

PLACER ASSESSMENT REPORT X

DOCUMENT NO: 120155

MAP NO.: PROSPECTUS

MINING DISTRICT: Dawson

115 N 10

CONFIDENTIAL X

TYPE OF WORK: Geological Evaluation

OPEN FILE

REPORT FILED UNDER: R. G. Hilker

DATE PERFORMED: September 7 - 29 1991

DATE FILED: April 13, 1992

LOCATION: LAT.: 63°30'N

AREA: North Ladue River

LONG.: 140°50'W

VALUE \$: 8,000.00

CLAIM NAME & NO.: SODA 1 - 40 P34634 - P34673

WORK DONE BY: R. G. Hilker, P. Eng. - Tron Duik Consultants Ltd.

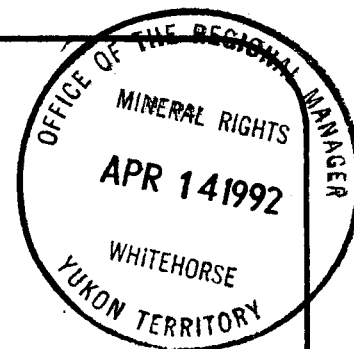
WORK DONE FOR: R. G. Hilker

DATE TO GOOD STANDING:

REMARKS: 115 - N - North Ladue River Area.

R. G. Hilker carried out an geological compilation and evaluation of the claims. The claims were explored and rotary drilled by a previous company during the 1980's. The potential exists for mining a series of pay streaks. Much of the data was reported in previous reports by Hilker. The North Ladue River area is beginning to display renewed exploration activity due to the rebuilding of the Matson Creek road in 1991. Hilker hopes to raise funds for a proper mining plan.

1991 PLACER GEOLOGICAL SURVEY
COMPILATION PLACER REPORT
SIXTYMILE GOLD DISTRICT, YUKON TERRITORY
NORTH LADUE RIVER AREA



NORTH LADUE RIVER TRIBUTARY
SODA CREEK

LAT. 60°30' N/LONG. 140°50' W
SODA 1-40 P34634-673 CLAIMS
DAWSON MINING DISTRICT, Y.T.
N.T.S. SHEETS 115-N-7/115-N-10

for

R.G.HILKER/CALGARY, ALBERTA
ASSESSMENT WORK REPORT
29 NOV. 1990/29 NOV. 1991

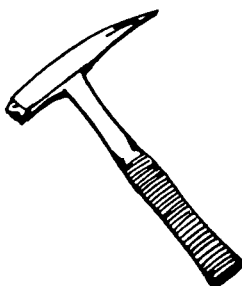
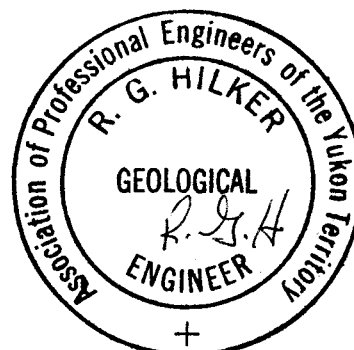
by

R.G.HILKER, P.ENG.
TRON DUIK CONSULTANTS LTD.
CALGARY, ALBERTA
EFFECTIVE DATE
NOVEMBER 29, 1991

"CONFIDENTIAL REPORT"
DAWSON MINING DISTRICT

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... report has been examined by
the Geological Evaluation Unit under
Section 41 Yukon Placer Mining Act
and is recommended as allowable
representation work in the amount
of \$ 8,00.00

Robert Dekker

for

Chief Geologist, Exploration and
Geological Services Division, Northern
Affairs Program for Commissioner of
Yukon Territory



1991 PLACER GEOLOGICAL SURVEY
COMPILATION PLACER REPORT
SIXTYMILE GOLD DISTRICT, YUKON TERRITORY
NORTH LADUE RIVER AREA

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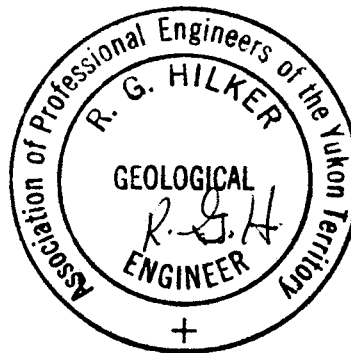
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"SYNOPSIS GOLD PLACERS"
NORTH LADUE RIVER DISTRICT
GEMINI-SPUD-SODA CREEKS



R.G.Hilker, P.Eng.
March 31, 1992
Calgary, Alberta

PLACER PROPERTY DESCRIPTION

The North Ladue River property is located in the historic Sixtymile Gold District, approximately 60 miles southwest of Dawson City, Yukon Territory. The property consists of three Yukon placer claim groups: GEM 1-30 comprising 30 placer claims numbered P34674 through P34703 inclusive covering Gemini Creek; SODA 1-40 comprising 40 placer claims numbered P34634 through P34673 inclusive covering Soda Creek; and SPUD 1-40 comprising 40 placer claims numbered P34728 through P34767 inclusive covering Spud Creek. Gemini, Soda and Spud creeks are located at approximately Latitude 63°16'N and Longitude 140°35'W, plotted on NTS Sheets 115-N-7/10 and are within the Dawson Mining District - Yukon.

PLACER HISTORY NORTH LADUE RIVER

Placer gold was discovered in the Sixtymile Gold District in 1892 and up until the discovery of the rich placer deposits of the Klondike in 1896 the Sixtymile Gold District was the most significant placer gold producing district in the Yukon. The total placer gold production for the district from 1892 to 1965 is reported to be 234,314 ounces.

The location of the North Ladue River property is geologically and geographically significant in that the Gemini, Soda and Spud Creeks drain the west side of the watershed which is drained to the east by Matson Creek, a historic placer tributary of the Sixtymile River. Placer gold was discovered near the headwaters of Matson Creek in 1911 and the upper reaches were intermittently worked until 1946. In 1978 Goldmark Minerals established a placer operation on Matson Creek recovering 6,900 ounces of fine gold from 317,100 cy of material processed until it ceased operation in 1985 because of thick overburden and the inability to trace pay gravels. In 1981 Golden Grizzly Placers initiated a placer exploration program to test the placer potential of the western watershed along the North Ladue River and ten tributaries including Gemini, Soda and Spud creeks which drain the western slope of the Matson Creek watershed. The program included bulldozer trenching and the drilling of 91 holes totalling 96 feet on Gemini Creek and three holes totalling 137 feet on Soda Creek and twenty holes totalling 789 feet on Spud Creek. The drill cuttings were processed in a small sluice box, the concentrates panned and the gold grains (referred to as "colors") counted. All of the holes drilled on Gemini, Soda and Spud creeks returned placer gold in the concentrate. The amounts varied from several small specks up to 50 colors in concentrate representing samples ranging from 6 ft. up to 31.5 ft. in thickness. The drilling conducted on Gemini, Soda and Spud creeks indicated potential economic payzones within the Klondike gravels.

The North Ladue River and upper Matson Creek drainage system and tributaries are all situated in Klondike Schist bedrock. The Klondike Gold District is underlaid by Klondike Schist rock types. Gemini-Soda and Spud creeks contain Klondike Schist gravels that are similar to the pay gravels within the drainage system in the Klondike Gold District.

SIXTYMILE/NORTH LADUE RIVER GOLD DISTRICT

The Sixtymile gold district is situated east of the Alaska-Yukon boundary. The area is bounded on the north by the divide between the Sixtymile and Forty Mile drainage system; on the east by the Sixtymile and Yukon Rivers; on the south by the White and Ladue Rivers, and on the west by the Alaska boundary. The general Sixtymile district that is referred to by the writer in this report encompasses an area of approximately 1,900 square miles. The area described is roughly 64 miles long between Moose Creek at the north limit and the Ladue River at the south end. The region is approximately 32 miles wide between the Alaska-Yukon boundary and east to the Sixtymile and Yukon Rivers. The Klondike gold district is within an area of approximately 800 square miles and is located about 48 miles east of Glacier Site.

LOCATION - ACCESS

The site of Glacier is accessible by vehicle from Dawson City via the Sixtymile Highway and by a secondary road to Glacier Creek. The road system is approximately 65 miles in length from Dawson City to Glacier Creek on the Sixtymile River. In 1990 a truck road has been constructed south of Bedrock Creek and the Sixtymile River to the headwaters of the right fork of the North Ladue River. During the summer field season of 1991 a new road was built from the right fork of the North Ladue River to Upper Matson Creek and Bow Pup. Two placer mining operators have taken a "lay" on placer ground located upstream from the confluence of Pine Creek and the headwaters of Upper Matson Creek. The Matson Creek placer operations have been dormant from 1985-1991 and large scale operations are expected to commence in 1992.

A tractor tote trail was constructed in 1981 from the Matson airstrip and campsite area to Gemini airstrip. The road is approximately 10 miles in length and is suitable for travel by a Honda ATV (TRX350 4 x 4) Fourtrax machine. The total distance from the Gemini airstrip-Matson campsite-1991 road to right-fork of the North Ladue River and to Bedrock Creek is 75 miles and requires 10 hours travel time by a Honda Fourtrax.

The GEMINI AIRSTRIP is located on an east-west ridge south of Gemini Creek, a distance of 65 airmiles from Dawson City. Within the North Ladue River tributary area, two airstrips are located on ridges adjacent to Cassidy and Gemini creeks. The Matson airstrip is located on the right-limit eight miles above the confluence of Marion and Matson Creeks, a distance of 60 miles from Dawson City.

Yukon Territorial Water Board: Gemini, Soda and Spud Creeks are "non-designated" creeks for placer mining purposes and require "classification". Matson Creek has been classified as a "Class-4" creek during 1991. A Yukon Water Use License is required for placer mining purposes on the Gemini, Soda and Spud tributary creeks. In early March 1992 applications have been filed to the government regulatory departments for creek classification and when issued application for a Water Use License.

MATSON CREEK GLORY-HOLE DEPOSIT

The richest placer gravels discovered to date occurred within an ancient bend of Upper-Matson Creek and the mouth of Bow Pup. The gold "glory hole" was discovered by R.G. Hilker in October 1978. Previous operators mined from the glory-hole in 1978-1979 and 1980 and produced 4,615 ounces of 885 fineness gold or 4,085 fine ounces from 73,000 cy sluiced. The weighted average value of the "glory-hole" bedrock gravels was \$24.35 cy, the calculation based on a gold price of Cdn. \$435 oz. During eight summer field seasons 1978-1985 the previous operators sluiced 317,000 cy of gravels that contained a weighted average value of \$8.29 cy. Therefore, previous Upper-Matson Creek operations have proven that high grade rich pockets or "glory-holes" occur in select areas of creek gravels. The upper benches or terraces contain spotty low grade paystreak gravels.

- GLORY-HOLE (wt.ave.) grade 0.056 oz cy - 0.783 gms cy - value \$24.35 cy
- PRODUCTION 1978-1985 (wt.ave.) grade 0.019 oz cy - 0.266 gms cy - value \$8.29 cy
- KLONDIKE AVE. grade 0.012 oz cy - 0.168 gms cy - value \$5.22 cy (\$435)

PLACER ECONOMICS TRIBUTARY CREEKS

The North Ladue River valley and ten tributary creeks were placer drilled September 7-November 5, 1981. Exploration drilling was conducted to collect the maximum amount of basic placer data within the drainage system. The drill program included two holes on Gemini Creek (96 ft), three holes on Soda Creek (137 ft) and twenty holes on Spud Creek (789 ft). R.G.Hilker, Placer Engineer, supervised the placer property acquisition in the North Ladue River area 1980 and the placer drill program in 1981. The writer was based in the Nodwell camp as drilling and exploration progressed during August-September-October-November 10, 1981. The drill cuttings were processed by strict placer methods and documented with care. The two drill holes located on Gemini Creek indicated a possible glory-hole deposit.

R.G.Hilker, P.Eng., recommends that future exploration on Gemini, Soda and Spud creeks be concentrated in areas favorable for "glory-hole" type of placer gold deposits. The glory-hole area will be small in size, perhaps 1,000 feet x 100 feet or 100,000 bedrock feet of payzone. The Klondike Schist bedrock will be overlaid by an average of 11 feet of black muck, 15-25 feet of waste gravels and 2-10 feet of gravel/bedrock payzone. The high grade deposit area could probably contain 15,000 cy of payzone material with an inferred value of \$22.00 - \$84.00/cy and possibly contain 7,000-8,000 ounces of recoverable gold.

Gemini drill hole G81-1 indicated in a 10 feet sample-inferred grade 0.051 oz cy and value of \$22.30 cy. Gemini drill hole G81-2 indicated a 6 feet (above bedrock) sample, inferred grade 0.195 oz cy and value of \$84.60 cy. The two Gemini drill holes were spaced 150 feet apart and suggest a payzone 100 feet wide (the reader is referred to the Gemini Placer Cross-Section Figure-1).

Private sophisticated investors funded Golden Grizzly Placers Ltd and the 1981 exploration and drill program costs were reported to be \$1.3 million. The economy downturned in late 1981 and the investors rescinded from any further financing of the North Ladue River project, consequently the project concept collapsed and by October 15, 1982 all 1744 Yukon Placer claims lapsed. The North Ladue River valley is located in an isolated area, however with the 1991 road into Upper-Matson Creek the access to the Gemini airstrip is excellent.

GEMINI PLACER POTENTIAL/GOLD CONTENT

Gemini Creek (Lat. 63°31'N-Long 140°50'W), a left-limit tributary of the North Ladue River, located on NTS Sheet 115-N-10, Dawson Mining District, Y.T. Yukon Placer Claims Gem 1-30, P34674-703. Drill line with holes G81-1 and G81-2 located on Gem-10 claim potential "glory-hole". (Refer to Gemini Placer Cross-Section Figure-1)

POTENTIAL GLORY-HOLE

Potential Inferred Grade Payzone:

Bedrock payzone gravels (6 ft) inferred grade 0.195 oz cy and inferred value \$84.60 cy.

Bedrock payzone gravels (10 ft) inferred grade 0.051 oz cy and inferred value \$22.30 cy.

Payzone based on drill line holes G81-1 and G81-2 spaced 150 feet apart and suggests a 100 feet wide payzone located on Gem #10 claim.

Weighted Average Inferred Grade Payzone (8 ft) 0.105 oz cy and Inferred Value of \$45.65.

Inferred Grade Surface/Bedrock:

Gemini Creek surface to bedrock material averages (41 ft); includes black muck (8.5 ft), waste gravels (24.5 ft) and payzone gravels (8 ft).

Weighted Average Inferred Grade 0.022 oz cy and Inferred Value \$9.57 cy.

The seasonal time period for exploration and sluicing on a placer operation in the North Ladue area is from May 20th to October 10th. This time period can vary, it depends on the yearly seasonal fluctuations. All main creeks in the North Ladue area appear to contain an abundant supply of water.

SODA PLACER POTENTIAL/GOLD CONTENT

Soda Creek (Lat 60°30'N-Long 140°50'W) a left-limit tributary of the North Ladue River, located on NTS Sheet 115-N-7/10, Dawson Mining District, Y.T. Yukon Placer Claims Soda 1-40, P34634-673. Drill line with holes S81-1, S81-2, & S81-3 located on Soda 13 claim (Refer to Soda Placer Cross-Section).

