000 cu. yd./yr. x \$1/oz. x .425

= \$19,000/year

5) Haulage Cost

The present prices charged for hauling ore are estimated to be \$1.20 per cubic yard. For every 1¢ increase in this cost per cubic yard the after-tax annual income would decrease by:

0.0125 \$/cu. yd. x 500,000 cu. yd./yr. x .425

= \$2,600/year

6) Refining Charge

The present refining charge is estimated to be \$2/oz. For every \$1/oz. increase in this cost above the estimated amount the annual after-tax income would decrease by:

.106 oz./cu. yd. x \$1/oz. x 500,000 cu. yd./yr. x .425

= \$23,000/year

7) Gold Concentration

The estimated gold concentration in the ore deposits was .106 oz./cu. yd. For every 0.01 oz./cu. yd. increase in this gold concentration, the annual after-tax income would increase by:

\$1.03/cu. yd. x 500,000 cu. yd./yr. x .425

= \$219,000/year

8) Taxation Rates on Income

The total tax rate on income was estimated to be 57.5%. However, for every 1% increase in the tax rate, the annual after-tax income will decrease by \$48,000/year.

9) Market Share

The 1975 Canadian production of gold was 1,674,000 oz. The estimated yearly production of gold from this project is 44,000 oz. The mine will thus have a 2.6% share of the total gold production in Canada.

EXHIBIT 1

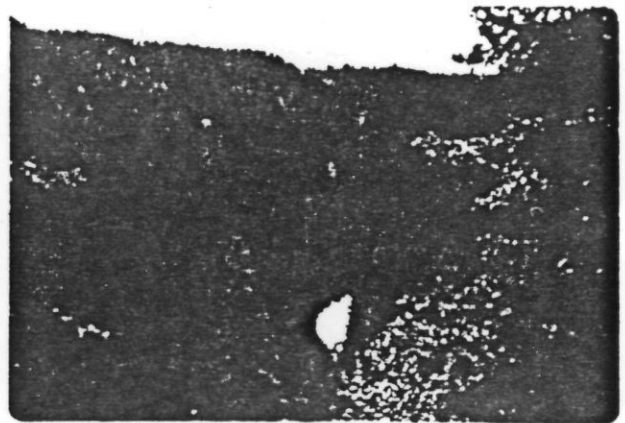
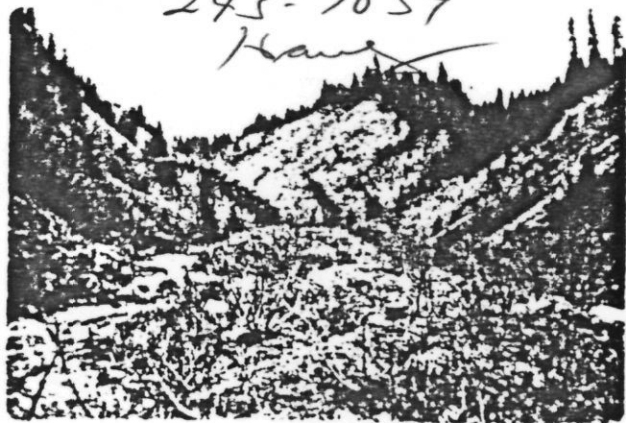
IMPACT OF PRODUCTION, COST FACTORS ON ANNUAL PROFITABILITY

<u>Variable Factor</u>	<u>Amount of Change throughout the year</u>	<u>Change in Annual Net After-Tax Income</u>
1. Haulage Rate	+100 cu. yd./day	+\$ 56,000
2. Production Days in Season	+1 day - 1 day	+ 18,000 - 18,000
3. Gold Price	+\$1/oz.	+ 19,000
Haulage Cost	- 1¢ +1¢/cu. yd.	- 2,600
5. Refining Charge	+\$1/oz.	- 23,000
6. Gold Concentration	+0.01 oz./cu. yd. - 0.01 oz./cu. yd.	+ 219,000 - 219,000
7. Taxation Rate	+1% - 1%	- 48,000 + 48,000



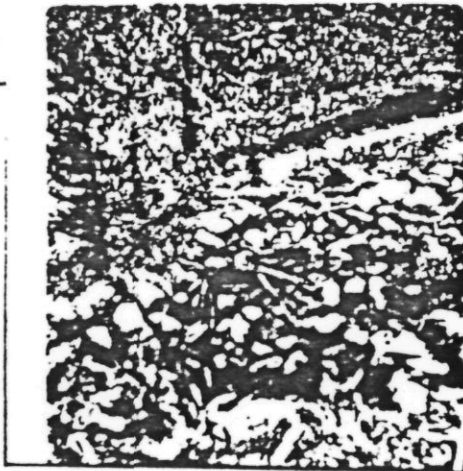
LOOKING DOWN OLD WORKED CHANNEL - NORTHWARD

SOUTH SIDE OLD CHANNEL - STRAIGHT EDISON SINCE 1966



LEFT AXECLYTHIL CHANNEL - WEST CLAY. 1921 RIGHT - FORE GROUND UPPER END OF OLD HILLINGS

WILLIAMS CREEK CANYON - 1921 BARKER VILLE



WELLS BR



- FRED WELLS -
FOUNDER OF CAR-
1860 OLD QUARTZ
AND TOWN OF WELLS
1861 - 1954