Potential Placer Inferred Grade (100 ft) Payzone:

Bedrock payzone gravels (14 ft) inferred grade 0.025 oz cy and inferred value \$10.90 cy.

Upper gold content payzone gravels (32 ft) inferred grade 0.003 oz cy and inferred value \$4.30 cy.

Weighted Average Inferred Grade Payzone Gravels (46 ft) 0.01 oz cy and Inferred Value \$4.35 cy.

Gold content gravels inferred grades were based on drill hole S81-3 and a 100 feet wide payzone. The writer notes that closer spaced drilling adjacent to hole S81-1 may possibly indicate a different payzone configuration. Further drilling below the confluence of Anne Pup on Soda Creek is recommended.

Potential Placer Inferred Grade (300 ft) Payzone:

Soda Creek surface to bedrock material delineated in drill holes S81-1, S81-2 and S81-3 averages (41 ft); includes black muck (8.5 ft), waste gravels (4 ft) and gold content gravels (32 ft). The three drill holes drilling depth documented on the geology logged drill reports includes bedrock penetration up to 6 feet.

Soda Creek Weighted Average Inferred Grade Gold Content and Payzone Gravels (41 ft) 0.007 oz cy and Inferred Value \$3.04 cy.

The writer notes that Soda Creek possibly includes higher grade gold content values upstream to Roxy Pup and downstream of Anne Pup.

SPUD PLACER POTENTIAL/GOLD CONTENT

Spud Creek (Lat 63°30'N-Long 140°50'W) a left-limit tributary of the North Ladue River, located on NTS Sheet 115-N-7, Dawson Mining District, Y.T. Yukon Placer claims Spud 1-40, P34728-767. Drill line with holes Sp81-1, SP81-2 and SP81-3 located on Spud #11 claim (Refer to Spud Placer Cross-Section Figure-1).

Potential Placer Inferred Grade: (100 feet payzone)

Upper gold content payzone gravels (24 feet) inferred grade 0.028 oz cy and inferred value \$12.25 cy.

Gold content gravels inferred grade were based on drill hole SP81-1 and a 100 feet wide payzone. The payzone gravels identified overlay 8 feet of waste gravels above bedrock. Refer to Spud Placer Figure-1.

Weighted Average Gold Content

Spud Creek weighted averaged inferred grade gold content of surface to bedrock material: Inferred Grade 0.007 oz cy and value \$3.04 cy.

ECONOMIC COMPARISON GOLD VALUES

An economic comparison of inferred grade, gold values and cost to produce an ounce of fine gold is based on a mining cost of \$6.50 cy and gold price of Cdn \$435.00 ounce.

KLONDIKE AVERAGE: 0.012 OZ.CY. - \$5.22 CY - \$486.00 OZ

MATSON PRODUCTION: 0.019 OZ.CY. - \$8.29 CY - \$342.00 OZ

MATSON GLORY-HOLE: 0.056 OZ CY - \$24.35 CY (\$116.00) OZ

GEMINI WT. AVE. PAY: 0.105 OZ CY - \$45.65 CY - \$62.00 OZ

GEMINI AVERAGE: 0.022 OZ CY - \$9.57 CY - \$295.00 OZ

SODA PAYZONE: 0.025 OZ CY - \$10.90 CY (\$260.00) OZ

SODA AVERAGE: 0.007 OZ CY - \$3.04 CY - (\$928.00) OZ

SPUD PAYZONE: 0.028 OZ CY - \$12.25 CY - (\$231.00) OZ

SPUD AVERAGE: 0.007 OZ CY - \$3.04 CY (\$928.00) OZ

ECONOMIC COMPARISON GOLD GRADE/VALUE

Variable Gold Price/Gold Grades-Value CY

Klondike District/Matson-Gemini-Soda-Spud Creeks

<u>CDN. PRICE</u> <u>GOLD</u>	<u>KLONDIKE</u> <u>0.012 oz cy</u>	<u>MATSON</u> <u>0.019 oz cy</u>	<u>GEMINI</u> <u>0.104 oz cy</u>	<u>S O D A</u> <u>0.025 oz cy</u>	<u>S P U D</u> <u>0.028 oz cy</u>
\$390.00 oz	\$4.68 cy	\$7.41 cy	\$40.56 cy	\$9.75 cy	\$10.92 cy
\$400.00 oz	\$4.80 cy	\$7.60 cy	\$41.60 cy	\$10.00 cy	\$11.20 cy
\$410.00 oz	\$4.92 cy	\$7.79 cy	\$42.64 cy	\$10.25 cy	\$11.48 cy
\$420.00 oz	\$5.04 cy	\$7.98 cy	\$43.68 cy	\$10.50 cy	\$11.76 cy
\$430.00 oz	\$5.16 cy	\$8.17 cy	\$44.72 cy	\$10.75 cy	\$12.04 cy
\$440.00 oz	\$5.28 cy	\$8.36 cy	\$45.76 cy	\$11.00 cy	\$12.32 cy
\$450.00 oz	\$5.40 cy	\$8.55 cy	\$46.80 cy	\$11.25 cy	\$12.60 cy
\$475.00 oz	\$5.70 cy	\$9.02 cy	\$49.40 cy	\$11.87 cy	\$13.30 cy
\$500.00 oz	\$6.00 cy	\$9.50 cy	\$52.00 cy	\$12.50 cy	\$14.00 cy

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- 1) Canadian Price gold determined by the London close fix and the Cdn/US exchange rate.
- 2) Klondike Gold District: Total placer material grade of 0.012 oz cy based on district average.
- 3) Matson Creek: Weighted average gold grade 0.019 oz cy based on production figures 1978-1985, determined by R.G.Hilker, P.Eng., December 14, 1985, Lode Resources Corporation report. Values and grade calculated on Matson Creek is based on \$435 oz and to fine ounces by 885 fineness factor.
- 4) Gemini Creek: Weighted average 0.104 oz cy "inferred gold grade" calculated to fine ounces by 885 fineness factor. Calculations of 100-150 ft. wide payzone based on two drill holes G81-1 and G81-2 drilled September 22, 1981 on the Gemini #10 or Gem #10 Yukon Placer Claim. Refer to Cross-section, Gemini Placer Figure-1.

- 5) Soda Creek: Payzone 14 feet thick "inferred grade" 0.025 oz cy calculated to fine ounces by 885 fineness factor. Calculations of payzone based on one drill hole S81-3 drilled September 23, 1981 and located on Soda #13 Yukon Placer Claim. The bedrock payzone is overlayed by Klondike gravels that included inferred gold values in drill hole S81-3 (32 ft-0.003 oz cy, value \$4.30 cy); drill hole S81-2 (26 ft-0.007 oz cy, value \$3.30 cy) and drill hole S81-1 (24 ft-0.009 oz cy, value \$3.80 cy). Inferred gold values for the three Soda drill holes are based on Cdn \$435 oz gold. Refer to Cross-Section Soda Placer Figure -1.

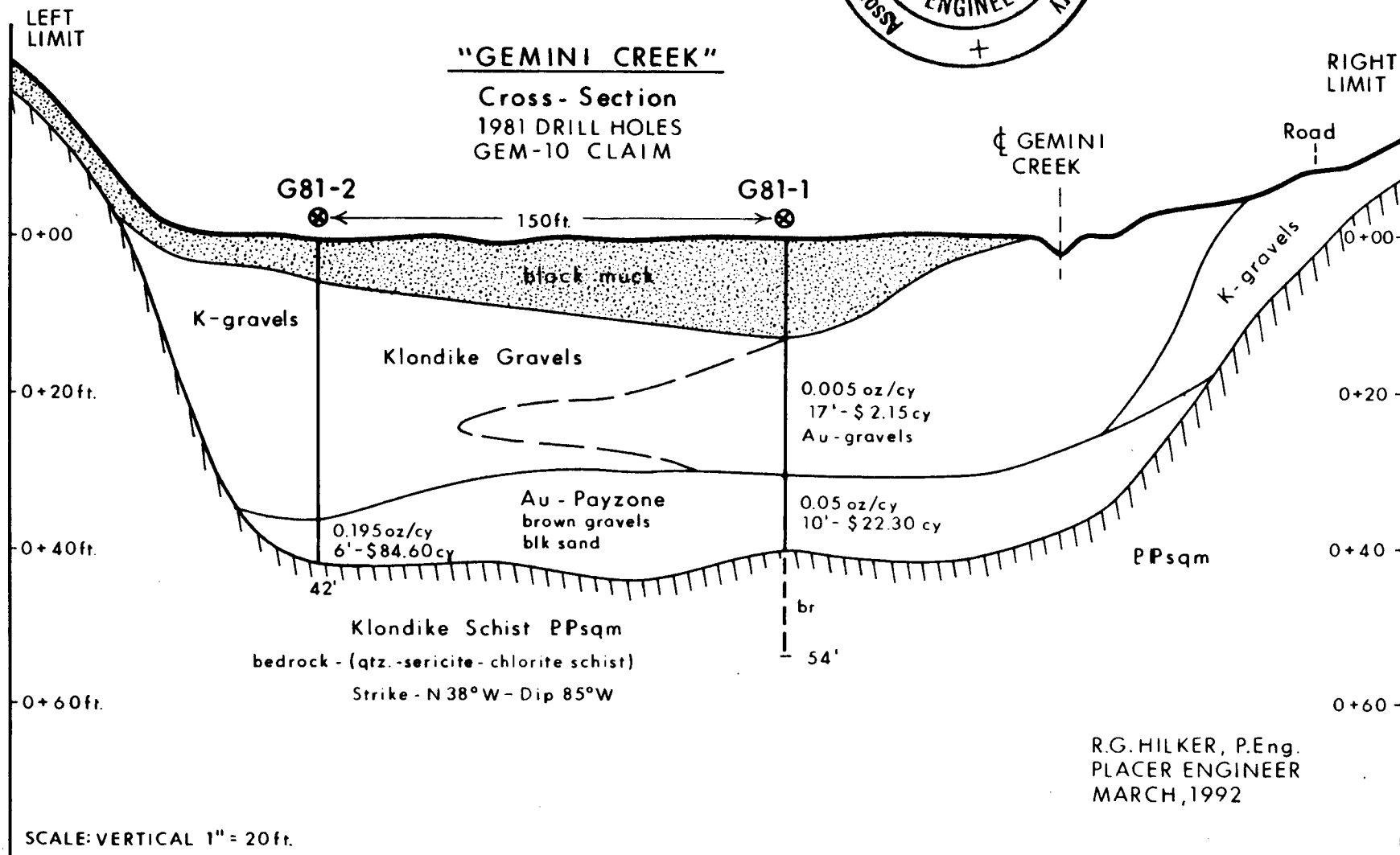
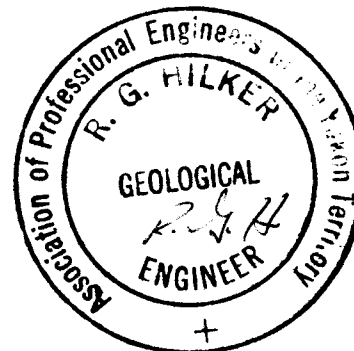
- 6) Spud Creek: Payzone 24 ft thick "inferred grade" 0.028 oz cy calculated to fine ounces by 885 fineness factor. Calculations of payzone based on one drill hole SP81-1 drilled September 30, 1981 and located on Spud #11 Yukon Placer Claim. Refer to Cross-Section Spud Placer Figure-1.

PLACER ECONOMICS/PRICE GOLD

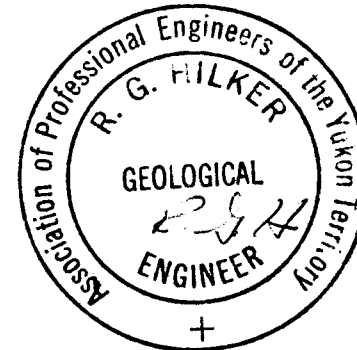
Average Value Klondike Placer Gravels

The average value of placer gravels per cubic yard volume varies with the price of gold. Therefore, the variable gold price has a direct influence on the economics of a placer operation. The Klondike Gold District average gold content is reported to be 0.012 fine ounces per cubic yard of material from surface into bedrock.

<u>Year</u>	<u>Cdn.Ave.Gold</u>	<u>Cdn.Value (0.012)</u>
1901-1935	\$20.67/oz.	\$0.25 cy
1935-1971	\$35.00/oz.	\$0.42 cy
1985	\$433.16/oz	\$5.20 cy
1986	\$507.16/oz.	\$6.09 cy
1987	\$594.26/oz.	\$7.13 cy
1988	\$537.96/oz.	\$6.45 cy
1989	\$451.94/oz.	\$5.42 cy
1990	\$447.66/oz.	\$5.37 cy
1991	\$413.00/oz.	\$4.96 cy
1992		
1993		
1994		
1995		

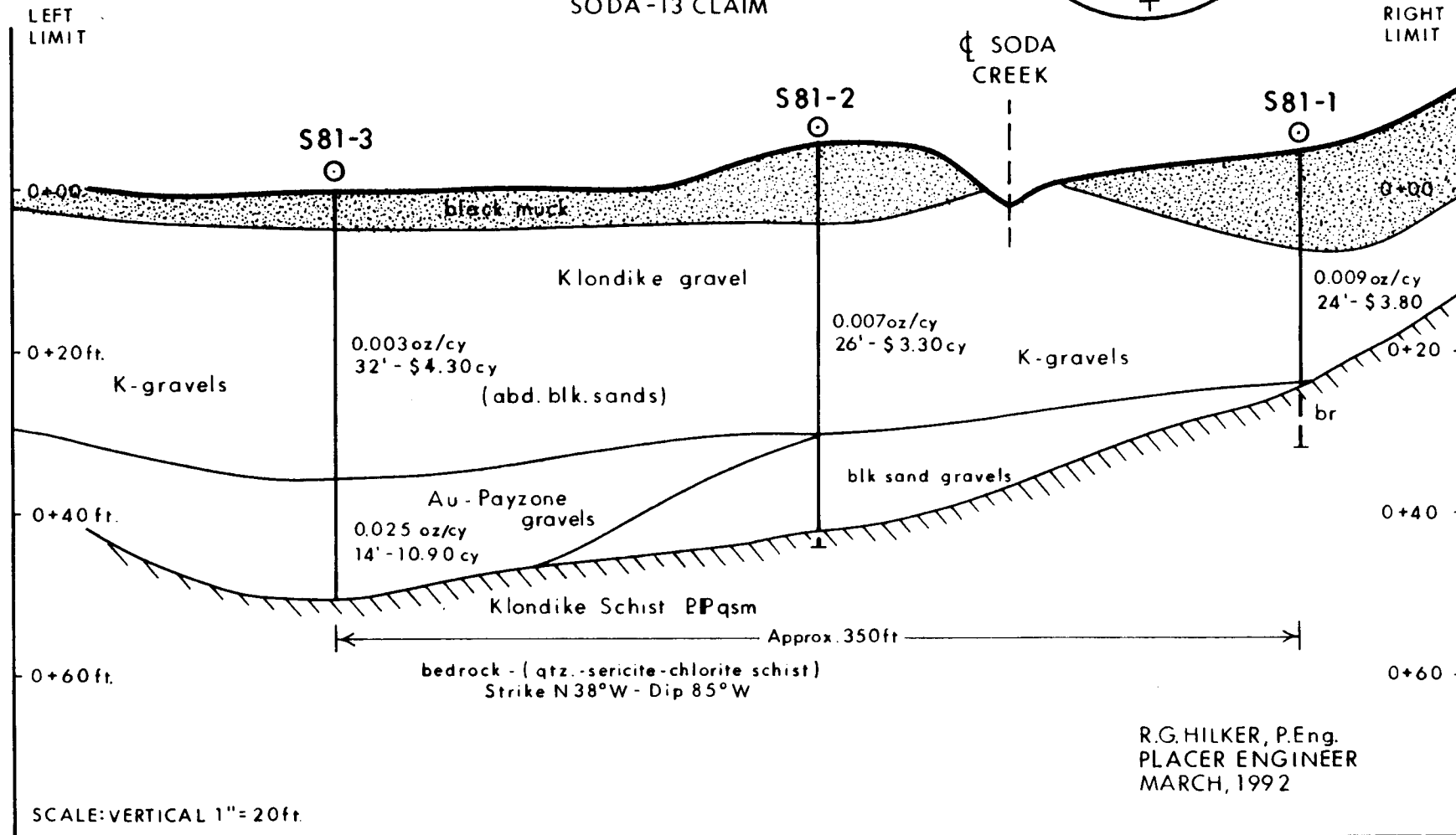


GEMINI PLACER FIGURE-1

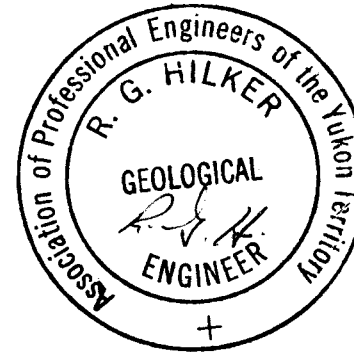


"SODA CREEK"

Cross Section
1981 DRILL HOLES
SODA-13 CLAIM

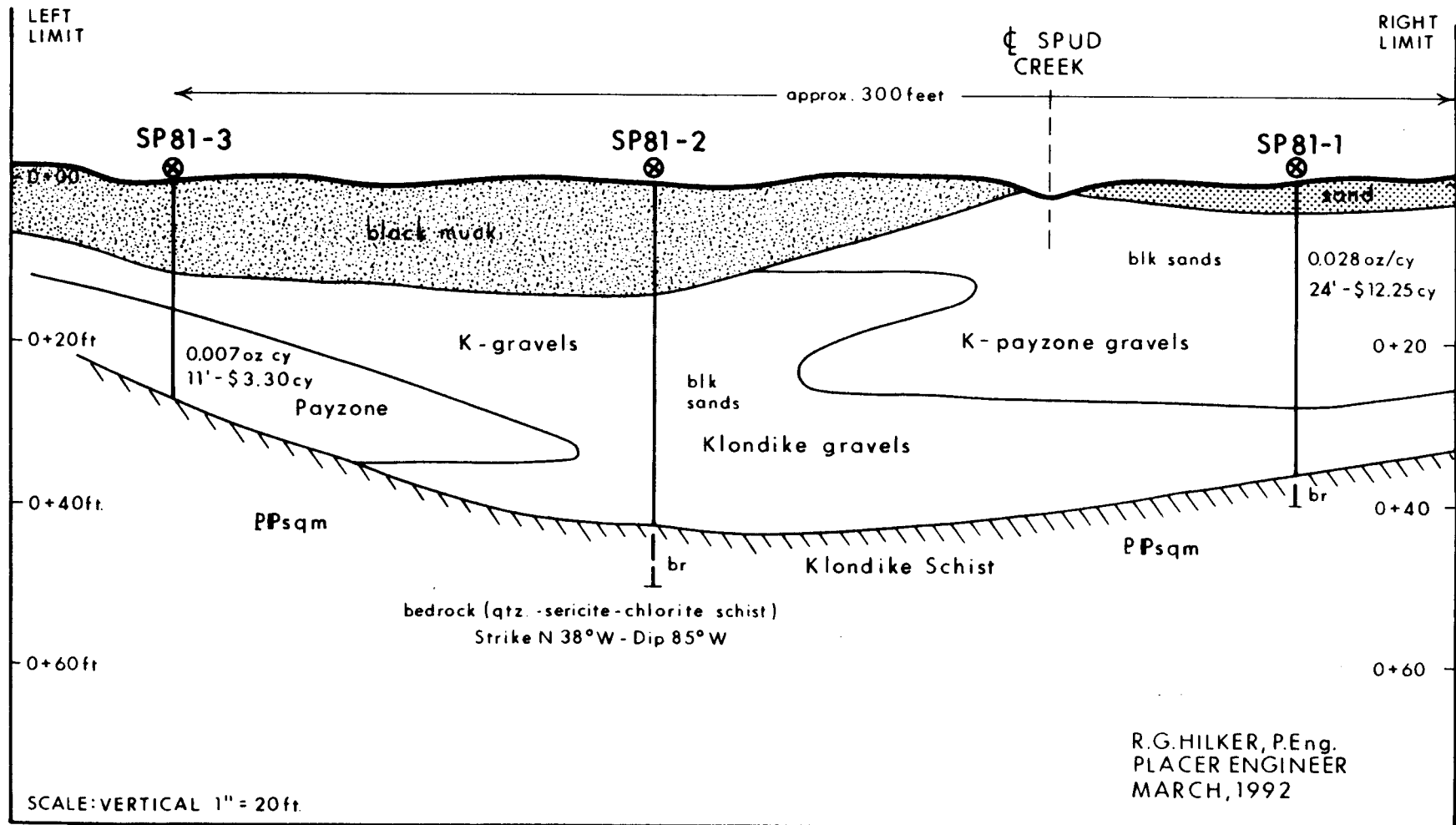


SODA PLACER FIGURE-1



"SPUD CREEK"

Cross-Section
1981 DRILL HOLES
SPUD-11 CLAIM



SPUD PLACER FIGURE-1

INTRODUCTION

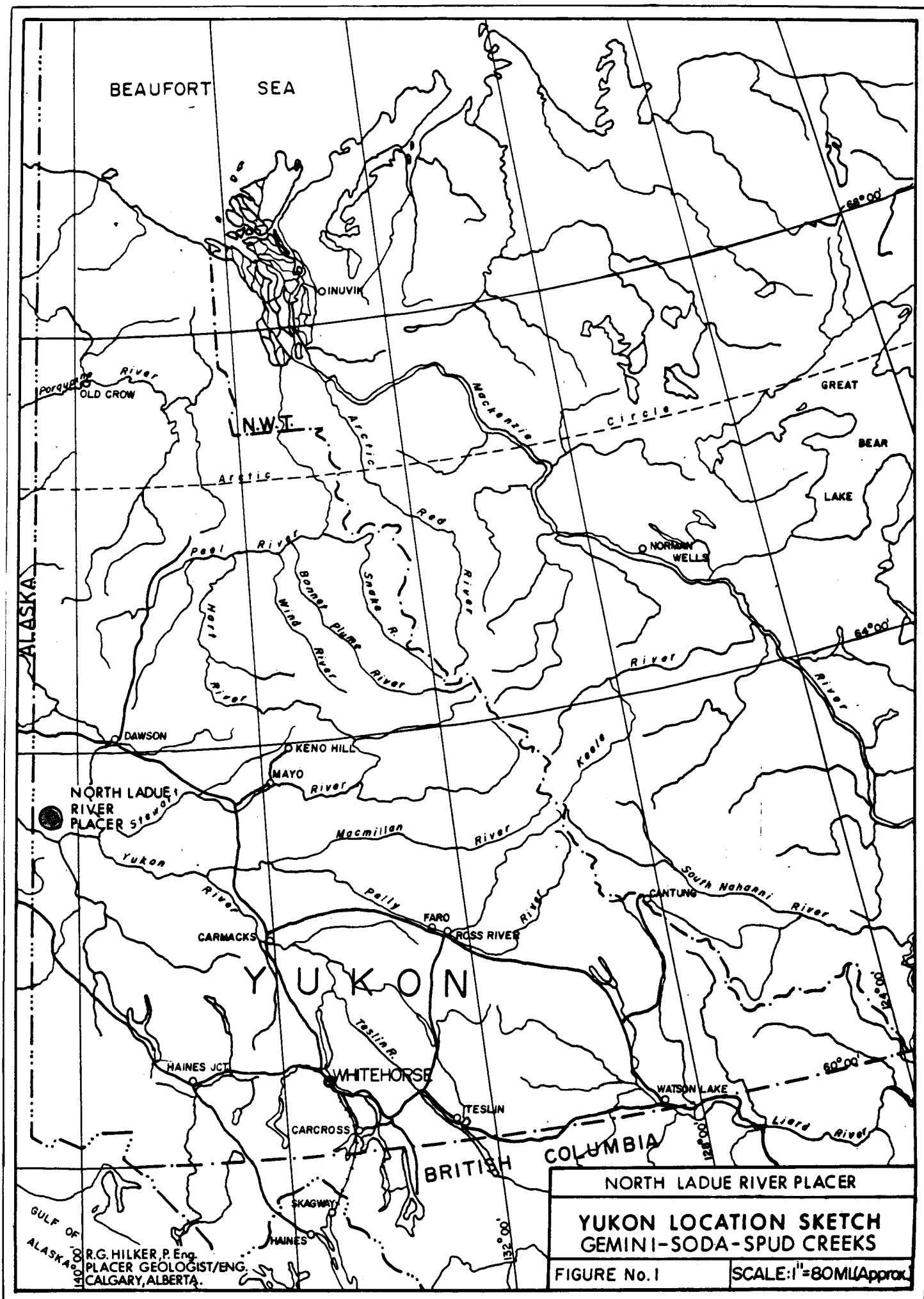
Sixtymile/North Ladue River Gold District

The Sixtymile district is situated east of the Coast Range and is within the Cordilleran Interior Plateau. The district is further described to be situated in the Western Yukon Plateau and locally forms a part of the Tertiary-aged Klondike Plateau. The topography was formed by uplifting of an undulated plain which formed a series of long branching ridges between intersecting streams and rivers. The topography of the area has an average elevation of 4,000 to 4,800 feet and forms the western part of the Quaternary age Dawson Range. The maximum relief of the Sixtymile, North Ladue and Ladue Rivers district is 4,000 feet. The North Ladue River and tributaries are within the southern section of the Sixtymile placer gold district. The North Ladue sub-parallel the Alaska-Yukon border along a 40 mile distance between the headwaters and confluence of the Ladue River. The North Ladue River is located 50-65 airmiles southwest of Dawson City, Yukon. The Sixtymile, North Ladue and Ladue Rivers district is non-glaciated and lies within the discontinuous zone of permafrost. The valleys are mainly U-shaped and are broad-floored; the stream system has clear water, indicating that they are not presently transporting material. There are approximately fifty "V-shaped" tributary creeks of variable size flowing into the North Ladue River from either the east or west valley ridges at approximately one mile intervals. The majority of these right/left limit tributaries originate in the "Klondike Schists", the most "favourable source for placer gold" in the region.

Discover Gemini-Soda-Spud Creeks 1981

The North Ladue River gold placer region extends over an area of approximately 360 square miles. The drainage system is roughly forty miles long, in a north-south direction and eight miles wide. The placer ground is located in the main valley gravels 90-110 feet deep and within 17 tributary creeks with gravels 30-40 feet thick. During the summer and fall of 1981, placer gold exploration was conducted on the North Ladue River and adjoining tributaries. The exploration programme consisted of tractor trenching in creek and bench gravels, and placer hammer drilling in the main valley and on 10 of the tributary creeks. The basic placer exploration was accomplished in the central section of the North Ladue River drainage system. The 1981 placer drilling indicated excellent placer gold gravels on three left-limit tributaries. Placer gold payzone areas were

identified by single drill lines located on Gemini, Soda and Spud creeks. The left-limit tributary creeks are located on the west side of a north-west bearing ridge that produces the drainage into the North Ladue River system. The Upper-Matson Creek placer gold gravels are located on the east side of a 10 mile long north-west ridge. The placer gold gravels, within the upper part of Matson creek, are situated about two miles east of the placer gold gravels within Gemini, Soda and Spud tributary creeks. The placer gold mode of occurrence on the North Ladue River left-limit tributary creeks possibly are relative to the placer gold on Upper-Matson Creek. The North Ladue River and Upper-Matson Creek drainage system is located within approximately 360 square miles of the Klondike Schist rock formation.



LOCATION AND ACCESS

General - Sixtymile Gold District/North Ladue River Area

The Sixtymile gold district is situated east of the Alaska-Yukon boundary between latitude 63°15'N to 64°10'N. The area is bounded on the north by the divide between the Sixtymile and Forty Mile drainage system; on the east by the Sixtymile and Yukon Rivers; on the south by the White and Ladue Rivers, and on the west by the Alaska boundary.

The general Sixtymile district that is referred to by the writer in this report encompasses an area of approximately 1,200 square miles. The area described is roughly 64 miles long between Moose Creek at the north limit and the Ladue River at the south end. The region is approximately 32 miles wide between the Alaska-Yukon boundary and east to the Sixtymile and Yukon Rivers. The Klondike gold district is within an area of approximately 800 square miles and is located about 48 miles east of Glacier Site.

The site of Glacier is accessible by vehicle from Dawson City via the Sixtymile Highway and by a secondary road to Glacier Creek. The road system is approximately 65 miles in length from Dawson City to Glacier Creek on the Sixtymile River. A tractor tote trail has been constructed south of Bedrock Creek and the Sixtymile River to the headwaters of the right fork of the North Ladue River. A tractor road is located downstream on the North Ladue River to Cassidy Creek and then upstream on Cassidy Creek to the divide with Matson Creek.

The distance from Dawson City to the Glacier airstrip is 48 airmiles; to the Matson airstrip 60 airmiles and to the North Ladue River 65 airmiles. The Glacier airstrip is located near the confluence of Big Gold Creek and the Sixtymile River. The Matson airstrip is located on the right limit approximately eight miles above the confluence of Marion and Matson Creeks. The Tenmile airstrip is located on the left limit of the Sixtymile River just below its confluence with Tenmile Creek. The North Ladue River airstrips are located on ridges south of Cassidy and Gemini Creeks.

Upper Matson Creek Road 1991

During the summer field season of 1991 a new road was built from the right fork of the North Ladue River to Upper Matson Creek and Bow Pup. Two placer mining operators have taken a "lay" on placer ground located upstream from the confluence of Pine Creek and the headwaters of Upper Matson Creek. The Matson Creek placer operations have been dormant from 1985-1991 and large scale operations are expected to commence in 1992.

Gemini Airstrip/Matson Creek Road

A tractor tote trail was constructed in 1981 from the Matson airstrip and campsite area to Gemini airstrip. The road is approximately 10 miles in length and is suitable for travel by a Honda ATV (TRX350 4 x 4) Fourtrax machine. The total distance from the Gemini airstrip-Matson campsite-1991 road to right-fork of the North Ladue River and to Bedrock Creek is 75 miles and requires 10 hours travel time by a Honda Fourtrax.

Gemini, Soda and Spud creeks are located at approximately Latitude 63°16'N and Longitude 140°35'W, plotted on NTS Sheets 115-N-7/10 and is within the Dawson Mining District-Yukon.

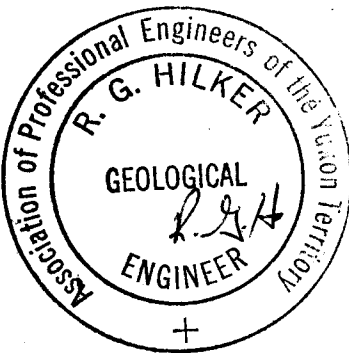
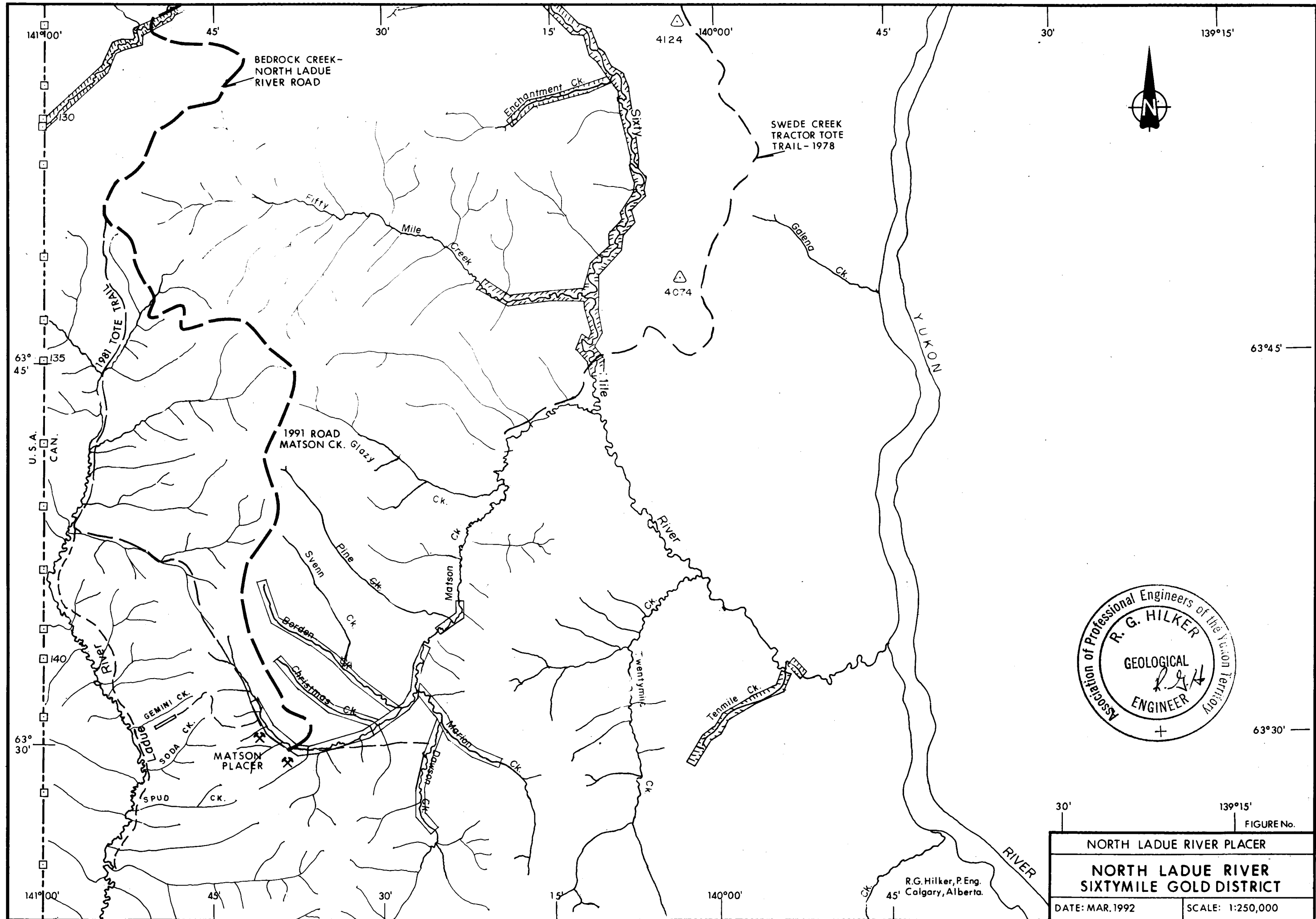


FIGURE No.	
NORTH LADUE RIVER PLACER	
NORTH LADUE RIVER SIXTYMILE GOLD DISTRICT	
DATE: MAR. 1992	SCALE: 1:250,000

R.G. Hilker, P. Eng.
45' Calgary, Alberta.

YUKON PLACER CLAIMS

The Yukon Placer claims are located on left-limit tributary creeks of the North Ladue River drainage system. The Gem 1-30, Soda 1-40 and Spud 1-40 Yukon Placer Claims are within the Dawson Mining District. The Gem 1-30 claims are located on Gemini Creek and are grouped under Grouping Certificate #DP01805, that was issued to Roxanne Hilker on May 22, 1991. The Soda 1-40 claims are located on Soda Creek and are grouped under Grouping Certificate #DP01803, that was issued to Robert G. Hilker on May 22, 1991. The Spud 1-40 claims are located on Soda Creek and are grouped under Grouping Certificate #DP01804, that was issued to Robert G. Hilker on May 22, 1991.

The North Ladue River valley has not been surveyed with a legal "baseline" to locate placer leases, placer claims or the location of tributary creeks. The Yukon Placer claims are therefore located as staked by Post #1 and Post #2 within the tributary drainage system. The placer property has not been legally surveyed and referenced to any government survey monuments located on the Yukon-Alaska Boundary. The "creek" or "river" surveyed baselines are used to accurately locate placer claims staked within a drainage valley. Surveyed "creek baselines" were located on the major creeks and benches, in the Klondike district, to establish where the "Discovery Claims" were staked and be a reference as to where placer claims were located "Above Discovery" - A/D or, "Below Discovery" - B/D. The Yukon Placer claims are recorded in the Dawson Mining District-Yukon Territory and plotted on NTS Sheets 115-N-7/10 (see Plan showing North Ladue River area Yukon Placer Claims). The claim groups are located at approximately Latitude 63°16'N and Longitude 140°35'W.

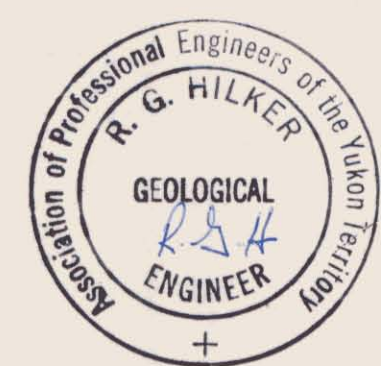
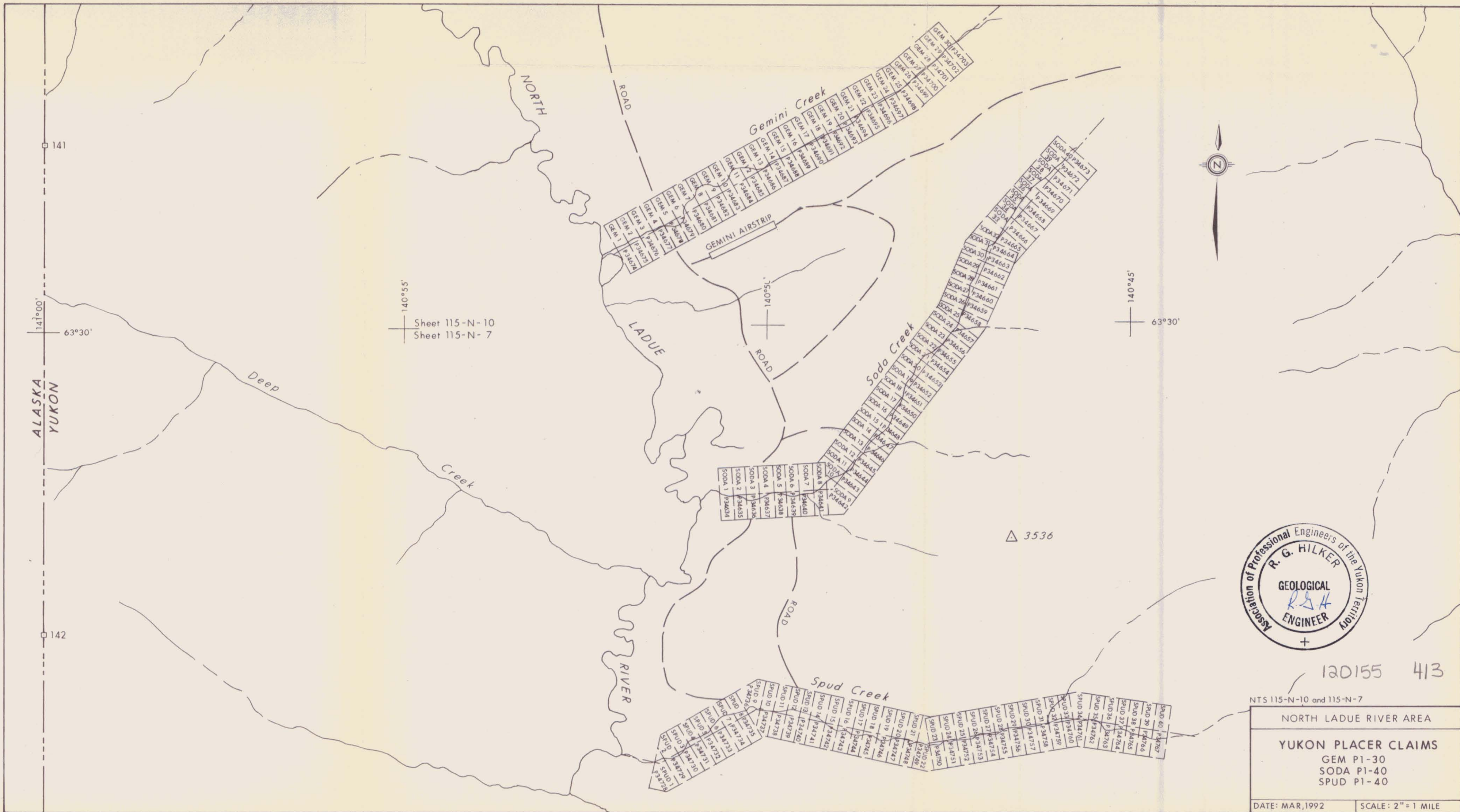
Yukon Placer Claims: Gemini/Soda/Spud Creeks

<u>Claim Name</u>	<u>Grant No.</u>	<u>Reg. Owner</u>	<u>Ann. Date</u>
Gemini			
Gem 1-30	P34674-703	Roxanne Hilker	29 Nov. 1992
Soda Creek			
Soda 1-40	P34634-673	R.G.Hilker	29 Nov. 1992
Spud Creek			
Spud 1-40	P34728-767	R.G.Hilker	29 Nov. 1992

x x x x x x x

YUKON TERRITORIAL WATER BOARD

Gemini, Soda and Spud Creeks are "non-designated creeks for placer mining purposes and require "Classification". Matson Creek has been classified as a "Class-4" creek during 1991. A Yukon Water Use License is required for placer mining purposes on the Gemini, Soda and Spud tributary creeks. In early March 1992 applications have been filed to the government regulatory departments for creek classification and when issued application for a Water Use License.



130155 413

NTS 115-N-10 and 115-N-7

NORTH LADUE RIVER AREA

YUKON PLACER CLAIMS

GEM P1-30
SODA P1-40
SPUD P1-40

DATE: MAR, 1992 SCALE: 2" = 1 MILE

HISTORY OF SIXTYMILE GOLD DISTRICT

The existence of gold on the Yukon River has been known since 1869 and the first gold prospectors entered the Yukon in 1878, according to Dawson, and in 1873 as reported by Goodrich. Sand-bar placer mining was carried out on the Big Salmon in 1881 and discoveries of gold-bearing bars on the Lewes, Pelly and Stewart Rivers soon followed. The Stewart River proved the most productive and in 1885 and 1886 was actively worked. The first discovery of coarse gold was made in 1886 on the Forty Mile River, however, the greatest part of the gold field was located in the Alaska Territory. Further discoveries extended the producing area to the drainage streams flowing into the Sixtymile River in the Yukon Territory. The Sixtymile River drainage system was the chief producer of placer gold until the discovery of the rich creeks in the Klondike district in 1896.

In 1892 the Forty Mile gold field was extended to tributaries of the Sixtymile River and Mr. C. Miller received credit for the discovery. Miller Creek flows into the Sixtymile River a few miles south of the old Glacier Creek Post Office Site.

The first organized mining on Miller Creek was conducted during the summer of 1892 and \$6,000.00 worth of gold was recovered. The approximate price of placer gold in 1892 was \$17.00 per ounce and refined gold was \$20.67 per ounce. Therefore, about 353 ounces of placer gold were recovered after the discovery claim was first recorded on Miller Creek. During the summer of 1892, gold discoveries were made on Glacier and Big Gold Creeks. The three creeks accounted for the main gold production in the Yukon until 1896 when interest was shifted from the Sixtymile area to the Klondike.

In the winter of 1912, a dredge was installed on Miller Creek by the Northern American Transportation and Trading Company. The dredge was steam-operated and of the Ridsen type, with an open bucket line and a bucket capacity of 5 1/3 cubic feet. In 1915 the dredge produced about 13,000 ounces and in 1916 about 8,900 ounces of gold. The dredge was closed down for over ten years, probably due to the First World War in 1914 - 1918, and was put back into operation by the Holbrook Dredging in 1929 through 1941.

In the Sixtymile District, R. G. McConnell has reported total gold production from 1893 - 1901 as \$500,000 or approximately 29,412 ounces. The total estimated production of the Sixtymile area, by W. E. Cockfield in 1917 was \$2,541,600 between 1892 and 1917, or approximately 149,506 ounces of gold. The reported value of gold does not include production from Matson Creek.

The Sixtymile Gold district placer crude gold has a reported fineness of 775,808, 810, 844, 847, 830, 860 and 890 fine and is representative of the district.

During the period 1929 to 1940, prospect drilling was conducted on the Sixtymile River and Miller Creek. Small sluicing operations were conducted by individual miners and reported on Miller, Glacier and Big Gold Creeks and on the Sixtymile River.

The Yukon Explorations Limited Company completed the building of a 3 1/2 cubic feet bucket line dredge in August of 1947. The dredge property was located near the confluence of Big Gold and Glacier Creeks and the valley of Sixtymile River and operated between 1947 and 1959. The dredge was operated under the name of Yukon Explorations Ltd. in 1947 and 1948 and produced about \$50,000 in gold and silver. The Yukon Placer Mining Company then operated the dredge from 1949 to 1961 and produced a total of \$2,536,430 gold and silver. At the end of the 1961 operation the Yukon Placer Mining Company closed down the dredge on the Sixtymile River property.

Since late 1940 and 1961 a number of companies and individual placer miners operated bulldozer-sluicing operations in the Sixtymile area of Miller, Glacier and Big Gold Creeks. From 1962 to 1972 very little mining activity was conducted in the area. The Sixtymile district has had increased mining activity since the increase in the price of gold in 1973. The total gold that has been reported mined in the Sixtymile Gold District 1892 - 1965 was 234,314 ounces.

The Sixtymile area and Moosehorn Range is currently very active in several parts of the region the following companies are conducting substantial placer mining operations:

- 1) Cogasa - the company worked on the Sixtymile River in the Glacier Creek area. The company is reported to be moving large quantities of gold-bearing gravels in a sluicing operation using D9-type crawler tractors and scraper-earth movers. Production in 1977 was reported to be 3,400 ounces of crude gold. The company has been reported to be inactive during the 1985 mining season.
- 2) Oakbay Manor Ten Mile Mining Ltd. - this company is very successfully producing raw gold on Tenmile Creek. The confluence of Tenmile Creek and the Yukon River is located on the right limit of the Yukon River, opposite the historical 1886 site of Ogilvie. The company reported 6,000 ounces of crude gold produced in 1977 and 5,000 ounces in 1981 on Tenmile Creek. The company is reported to continue mining operations from 1982 through 1985.
- 3) Claymore Resources - the company is placer mining on an unnamed creek which flows into Alaska, U.S.A. and is located on the eastern drainage system of the Moosehorn Range. The placer operation has been profitable during 1978, 1979 and 1980, however, no production figures are available. Mining operations have continued from 1981 to 1985.
- 4) Goldmark Minerals Ltd. - the company mined on the upper part of Matson Creek and produced 315 ounces in 1978, 2,100 ounces in 1979, 2,200 ounces in 1980 and 951 ounces in 1981. Mining operations have continued from 1982 to 1985, however the company ceased mining on Matson Creek at the end of the 1985 summer season.

The following data indicates values of the gold content in the Klondike, Sixtymile, Indian River and Stewart River Gold Fields and calculated fineness of the gold.

<u>GOLD FIELD/CREEK NAME</u>	<u>GOLD VALUE @ \$20.67</u>	<u>FINENESS</u>
<u>Sixtymile Gold Field:</u>		
Big Gold Creek	\$17.65	867
Glacier Creek	\$17.46 - 17.57	848 - 853
Matson Creek	\$15.02	776 - 875
Miller Creek	\$17.09	829
Sixtymile Creek	\$15.70	810 - 817
Ten Mile Creek	\$17.38	844
<u>Klondike Gold Field:</u>		
Bonanza Creek	\$16.12 - 16.97	781 - 823
Bear Creek	\$13.31 - 14.86	640 - 718
Dominion Creek	\$16.80 - 18.08	815 - 879
Eldorado Creek	\$13.08 - 16.18	627 - 784
Hunker Creek	\$15.50 - 16.90	750 - 820
<u>Indian River Gold Field:</u>		
Black Hills Creek	\$15.50 - 17.67	750 - 858
Eureka Creek	\$13.90 - 15.02	670 - 726 - 780
Henderson Creek	\$14.98 - 15.00	724 - 725 - 780
Montana Creek	\$15.91	770
<u>Scroggie Creek Gold Field:</u>		
Barker Creek	\$18.35 - 18.85	893 - 917
Mariposa Creek	\$18.60	905
Scroggie Creek	\$18.60 - 19.70	905 - 960

Note: Fineness calculated on values of gold recorded by G. Shaw and the value of gold at \$20.67 per ounce in 1916.

HISTORY OF MATSON CREEK

Matson Creek forms what is referred to as the South Fork of the Sixtymile River and contains a watershed comparable to the river above the forks. The headwaters of Matson Creek reach the divide near the North Fork of the North Ladue River and flow in a northeasterly direction to the Sixtymile River (see Plan #1 - Location). The creek is gently-sloping, within a wide valley, and is over 30 miles in length. The Discovery Claim was staked in 1911 and was therefore referred to as "being discovered in 1911". The Discovery Claim is situated towards the head of the Matson Creek and at the foot of Weide Gulch. Matson Creek rises from the confluence of the Sixtymile River to within 10 miles of the Alaska border.

Matson Creek and all its drainage tributaries were staked from end to end in 1911. Weide Gulch is located about 5 miles above the forks in Matson and Marion Creek.

Gold values were reported by W. E. Cockfield in 1917 to be \$0.18 and \$1.00 per square foot of both coarse and fine gold.

Placer claims located near Weide Gulch were worked by Mr. J. Matson who lived on the creek and placer-mined from about 1911 until 1946. The creek was named for Mr. Matson, who also had the distinction of having married the famous "Klondike Kate" of Dawson City fame. Mr. Matson died in 1946 and the sudden cause of his death is still shrouded in mystery, although there are numerous rumours as to the reason for his decease (John Matson 1863-1946).

Placer prospecting leases were staked on Matson Creek in 1951 and located about 5 miles upstream from the confluence of the Sixtymile River.

In recent years, Placer Prospecting Leases have been staked on Matson Creek. Mr. Gerry Malone, now deceased, started to build a tractor road from Bedrock Creek and the Sixtymile River to Matson Creek in 1975 and the summer of 1976. The road was never completed and is about 4 miles north of Matson Creek; however, the route of the road is not suitable for tractor-train travel.

In the summer of 1977 "Leases To Prospect" were staked on the entire length of Matson Creek and on tributaries to Matson Creek. The tributaries staked were; Marion and Dawson Creeks, Christmas - Borden - Pine and Svern - Glazy Creeks.

During the summer of 1978 a placer mining operation was established on upper Matson Creek. The discovery open cut produced 315 ounces of crude gold, in ten days of sluicing from 10,000 cubic yards of bench gravels. The placer mining operation was continued in 1979 through 1985 with gold production from upper Matson Creek.

PREVIOUS MINING OPERATION - 1978 TO 1985

Goldmark Minerals Ltd. - Calgary, Alberta mobilized placer mining equipment and camp trailers to Matson Creek in 1978. A 1,500 foot airstrip was constructed in 1978 to haul fuel and supplies to the upper part of Matson Creek. Tractor trenching discovered rich placer gravels near the mouth of Bow Pup and Matson Creek. During a ten-day period in early October 1978, 10,000 cubic yards of gravels were sluiced and 315 ounces of placer gold recovered. From the summer of 1978 through 1985, Goldmark continue summer sluicing operations and exploration programs on the upper part of Matson Creek. The writer has researched the Goldmark Minerals Ltd. Annual Reports for 1979-1980-1981-1982-1983-1984 and Interim Reports from 1983-1984 and 1985 and summarized the production and exploration data.

Note: All gold recovered that was reported by Goldmark is placer gold that is 885 fineness.

1979 ANNUAL REPORT

1) 1978 Production:

- a) Matson Project (Mark Claims) 10,000 yd.³ sluiced-recovered 315 ounces - actual value \$73,500 (gold price \$275 Cdn.) - gravel value \$7.35 yd.³.

2) 1979 Production:

- a) Matson Project (Mark Claims) 40,000 yd.³ sluiced - recovered 2,100 ounces - value \$790,000 (sold at gold price \$444 Cdn.) - gravel value \$19.75 yd.³.
- b) Matson Project (one rich pocket yielded approximately 1,565 ounces in 11,000 yd.³ - reported in 1979 Annual Report).
- c) Val d'Or Project (Gold Claims) 25,500 yd.³ sluiced in bench gravels (old Matson workings) - recovered 242 ounces - value \$108,000 (sold at gold price \$444 Cdn - reported in 1981 Annual Report) - gravel value \$4.24 yd.³.

1980 ANNUAL REPORT

1) 1980 Production:

- a) Matson Project (Mark Claims) 23,000 yd.³ sluiced - recovered 2,200 ounces - value \$1,308,000 (actual proceeds) - gravel value \$56.87 yd.³. (Reported that the paystreak was very rich, high clay content in gravels and low gravel production).
- b) The 1980 Annual Report was dated July 1981, placer drilling was mentioned. Winter core drilling (1981) has outlined 150,000 yd.³ of bench gravels for sluicing in 1981 (see Figure 5) - Matson Project.

- 1) c) Val d'Or Project (Gold Claims) 1,600 yd.³ test sluiced in bench gravels (near John Matson grave) - recovered 16 ounces - value \$16,900 (actual proceeds) - gravel value \$10.56 yd.³.

1981 ANNUAL REPORT

- 1) Drilling Matson Project - Bench Gravels:
(Quote from 1981 Annual Report)

An exhaustive drilling program on the extensive gravel bench or terrace areas where mining would be permitted yielded only one gold bearing deposit of approximately 250,000 cubic yards. Assays of the samples from the initial two drill lines across this bench area indicated fairly coarse gold particles (approximately 7 mg per particle) at concentrations yielding approximately \$13 per cubic yard.

Subsequent drilling confirmed larger numbers of gold particles which were assumed to average 3.5 mg per particle and, on the basis of these results, stripping of the overburden was undertaken. Assays of these samples, which were not available for some time, indicated very flat particles which averaged in most cases only 0.9 mg per particle, still indicated, despite falling gold prices, that gold sales would exceed costs. The originally estimated gold in place of 2912 ounces was revised downward to 1716 ounces.

The sluicing was accomplished in three stages. In the first stage, the calculated losses were 14% of the gold in place, but in the next two stages losses averaged 68%. This was despite several major modifications to the sluice box designed to catch the very fine, flat particles.

2) 1981 Production

- a) Matson Project (Mark Claims) 150,000 yd.³ of bench gravels sluiced - recovered 857 ounces - value \$420,000 (gold price \$446 Cdn.) - gravel value of \$2.80 yd.³; 94 oz. recovered from 1980 cut (951 oz.).
- b) 1981 bench gravel production (from information supplied to writer from D. Harvey Bichell - December, 1985 - paystreak variations from drilling results to production from three mining cuts).

Bench Cut #1 - average particle size 7 mg, calculated gold in gravels 576 ounces - recovered 495.435 ounces or 86% recovery.

Bench Cut #2 - average particle size one mg, calculated gold in gravels 688 ounces - recovered 224.823 ounces or 33% recovery.

Bench Cut #3 - average particle size 0.9 mg, calculated gold in gravels 442 ounces - recovered 136.305 ounces or 31% recovery.

Summary:

- Reported Calculated Reserve - 1,706 ounces
- Reported Recovered Gold - 856.56 ounces

3) Val D'Or Project Exploration

- a) Prior to breakup conditions in the spring of 1981 overburden stripping and settling ponds were started (in area Gold 19 and 20 Claims).
- b) 1981 drilling and sampling of valley floor (creek gravels) on Matson Creek indicate significant reserves profitable placer gravels (area of 1982 and 1983 cuts).
- c) Development and exploration operations were suspended when the Yukon Territorial Water Board denied Goldmark a Water Use Permit.

1982 ANNUAL REPORT

1) 1982 Production

- a) Val d'Or Project (Gold 19 and 20 Claims) 8,000 yd.³ of creek gravels sluiced - recovered 33 ounces (value recovered \$16,354.80 at gold price \$560 Cdn. - December 30/82 - R. G. Hilker files) - value gravels \$2.04 yd.³.

1983 ANNUAL REPORT

1) 1983 Placer Drill Program

- a) Matson Project (Mark Claims - Campsite Area)
 - third party \$50,000 drill program.
 - drill program totalled 2,785 feet core from 122 sample sites from creek gravels.
 - drill holes indicated approximately a depth to bedrock of 21 - 22 feet, muck overburden 10 - 12 feet thick and gravels about 10 feet thick.
 - area of approximately 1,800 feet X 300 feet was delineated between drill lines L-3 and L-B.
 - 189,000 yd.³ creek gravels drill proven to contain about \$10.00 U.S. (\$12.30 Cdn.) per cubic yard grade (D. H. Bickell personal communication Dec./85 - drilling to September or October, 1983).
- b) The 1983 Annual Report indicates the drill program delineated 250,000 yd.³ of proven profitable grade and 500,000 yd.³ of probable profitable grade (the approximate 1983 gold price was \$422 U.S. and Canadian dollar exchange \$1.23 or a gold price of \$515.50 Cdn. The August 31/83 price was \$511.14 Cdn. and December 30/83 price was \$475.35 Cdn. - R. G. Hilker files).

2) 1983 Production

- a) Val D'Or Project (Gold 19 and 20 Claims) 4,000 yd.³ of creek gravels sluiced - recovered 75 ounces - (value of \$34,185.70 at gold price of \$515.00 Cdn.) - gravel value \$8.55 yd.³.

1984 ANNUAL REPORT - (Interim Report June 30/84)

1) Matson Production

- a) Matson Project (Mark Claims) 55,000 yd.³ of gravels sluiced - recovered 992 ounces of gold - value (\$358,191.36 at Dec. 28/84 - price gold \$408.00 Cdn.) - gravel value \$6.51 yd.³.

2) 1984 Drilling Program

- a) 2,000 feet drill core from areas adjacent to 1984 mining cut and campsite area.

1985 INTERIM REPORTS - (June 30 and August 1985)

1) Matson Production

- a) Matson Project (1984 Mining Cut) 50 ounces of gold recovered from thawed gravels.

- 2) Matson Hydraulic Cut - 75 feet of overburden was hydrauliced that covered an untested gravel terrace. The gravels were tested and contained little or no gold, no gravels were sluiced.

3) Interim Report - November, 1985

Field operations on Matson Creek, consisting largely of the testing of terrace gravel deposits, commenced on April 7, 1985 and were terminated on August 5 of this year. Extensive sampling at a number of sites was accomplished using Goldmark's core drill and large bulldozers and by employing high powered water jets to thaw and remove thick overburden. Data from this program and from an exhaustive study of all other Klondike area placer deposits led Management to conclude that the gold content on Matson Creek is uniquely discontinuous and too deeply buried to be profitable at present prices.

SUMMARY PRODUCTION DATA - Matson Creek

<u>Year Production</u>	<u>Cubic Yards Sluiced</u>	<u>*Placer Gold Recovered</u>	<u>Grade Cubic Yard</u>	<u>**1985 Grade Cubic Yard</u>
1978	(M) 10,000 yd. ³	315 oz.	\$ 7.35 yd. ³	\$12.13 yd. ³
1979	(M) 40,000 yd. ³	2,100 oz.	\$19.75 yd. ³	\$20.21 yd. ³
	(V) 25,500 yd. ³	242 oz.	\$ 4.24 yd. ³	\$ 3.65 yd. ³
1980	(M) 23,000 yd. ³	2,200 oz.	\$56.87 yd. ³	\$36.82 yd. ³
	(V) 1,600 yd. ³	16 oz.	\$10.56 yd. ³	\$ 3.85 yd. ³
1981	(M) 150,000 yd. ³	857 oz. 94 oz.	\$ 2.80 yd. ³	\$ 2.20 yd. ³
1982	(V) 8,000 yd. ³	33 oz.	\$ 2.04 yd. ³	\$ 1.59 yd. ³
1983	(V) 4,000 yd. ³	75 oz.	\$ 8.55 yd. ³	\$ 7.22 yd. ³
1984	(M) 55,000 yd. ³	992 oz.	\$ 6.51 yd. ³	\$ 6.94 yd. ³
1985	(M) Unknown	50 oz.	(\$ 6.51 yd. ³)	(\$ 6.94 yd. ³)

(M) - Matson Project - Mark Claims

(V) - Val d'Or Project - Gold Claims

* - Placer gold is 885 fineness

** - 1985 price of gold determined in December/85 at \$318.00 U.S. and Canadian dollar exchange rate of \$1.37. The price of gold is set at \$435.00 for calculation purposes in this report.

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Weighted Average Values - Previous Production

1) *10,000 yd. ³	X \$12.13 yd. ³	= \$ 121,300
40,000 yd. ³	X \$20.21 yd. ³	= 808,400
25,500 yd. ³	X \$ 3.65 yd. ³	= 93,075
23,000 yd. ³	X \$36.82 yd. ³	= 846,860
1,600 yd. ³	X \$ 3.85 yd. ³	= 6,160
150,000 yd. ³	X \$ 2.20 yd. ³	= 330,000
8,000 yd. ³	X \$ 1.59 yd. ³	= 12,720
4,000 yd. ³	X \$ 7.22 yd. ³	= 28,880
<u>55,000 yd.³</u>	<u>X \$ 6.94 yd.³</u>	<u>= 381,700</u>
317,100 yd. ³		\$2,629,095

* The production figures used are compiled from the Summary Production Data Table - gold price is \$435/oz. Cdn.

2) Weighted average $\frac{\$2,629,095}{317,100 \text{ yd.}^3} = \underline{\$8.29 \text{ per cubic yard}}$

- or there is approximately $\frac{\$8.29 \text{ yd.}^3}{\$12.38 \text{ gms}} = 0.670 \text{ gms/yd.}^3$

- 3) During the time period of 1978 - 1985, or in eight summer field seasons, the previous operators sluiced approximately 317,100 yd.³ of gravels, that contained a weighted average of \$8.29/yd.³ gold values. There was gold produced in 1981 (94 oz.) and 1985 (50 oz.) with no gravel yardage documented.

Therefore, previous placer operators have indicated that gravel values have been approximately \$8.29 per cubic yard based on a gold price of \$435 Cdn.

The reader is cautioned that the writer has not conducted test work on the 411 Yukon Placer Claims to prove gravel potential or value of the property. It will be necessary to test-sluice and placer drill the property to fully evaluate for gravel reserves and grade.

The writer has been advised that the Goldmark Minerals Ltd. gold production reported in the Annual Reports was crude ounces. Matson Creek placer gold has been refined by the Canadian Mint and the fineness has been determined to average 885.

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Matson Creek Heavy Concentrate and Placer Gold

Heavy Concentrate:

The heavy concentrate recovered from Matson Creek contain heavy grains of various minerals, that have a dark colour, and accompany gold in alluvial deposits. The Matson heavy minerals consist mainly of magnetite and hematite and are associated with minor garnet, rutile and possibly ilmenite. The heavy concentrate consists of 50 - 60% magnetic minerals and 40 - 50% partial or non-magnetic minerals.

The writer estimates there is approximately 25 pounds of heavy concentrate per cubic yard of gravels, or about one ton of concentrate per 132 cubic yards of creek gravels.

Placer Gold:

The Matson Creek gold has an average fineness of 885, the fineness occurs to highs of 887 - 892. The main impurity in the 885 fineness gold is silver. The Matson gold varies in size, shape and weight; the coarse-medium gold to 20 mesh size tends to semi-rounded flat nuggets and ellipsoidal shaped, and the fine gold is flaky shaped. The following gold size classification describes the Matson Creek placer gold.

- a) Coarse Gold - gold particles that vary in size and weight, that are partially rounded to ellipsoidal in shape (ASTM Standard #4-6-8-10 mesh screens).
- b) Medium-Size Gold - gold of an approximate size that will pass through a 10-mesh screen and remain on a 20-mesh screen (ASTM Standard 12-14-16-18-20 mesh screens).
- c) Fine Gold - small gold particles which would pass through a 20-mesh screen but remain on a 40-mesh screen.
- d) Flaky Gold - very thin scale shaped or pieces of gold.
- e) Scaly Gold - gold particles that are small, rounded and flattened; when broken the scaly particles tend to have jagged edges; usually quite thin in proportion to their diameter.
- f) Micron-Size Gold - extremely small size gold that is 1,000 part of one millimeter or a particle of diameter between 0.01 and 0.0001 millimeter. Micron gold referred to in placer mining and recovery plants usually refers to one millimeter to a micron in size. A sluice box washing system does not recover fine to micron size gold and losses probably vary between 40 - 80% of the total gold content contained in placer gravels. The Matson placer gold recovered varies considerably in size, there is approximately 20 - 35% coarse and medium particles, and the remainder is fine to micron gold particles.

Gradient of Matson Creek and Tributaries

<u>Location</u>	<u>Feet Per Mile</u>	<u>% Gradient Creekbed</u>
1) Matson - Mark 1-41 and Gold 1-33 Claims	64 feet/mile	1.21%
2) Matson - Verle 1-53 Claims (Approx. 5 miles)	38 feet/mile	0.72%
3) Christmas Creek (Approx. 5 miles) Chris 1-53 Claims	97 feet/mile	1.83%
4) Borden Creek (Approx. 5 miles) Bord 1-53 Claims	89 feet/mile	1.68%
5) Marion Creek (Approx. 5 miles) Marion 1-53 Claims	40 feet/mile	0.76%
6) Dawson Creek (Approx. 5 miles) Daw 1-53 Claims	60 feet/mile	1.14%

Note: A "creek placer" contains gold bearing gravel deposits in the beds and intermediate flood plains of small streams. When a creek placer is mined an "open cut" is excavated in the stream gravels from the surface to bedrock. The water from the creek and drainage system seeps into the open cut in non-frozen or permafrost frozen gravels. Therefore, a "bedrock drain" trench is required to drain the water downstream from the open cut. The gradient of the creek and bedrock is a critical factor that effects the length of the bedrock drain to be excavated downstream. The gradient of bedrock and the overlying thickness of gravels and muck determines the length of the drain. The bedrock gradient should be approximately 55 - 110 feet per mile or 1.00 - 2.00%. The creek gravels and overburden muck is approximately 20 - 22 feet in depth.

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HISTORY - NORTH LADUE RIVER AREA

The following conclusions are quoted from G.S.C. Memoir 123, Sixtymile and Ladue River Area, Yukon, by W. E. Cockfield, 1921:

"Placer deposits occur along the various creeks named in this report, both in the creek gravels and in the bench gravels, but the producing area has been limited largely to Miller, Glacier and Big Gold Creeks and a short stretch of Sixty Mile River. Portions of the gravels still remain untouched, but the production has been steadily decreasing, and this decrease will continue unless energetic prospecting is undertaken. The geological conditions on Boucher, California and many other creeks are identical with those on Miller and Glacier Creeks and there is no apparent reason why the placer gold should be confined to those creeks already producing. With regard to the Ladue Valley, it may be said that none of the creeks has been thoroughly tried. The shafts that have been sunk are no test of such a great area. Float gold has been found at a number of points, but whether payable deposits occur can be told only by prospecting. The ground in the main valleys is deep, the thickness of the superficial deposits frequently exceeding 75 feet, but equally good returns may be obtained from the tributary valleys which are more easily worked.

Regions where the metamorphic rocks of the Yukon group have been invaded by later granitic, andesitic and basaltic rocks have proved good gold producers and should in this case prove favourable also, particularly as the region has not been glaciated."

SIXTYMILE AND LADUE RIVER AREA

The following conclusions are quoted from the Geological Survey Summary Report, 1917, Part B, page 8B (Sixtymile Gold District):

"It will be seen from the outline given above that much ground remains to be worked on the creeks which have already been discovered and known to contain gold, and that a small but steady production is expected for some years to come. The estimated production for 1917 is \$50,000. This estimate was very kindly furnished me by Mr. William Schofield, Mining Recorder at Glacier Creek. On the other hand, it does not seem reasonable to suppose that all the economic deposits of gold have been discovered or that the entire gold belt of the Sixtymile River has been prospected. There is no reason, in view of the geological conditions, why the gold belt should be confined to the creeks mentioned above and that the rest of Sixtymile and Ladue valleys, particularly as the region has not been glaciated. Float gold is known at several points in Ladue Valley and although, at the time of writing, no deposits of economic importance have been discovered, still it must be remembered that very little prospecting has been done there. The ground in the master valleys is deep and, consequently, the writer hopes to see the producing field much enlarged in the future. With regard to the creeks which are already producing, the production must come more and more from the bench gravels, as the creek gravels become exhausted."

EARLY PROSPECTING - NORTH LADUE RIVER AREA

During the staking of the prospecting leases in the fall of 1980, the following early prospecting on the North Ladue River was noted:

1. Basic exploration churn drilling was conducted on the North Ladue River during the summer of 1976. The churn drill used was a Kirk Hillman Airplane Drill, mounted on a pipe sled; it places a five-inch casing and has a 6.5" drive shoe. In an affidavit for assessment work on lapsed PL3658, four 5" diameter drill holes were sunk:

Hole #4: 102' deep
Hole #5: 100' deep
Hole #6: Approximately 100' deep
Hole #7: 71' deep

The churn drill holes were drilled on the North Ladue River and indicate deep gravels to bedrock in the area of lapsed PL3658 within the main valley floor; however, the main Ladue River Valley gravels could be dredged to bedrock.

2. Shafts and an old Procupine Boiler located about 20 miles upstream from the mouth of the North Ladue River.
3. Five old shafts and cabin on upper lease of Rice Creek.
4. All the tributary creeks to the North Ladue River contain typical Klondike Schist gravels which are very similar to gravels that occur on Upper Matson Creek and in the Klondike Gold Field creeks of Eldorado, Bonanza, Hunker, Quartz, Sulphur, etc.

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NORTH LADUE RIVER PROJECT 1981 PROGRAMME

General Description

During the spring, summer and fall of 1981, equipment was mobilized into the North Ladue River valley. The North Ladue River is located southwest of Dawson City, Yukon Territory, approximately 65 air miles, and is within N.T.S. Sheets 115-N-7, 10 and 15.

Access was from the Moosehorn Range on a 15-mile tractor road built to the confluence of the Ladue River and Rice Creek. A Land Use Permit was obtained for 45 miles of access from Mile 1222 of the Alaska Highway to the Moosehorn Range on a winter only tote trail. A D7G tractor, two large trailers, bunkhouse trailer on skids, small sluice box, miscellaneous equipment, welder, generator and fuel were mobilized from an airstrip in the Moosehorn Range to the North Ladue River valley in April and May. Twenty-five hundred gallons of diesel fuel and gasoline in 45-gallon barrels were trucked from Whitehorse to the Beaver Creek airstrip and flown from there in a Twin Islander aircraft to the Moosehorn airstrip - a distance of 45 miles. Considerable rotary blade (Bell 206B) helicopter support was provided from Dawson City to the Moosehorn Range to mobilize the equipment. The Ladue River was crossed with the equipment after a one-week wait for high water to recede because of the early spring break-up and run-off (April 1-May 15). The tractor trail proceeded upstream in the North Ladue River valley to Gemini Creek where the first suitable site for an airstrip was found. The Gemini airstrip was constructed on a ridge of dry gravels and is 2500' long; it provided fixed wing access to the North Ladue River valley - diesel fuel and supplies were flown in to supply the tractor camp (May 15-21). The tractor train proceeded further upstream in the North Ladue River valley to Cassidy Creek and a 2600' airstrip was constructed on a ridge. Land Use Permit was obtained for the access from the Moosehorn Range for the airstrips.

The D7G tractor was used for trenching in creek and bench gravels in the North Ladue River valley and on Cassidy Creek. Fuel and supplies were transported by a Beaver aircraft from Dawson City to the Cassidy and Gemini airstrips (June-July 15). A Nodwell tracked trailer camp was leased by Golden Grizzly Placers for use on the North Ladue River project. The camp, tracked vehicles and tanker were transported from Calgary to Dawson City and considerable work was done to prepare units for an isolated work area. The Nodwell units were very unique as the sides folded out to provide space for dinner and sleeping quarters. The camp consisted of: Nodwell 110 tracked vehicle, self-propelled cookhouse/diner, self-propelled wash-house/sleeper, tracked sleeper trailer, generator/shop tracked trailer, 2000

gallon tracked tanker trailer. The Nodwell camp was transported by truck-trailers from Dawson City to the Sixtymile River, a distance of 65 miles. A D6D tractor was leased to provide support for the camp and to do exploration trenching on the creeks. The D7G tractor built a tote trail from Cassidy Creek to the right fork of the North Ladue River and trail improvements on a tractor road over a 2500' ridge to Bedrock Creek and the Sixtymile River. The Nodwell camp and tractors were staged at All Gold Creek at Sixtymile and then were moved into the North Ladue River valley at the upper forks (July 15-August 1). The Nodwell camp was used as a base to do exploration trenching on the prospecting leases for the assessment work requirements necessary to keep the leases in good standing. The exploration trenching was continued on the upper part of the project, between Cassidy Creek and the forks of the North Ladue River area, and included approximately 65 miles of creek leases.

The following camp sites were established in the North Ladue River valley and near the mouth of tributary creeks:

- | | |
|--------------|---|
| Campsite #1 | Forks of North Ladue River
(July 28) |
| Campsite #2: | Butch Creek
(August 4) |
| Campsite #3: | Lila Creek
(August 30) |
| Campsite #4: | Apollo Creek
(September 28) |

Linecutting crews were set up in three two-man camps on the project area from August 2 to September 21. The crews were moved by Nodwell vehicles, tractors and by helicopter. Each camp was supplied with all the tools, equipment and SBX-11 radios to conduct the line-cutting and claim-post cutting necessary to convert a prospecting lease to a placer claim.

The Model 180 Hammer Drill mounted on a Bombardier Carrier was mobilized from Calgary, Alberta to Dawson City, September 2-7, by truck transport. The drill and Nodwell 110 Service Rig were trucked from Dawson to the Sixtymile by September 9 and the D7G and D6D tractors returned to the staging area at All Gold Creek to escort the drill and service rig into the North Ladue River valley. On September 14, the drill rig was at the Cassidy airstrip and, after a differential breakdown, the Bombardier Carrier and drill were hauled to the first

drill site at LAD 81-1 on the main North Ladue River valley and the first hole commenced drilling on September 17. Placer drilling was conducted in the North Ladue River valley and on 10 tributary creeks. A total of 3987 feet of drilling was completed in 90 holes. The drilling programme was seriously handicapped by extremely poor flying conditions from the Dawson City airport during the time period of September 25 through November 11. Difficulties were experienced flying diesel fuel, repair parts and general supplies. The Bombardier drill rig is very heavy and extreme caution was required when moving it to various locations, due to soft ground conditions in discontinuous permafrost terrain.

A Hughes 500C helicopter was chartered for the staking conversion October 1 through 18. Four stakers, one office assistant and the writer completed the staking and large quantity of recording forms by October 15. On October 15, 1744 placer claims were recorded at the Dawson Mining Recorder's Office in Dawson City.

A large 14 x 16' aluminum frame tent was erected at the Apollo campsite #4 in early October for thawing drill cutting samples. The drill cuttings were processed at the site with a long-tom sluice box and hand-panning heavy concentrates. The heavy concentrate samples and drill logs were processed by R.G.Hilker - Geological Engineer - by a standard geological procedure. All of the samples of heavy concentrates were placed in plastic containers with snap-on lids. Samples of bedrock rock fragments were collected when possible.

SUMMARY 1981 EXPLORATION

The mobilization of equipment, tracked camp and self-propelled hammer drill were very successfully used in the basic and initial exploration of the North Ladue River area for placer gold deposits. The intent of the 1981 programme was to conduct placer exploration on the prospecting leases for the necessary assessment work requirements; for converting leases to placer claims; and to discover the extent of gold on the tributaries of the major drainage system.

The exploration programme was achieved during the time-period April 1 through November 11, 1981:

April/May: Mobilization of D7G tractor to North Ladue River; Gemini airstrip (2500') and Cassidy airstrip (2600') were built.

June/July: Drilling on Rice Creek with a Kirk-Hillman 4" airplane placer drill. (Good gold indications in Hole R-2).

June/July/August: Tractor exploration trenching on upper one-third of North Ladue River property for assessment work requirements. Mobilization of D6D tractor and Nodwell tracked camp to north end of North Ladue River valley.

September 1-15: Mobilization of drill systems - diesel hammer drill mounted on a Bombardier Carrier to the north end of the North Ladue River valley.

September/October/November 5: Placer hammer drilling on the central section of the property from Deer Creek south to Hook Creek and the main North Ladue River valley.

October: Tractor exploration trenching on the south end of the property for assessment work requirements.

August/September/October 1-15: Line-cutting centre line for placer claims; cutting posts; measuring lines and marking posts by seven line-cutters in August and September. Conversion of leases to placer claims by four stakers (October 1-15) and all related staking forms, expenditure sheets and sketches submitted to the Dawson Mining Recorder's Office. A total of 1744 placer claims were recorded October 15, 1981 and recording fees paid.

CONCLUSIONS:

- 1) A total of 90 holes that totalled 3987 feet of placer drilling was conducted in the North Ladue River valley and 10 tributary creeks - Deer, Club, Lila, Gemini, Soda, Deep, Spud, Atlinto, Apollo and Hook creeks.
- 2) Excellent gold indications were found on Gemini, Soda and Spud Creeks by exploration drilling.

- 3) Average depth of black muck in the North Ladue River was 7.5 feet at six locations near the main river.
 - Average depth of black muck in the 10 tributary creeks drilled was eleven (11) feet at 71 hole locations.
- 4) Two "Land Use Permits" for access into the North Ladue River valley are valid until 1983. A "Water Use Permit" was issued for the 1981 season for processing drill cuttings.
- 5) Access to the North Ladue River valley is as follows:
 - From Bedrock Creek and the Sixtymile River, south to the forks in the North Ladue River. Tractor tote trail - distance of approximately 35 miles - summer route;
 - From Mile 1222 Alaska Highway (north of Beaver Creek), north on a winter road to Moosehorn Range/Canyon Creek; cross Ladue River near the mouth of Rice Creek
 - winter tote trail only.

PLACER EXPLORATION - NORTH LADUE RIVER AREA

General

During the summer and fall of 1981, placer gold exploration was conducted on the North Ladue River and adjoining tributaries. The exploration programme consisted of tractor trenching in creek and bench gravels, and placer hammer drilling in the main valley and on 10 of the tributary creeks. The exploration trenching and drilling was applied to assessment work on the Yukon Prospecting Leases.

The tributary creeks drilled are described as follows:

North Ladue River

Hole Nos. LAD 81-1 to LAD 81-11
Total of 11 holes
Total footage: 601 feet

Gemini Creek

Hole Nos. G 81-1 & 2
Total of 2 holes
Total footage: 96 feet
(Excellent gold indications)

Deer Creek

Hole Nos. D 81-1 to D 81-3
Total of 3 holes
Total footage: 128 feet

Soda Creek

Hole Nos. 581-1 to 581-3
Total of 3 holes
Total footage: 137 feet
(Excellent gold indications)

Club Creek

Hole Nos. C 81-1 to C 81-3
Total of 3 holes
Total footage: 120 feet

Spud Creek

Hole Nos. SP 81-1 to SP 81-20
Total of 20 holes
Total footage: 789 feet
(Favourable gold indications)

Lila Creek

Hole Nos. L 81-1 to L 81-3
Total of 3 holes
Total footage: 160 feet

Hook Creek

Hole Nos. H 81-1 to H 81-8
Total of 8 holes
Total footage: 330 feet

Atlinto Creek

Hole Nos. AT 81-1 to AT 81-6
Total of 6 holes
Total footage: 250 feet

Deep Creek

Hole Nos. D 81-1 to D 81-4
Total of 4 holes
Total footage: 112 feet

Apollo Creek

Hole Nos. AP 81-1 to AP 81-28
Total of 28 holes
Total footage: 1264 feet

Summary - Drilling Completed

Total number of holes 90 holes
Total footage drilled 3987 feet

Summary - Drilling Dates

Dates drilled September 17, 18, 19, -, 21, 22,
23, 24, 25, 26, 27, -, -, 30
October 1, 2, 3, 4, 5, 6, 17, 18,
20, 21, 22, 23, -, -, 26, 27, 28,
29, 30, 31
November 1, -, 3, 4, 5

Total of 33 days of drilling

Non-drilling dates September 20 (differential)
September 28 (camp move)
September 29 (drill move)
October 6-16 (planetary)
October 19 (compressor maintenance)
October 24-25 (out of diesel fuel)
November 2 (maintenance on drill)
November 5-10 (pins for drill, down
for parts)

Summary - Hammer Drill Programme, 1981

Total number of holes completed 90 holes
Total footage drilled on 11 creeks 3987 feet
Total number of days drilled 33 days
Average number of holes drilled/day 2.73 holes/day
Average footage drilled/day 120.8 feet/day

The average thickness of black muck which overlies gravels on the North Ladue River is 7.5 feet in six locations.

The average thickness of black muck which overlies gravels on the tributary creeks is 11 feet at 71 locations on 10 creeks.

The drill used on the North Ladue River Project was a "DRILL SYSTEMS", model H-180 diesel hammer drill with 6 5/8" O.D. drill bit and double-walled rods.

Model H-180 Hammer Drill:

- Permafrost bit 6 5/8" O.D.
- Double-walled rods, 4" I.D.
- Dual-walled rods with reverse air circulation for cutting when percussion drilling
- Air circulation between the two walls of pipe and the cuttings are forced through the inner pipe to the surface. The outer part of the pipe "cases" the hole
- Cuttings recovered in a "cyclone" and placed in plastic bags
- Diesel pile hammer

Rice Creek Drilling

Placer drilling was conducted on the upper part of Rice Creek on PL5658 with a C. Kirk Hillman 5¼" Airplane Placer Drill. The drilling on this creek was mobilized on June 4 and drilling was done sporadically until July 24, 1981.

Rice Creek Drilling Holes

Hole No: R 81-1		18.5 feet
R 81-2		20 feet
R 81-3		19 feet
R 81-4		8 feet

Hole R 81-2 (total depth 20 feet)

10 feet		10 fine flaky colours
11 feet		2 f.s.
12 feet		1 f.s.

NORTH LADUE RIVER PROJECT
1981 Placer Drilling Summary
September 07 - November 5, 1981

<u>Drill Hole #</u>	<u>Location</u>	<u>Total Depth</u> Ft.	<u>Black Muck</u> Ft.	<u>Gravels</u> Ft.	<u>Bedrock</u> Ft.
<u>Gemini Creek</u>					
G 81-1	GEMINI #10	54	0-13	13-40	40-54
G 81-1	GEMINI #10	42	0-6	6-42	---
<u>Soda Creek</u>					
S 81-1	SODA #13	36	0-12	12-28	28-36
S 81-2	SODA #13	51	0-10	10-48	48-51
S 81-3	SODA #13	50	0-4.5	4.5-50	---
<u>Spud Creek</u>					
SP 81-1	SPUD #11	40	0-4	4-36	36-40
SP 81-2	SPUD #11	50	0-14	14-43	43-50
SP 81-3	SPUD #11	27	0-12	12-26	26-27
SP 81-4	SPUD #16	38	0-4	4-36	36-38
SP 81-5	SPUD #16	40	0-12	12-38	38-40
SP 81-6	SPUD #16	42	0-11	11-42	---
SP 81-7	SPUD #22	24	--	0-22	22-24
SP 81-8	SPUD #22	44	0-12	12-44	---
SP 81-9	SPUD #22	54	0-12	12-52	52-54
SP 81-10	SPUD #22	58	0-22	22-58	---
SP 81-11	SPUD #25	20	0-7	7-19	19-20
SP 81-12	SPUD #25	38	0-12	12-36	36-38
SP 81-13	SPUD #25	56	0-22	22-56	---
SP 81-14	SPUD #35	32	0-14	14-30	30-32
SP 81-15	SPUD #35	30	0-10	10-28	28-30
SP 81-16	SPUD #35	40	0-12	12-34	34-40
SP 81-17	SPUD #36	34	0-4	4-29	29-34
SP 81-18	SPUD #36	40	0-8	8-37	37-40
SP 81-19	SPUD #36	44	0-4	4-44	---
SP 81-20	SPUD #36	38	0-18	18-38	---

GENERAL PLACER GEOLOGY

Klondike Gold Field Geology

The Ogilvie map area, containing the Klondike Gold Field, has not been glaciated. The ridge tops are rounded, of similar elevation, and contain no plateaus. This area includes long ridges with steep sides and narrow V-shaped valleys. The terrain in the Ogilvie area is described by H. S. Bostock as being at accordant summit levels and the erosive surface developed since Tertiary time. The accordant summit level is defined as a level surface indicating that the hill tops or mountain summits, over a region, have approximately the same elevation. In a region of high topographic relief this suggests that the summits are remnants of an erosional plain formed in a previous erosion cycle. Also, the area can be described as being a summit concordance which is equal or nearly equal in elevation of ridge tops or mountain summits over a region. The concordance is thought to indicate the existence of an ancient erosional plain of which only scattered patches are preserved. The Tertiary period spans between 65 million years - Paleocene, through to the Pliocene of 2 to 3 million years. The ancient Tertiary surface has since been cut to depths of 2,000 feet by the main drainage system. Outcrops are scarce in the area and are usually confined to ridge tops, stream-cut banks, stream beds and south-facing slopes. In places, rock fragments in the soil suggest the type of the underlying rock.

The quartz stringers and veins that occur in the metamorphic igneous or sedimentary source rocks of the Yukon Group are considered as the source of the gold in the Klondike, Sixtymile, Indian River and Scroggie districts (W. E. Cockfield, 1921). The quartz stringers and veins that carried gold would probably be of different ages and not all quartz veins carried gold. The possible source of the veins could be from Permian (?) and/or Triassic (?) age granitic and ultra-mafic intrusives. The gold was concentrated in the creek and bench gravels by the disintegration, weathering and erosional process into the valley bottoms since the Tertiary time period 65 million years ago.

The oldest rocks in the area (Table of Formations) are Precambrian and Later in age and consist of the Yukon Group - limestone, gneiss, quartzite, schist and slate - and the Klondike schist which contains sericite schist and minor chlorite schist. The aforementioned rocks are intruded by gneissic granite and ultra-mafic intrusives in parts. Paleozoic, Mesozoic and Cenozoic aged sedimentary intrusive and extrusive rock types occur throughout the Ogilvie map area. Tertiary/Modern gravel stream deposits and Modern/Recent stream deposits are the source of the placer gold deposits within the Klondike district.

The older Yukon Group (Unit E-Bostock, 1942) (Schist Gneiss - D. J. Tempelman-Kluit, 1974) of rock consists mainly of mica schists, hornblende schists, chloritic schists, actinolite schists, cyanite schists, greenstone schists, schistose quartzites, schistose amphibolites, mica gneisses, hornblende gneisses, gneissoid quartzites, and crystalline limestone that is in parts dolomitic. Several of the schistose rock types have been metamorphosed gradually and pass into corresponding gneissoid varieties. Particularly there is a transition between a mica and hornblende schist into mica hornblende gneisses. The schistose and gneissoid rocks are reported by D. P. Cairnes to be mainly of sedimentary derivation, but that some of the rocks may be of igneous origin. Because of the folding, faulting, contortion and high degree of metamorphism of the origin source rocks, the original sedimentary and igneous rock types are indistinguishable in the field. The schistose rocks and associated gneissoid rocks and crystalline limestone are similar to the schistose rocks of the Klondike and in other of the more important gold producing districts of Yukon and Alaska. These Schist Gneiss group of rocks underlie the Indian River and Scroggie gold-bearing districts.

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GENERAL PLACER GEOLOGY

Klondike Gold Field Geology

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GENERAL DESCRIPTION OF PLACER GRAVELS

The gold-bearing stream deposits in the Klondike Placer Districts are Tertiary/Modern and Modern/Recent in age. The following is a description of the gravels which occur on several of the major gold placer creeks in the Klondike/Indian River-Scroggie Districts (quoted from "The Yukon Territory - Its History and Resources - 1916", pages 33, 34 and 35):

LOW LEVEL GRAVELS - The low level creek gravels are the most important gravels in the district. They floor the bottoms of all valleys to a depth of from 4 to 10 feet; they rest on bedrock usually consisting of decomposed and broken schists, and are overlaid by a sheet of black frozen muck ranging in thickness from 2 to 30 feet or more. They are local in origin and consist entirely of the schists and other rocks outcropping along the valleys. The schist pebbles are usually flat, round-edged discs measuring 1 to 2 inches in thickness and 2 to 6 inches in length. They constitute the greater part of the deposit but are associated with a varying proportion of rounded and sub-angular quartz pebbles and boulders and, less frequently, with pebbles derived from the later eruptive rocks of the region. The pebbles are loosely stratified, usually embedded in a matrix of coarse, reddish sand, and alternate in places with thin beds of sand and muck.

(a) Creek - The creek gravels frequently enclose leaves, roots and other vegetable remains and also the bones of various extinct and still-existing northern animals, such as the mammoth, the buffalo, the bear, the musk-ox, the mountain sheep and goat.

(b) Gulch - The gulch gravels occupy the upper portions of the main creek valleys and small tributary valleys. They differ from the creek gravels in being coarser and more angular. A considerable proportion of their material consists of almost unworn fragments of schist washed down from the adjacent slopes. They contain the same vegetable and animal remains as the creek gravels.

(c) River - The only river gravels of the district proven, so far, to contain gold in paying quantities occur in the wide flats bordering the lower portions of the Klondike River below the mouth of Hunker Valley. The river gravels consist of quartzite, slate, chert, granite and diabase pebbles largely derived from the western slopes of the Ogilvie Range. They are harder and better-rounded than the creek gravels, a necessary result of the greater distance travelled.

TERRACE GRAVELS - Rock terraces occur at various points cut into the steep slopes of the present valleys. They are produced during the deepening of the valleys and are simply remnants of former valley bottoms. They are small, seldom exceeding a few yards in width and a few hundred yards in length, irregular in distribution and occur at all elevations up to the bottoms of the old valleys. The terraces support beds of gravel, usually from 6 to 15 feet in thickness, very similar to those in the creek bottoms but showing somewhat more wear. The terrace gravels, like the creek gravels, are overlaid as a rule with muck, and at one point on Hunker Creek they were found buried beneath 100 feet of this material.

KLONDIKE DISTRICT PERMAFROST

The Klondike Gold District is within the "discontinuous permafrost zone", the gravels in the region are frozen in parts and thawed in other areas. The permafrost condition varies in thickness from surface to a depth of 200 feet in the creek, bench and hill gravel deposits. Therefore, a majority of the gold bearing placer ground in the Yukon Territory is permanently frozen for about 60 - 200 feet in depth. The gold-bearing gravels are usually overlain by several feet of "black muck" that contains 50 to 75% ice by volume. The Yukon black muck is a mixture of fine silt, partially decomposed vegetation and ice. When thawed the black muck becomes a thick soupy partial liquid that flows.

The position of the creeks to sun exposure during the long daylight hours in the summer months, has caused a thawing effect on north and east slopes in the area. Consequently, alternate thawing and freezing conditions have caused erosion, land sliding and creeping on the north and east slopes of the unconsolidated gravels. Therefore, any gold-bearing terrace gravels are re-deposited into the creek bottom over previously deposited creek gravels. Alternately, the south and west facing terrace gravels are in their original deposition position and have been uplifted to their present elevation above the creek valley bottom. The creeks in the area are not cutting deeper into the present valley bottoms, due probably, to bedrock grade and frozen gravel conditions. The valleys in the area have a main terrace and gravels that are located between 50 to 75 feet above the present stream level. Discontinuous permafrost occurs in the creek valleys and areas dredged in one season by the Yukon Consolidated Gold Company's eight dredging operations on Bonanza, Eldorado and Hunker Creeks, 68.4% was frozen and required thawing by steam. The present method of thawing is to strip the surface vegetation off the muck and expose it to the sun. A second method of thawing is hydraulic monitoring of the surface vegetation and muck by producing a 'head' of water with a high-pressure pump. Frozen gravel and muck conditions of permafrost exist in the Scroggie, Klondike, Stewart and Sixtymile gold-bearing districts. Quoted from: 'The Yukon Territory - Its History and Resources - 1916'.

"Throughout almost all the mining districts in the Yukon Territory, with the exception of Kluane, the gravels are covered by a body of black frozen muck which varies from 4 to 20 feet in thickness. The muck can be picked, but no impression can be made on the frozen gravels, which have to be thawed. The thickness of the frozen stratum varies considerably and is less on the ridges than in the valleys and less on southern than on northern slopes. A shaft sunk on the ridge south of Eldorado Creek reached unfrozen ground at a depth of 60 feet, while one in the valley of Eldorado Creek was stopped by running water at a depth of a little over 200 feet. Another shaft sunk through gravel on the plateau between Bonanza Creek and the Klondike River passed through the frost line at a depth of 175 feet; near the head of Quartz Creek, a shaft tapped running water at a depth of about 216 feet. The summer heat has little effect on the frozen layer except in the few places where the surface is unprotected by moss. Exposed gravel beds in

favourable positions thaw out to a depth of from 6 to 10 feet, but where moss is present frost is always encountered close to the surface. The depth of gravel varies from 3 feet on some of the creeks to 30 and 40 feet on Lower Dominion and from 80 to 100 feet on Quartz Creek. The frozen muck which overlies the gravels forms an exceedingly firm roof and no timbering is required in the drifts. The shafts in which self-dumpers are operating, however, are usually timbered as well as the tunnels leading from the bottom of the shafts to the face of the drifts. Underneath the frozen muck, large chambers can be excavated during the winter. In one case on Dominion Creek, a muck roof, unsupported by pillars, covered a vault said to measure 140 feet by 230 feet, and remained unbroken until mid-summer. Examples of muck roofs spanning vaults over 100 feet in width are quite common".

PRINCIPLES OF PLACER DEPOSITS

General:

In the formation of placer deposits, mechanical concentration is the natural separation of heavy from light minerals by means of moving water or air by which the heavier minerals become concentrated into a payzone deposit. The placer minerals are released from host rock or veins by the weathering process. The heavy minerals and rock or vein material are washed slowly downslope to the nearest stream. Moving stream water sweeps away the lighter matrix and the heavier placer minerals sink to the bottom of the drainage creek or are moved downstream relatively short distances. From thousands of tons of debris, the few heavy minerals in each ton are gradually concentrated in the stream gravels until they accumulate in sufficient abundance to be classified a placer deposit. The very small amount of gold contained in the original matrix host rock and veins is concentrated in a stream system gravels in relatively small volume paystreak.

Placer Deposits:

A placer deposit is described as a mass of gravel, sand, or similar material resulting from the decomposition of crumbling and erosion of solid rocks that contain particles or nuggets of gold, platinum, tin or other valuable minerals derived from the rocks or veins. Placer mining is a type of mining in which the surficial detritus or gravel is washed for gold or other valuable minerals. When water under pressure is employed to break down the gravels, the term hydraulic mining is generally used. There are deposits of detrital or gravel material containing gold which are buried below waste gravels too deep to be profitably extracted by surface mining. The deep buried gold-bearing gravel material must be worked by drifting beneath the overlying barren material. The underground operation necessary to extract auriferous material from near bedrock is termed "drift mining".

Payzone Gravels:

Placer concentrations can occur only if the valuable minerals possess the three properties; high specific gravity, chemical resistance to weathering and durability. Placer minerals that have these properties are gold, magnetite, ilmenite, garnet, zircon, hematite, chromite, epidote, olivine, limonite, rutile, pyrozone, monazite, native copper, tinstone and platinum. The black sand or heavy concentrate content of gold placers is commonly between 5 and 20 pounds of black sand concentrate per cubic yard of gravel. The heavy minerals are deposited within the gravels of a drainage system above and on bedrock. The concentration of heavy minerals in gravels is referred to as paystreak or payzone. The gold bearing payzone gravels above bedrock deposition dimensions are length, width and thickness. The payzone usually contains variable gold content along a continuous and discontinuous payzone. The gold bearing gravels are usually 5 - 12 feet thick above bedrock and overlaid by waste gravels. The heavy minerals and gold are worked into soft decomposed bedrock for 2 - 4 feet by water hydraulics.

Description of Gravels

1) Approximate Weight of Earth and Gravels:

Ordinary Gravel - bank measure -----	3,200 lbs. per cy
Dry Gravel - loose measure -----	2,000 lbs. per cy
Dry Sand - loose measure -----	2,200 lbs. per cy
Ordinary Earth - bank measure -----	3,000 lbs. per cy
Dry Earth - loose measure -----	2,000 lbs. per cy
Clay - bank measure -----	3,200 lbs. per cy

Note - for all calculation purposes the writer uses 3,300 lbs. for creek gravel weight per cubic yard. A standard size gold pan of gravel weighs 25 lbs. with a pan factor of 132 pans per cubic yard.

2) Swell Factor:

Ordinary Gravel -----	20 to 30%
Cemented Gravel -----	40%
Sand and Gravel -----	15%
Gravel and Clay -----	35%
Loam -----	20%
Dense Clay -----	50%

3) Classifications of Gravel Size:

Boulders -----	Greater than 256 mm (10")
Cobbles -----	64 mm to 256 mm (2½" to 10")
Pebbles -----	4 mm to 64 mm (3/16" to 2½")
Gravel -----	Greater than 2 mm
Sand -----	2 mm to 1/16 mm
Silt -----	1/16 mm to 1/256 mm
Clay -----	Less than 1/256 mm

UNITS OF WATER MEASUREMENT

- 1 gallon (gal.) = 231 cubic inches.
= 0.1337 cubic feet.
- 1 gallon of water weighs 8.33 pounds.
- 1 million gallons (m.g.) = 3.0689 acre feet.
- 1 cubic foot (cu. ft.) = 1728 cubic inches.
= 7.48 gallons.
- 1 cubic foot of water weighs 62.4 pounds.
- 1 acre foot (ac. ft.) = amount of water required to cover one
acre one foot deep.
= 43,560 cubic feet.
= 325,850 gallons.
= 12 acre inches.
- 1 gallon per minute (g.p.m.) = 0.00223 cubic feet per second.
= 1440 gallons per day (24 hrs.).
- 1 million gallons per
24 hours (m.g.d.) = 1.547 cubic feet per second.
= 695 gallons per minute.
- 1 cubic foot per
second (sec. ft.) = 7.48 gallons per second.
= 448.8 gallons per minute.
= 646,272 gallons per day (24 hrs.).
= .992 acre inch per hour.
= 1.983 acre feet per day (24 hrs.).
= 40 miners inches (legal value) in Arizona,
California, Montana and Oregon.
= 50 miners inches (legal value) in Idaho,
Kansas, Nebraska, Nevada, New Mexico,
North Dakota, South Dakota and Utah.
= 38.4 miners inches in Colorado.
= 35.7 miners inches in British Columbia.
- 1 miners inch (mi.in) = 11.25 gallons per minute when equivalent
to 1/40 second foot.
= 9 gallons per minute when equivalent to
1/50 second foot.
- 1 miners inch-day
(24 hrs.) = 16,200 gallons when equivalent to 1/40
second foot.
- 1 miners inch-day
(24 hrs.) = 12,960 gallons when equivalent to 1/50
second foot.

MINERS INCH - Water Measure.

- 1) The quantity of water is measured in miners inches. The miners inch is legally defined in California as the equivalent of a flow of $1\frac{1}{2}$ cu. ft. or $11\frac{1}{4}$ gals. per min. The common way of measuring the flow is through a wooden flume across the closed end of which is a horizontal opening 1 in. high, the center being 3 in. above the floor of the flume. If the water is kept at a depth of 6 in. in the flume, the flow through each square inch of opening is equivalent to 1 miners inch.

The Duty of the Miners Inch - the duty of the miners inch is the number of cubic yards of gravel that can be broken down and sent through the sluice by 1 miners inch for 24 hours. It depends upon the height of the bank, the character of the gravel and the bedrock, the grade of the bedrock, the type of sluice and the pressure of the water. In well-rounded gravel without large stones and under other favorable conditions of operation the duty of the miners inch is from $4\frac{1}{2}$ to 6 cu. yds. of gravel for 24 hours. Under less favorable conditions the duty of the miners inch may range from 2.8 to 4.6 cu. yds. for 24 hours.

- 2) Miners Inch. A unit of water measurement. Originally it represented the quantity of water that will escape from an aperture one inch square through a two-inch plank, with a steady flow of water standing six inches above the top of the escape aperture. The miners inch is now defined by statute in various states.

1 second-foot = 40 miners inches in Arizona, California,
Montana and Oregon.

= 50 miners inches in Idaho, Nevada, New Mexico
and Utah.

= 38.4 miners inches in Colorado.

1 miners inch equals 11.25 gallons per minute when equivalent
to $1/40$ second-foot.

1 miners inch equals 9 gallons per minute when equivalent
to $1/50$ second-foot.

SIXTYMILE GOLD FIELD GEOLOGY

GENERAL GEOLOGY

The Sixtymile district is located east of the Coast Range and is within the Cordilleran Interior Plateau. The district is further described to be situated in the Western Yukon Plateau and locally forms a part of the Tertiary-aged Klondike Plateau. The topography was formed by uplifting of an undulated plain which formed a series of long branching ridges between intersecting streams and rivers. The topography of the area has an average elevation of 4,000 to 4,800 feet and forms the western part of the Quaternary age Dawson Range. The maximum relief of the Sixtymile and Ladue Rivers district is 4,000 feet.

The most important tributaries of the Sixtymile River are Big Gold, Little Gold, Glacier, Miller, California, Boucher, Fish, Fifty Mile (middle fork) and Matson (south fork) Creeks. The main Ladue River tributary is Rice Creek and the important tributaries on the North Ladue River are McElfish and Bakke Creeks.

The Sixtymile and Ladue River district is non-glaciated and lies within the discontinuous zone of permafrost. The valleys are mainly V-shaped, are broad-floored and have interlocking spurs. The stream system has clear water, indicating that they are not presently transporting material because of frozen gravel conditions and bedrock grade. The valleys have been sunk into the uplands to a depth of 1,500 to 3,000 feet.

The Sixtymile district has several gold producing creeks; at Glacier Site - Miller, Glacier, Little Gold and Big Gold Creeks; Upper Matson Creek, Pups and Gulches; Ten Mile Creek; and reported float gold on the North Ladue River, Rice Creek and associated drainage tributaries.

The Miller, Glacier and Little Gold Creeks area is contained within the Nasina Series quartzite formation. To the north of Little Gold Creek, south of the Sixtymile River and south of Miller Creek three large patches of Klondike Schist occur. The Klondike Schist and Nasina Series are part of the Yukon Group and probably Permian or Later in age. The Yukon Group formations of Klondike Schist and the Nasina Series are intruded by a Tertiary age andesite and basalt stock. Big Gold Creek is located within the andesite and basalt intrusive stock. All of the gold-bearing creek and bench gravels are contained in Miller, Glacier, Little and Big Gold Creeks. The drainage from the four creeks empty into the Sixtymile River and consequently gold-bearing gravels have been deposited at the confluences of the creeks and the river. The Sixtymile River valley contains gold-bearing gravels a short distance downstream from the four creeks. The first gravels to be worked on the Sixtymile River were the bench gravels lying between the mouth of Miller Creek and the mouth of Big Gold Creek. Later the Sixtymile creek gravels were dredged between Miller and Big Gold Creeks.

The Nasina Quartzite is probably Permian or Later in age (D. J. Templeman-Kluit, 1974 - P 23 Nasina Quartzite), as like most rocks of the Yukon Group being Pre-Mesozoic in age. The Nasina Quartzite consists of; black weathering, massive, dark grey to black graphitic-quartzite with lesser grey micaceous quartzite and quartz mica schist (D. J. Tempelman-Kluit, 1974), as described on the Stewart Map. On the Dawson Map (L. H. Green and J. A. Roddick, 1961) describes the Nasina Series as; grey and grey-green, micaceous quartzite; dary grey, light grey and silvery muscovite schist, minor fine-grained quartz biotite gneiss, graphitic schist and quartz-muscovite chlorite schist; higher rank metamorphic rocks with biotite and garnet; coarsely crystalline whitish limestone. W. E. Cockfield, 1921, describes the Nasina Series as; quartzite, quartz-mica schist, mica schist, sheared conglomerate, graphite schist, and crystalline limestone mainly of sedimentary origin.

The older Yukon Group (Unit E - Bostock, 1942) (Schist Gneiss - D. J. Tempelman-Kluit, 1974) of rocks consists mainly of mica schists, hornblende schists, chloritic schists, actinolite schists, cyanite schists, greenstone schists, schistose quartzites, schistose amphibolites, mica gneisses, hornblende gneisses, gneissoid quartzites, and crystalline limestone that is in parts dolomitic. Several of the schistose rock types have been metamorphosed gradually and pass into corresponding gneissoid varieties. Particularly there is a transition between a mica and hornblende schist into mica hornblende gneisses. The schistose and gneissoid rocks are reported by D. P. Cairnes to be mainly of sedimentary derivation, but that some of the rocks may be of igneous origin. Because of the folding, faulting, contortion and high degree of metamorphism of the origin source rocks, the original sedimentary and igneous rock types are indistinguishable in the field. The schistose rocks and associated gneissoid rocks and crystalline limestone are similar to the schistose rocks of the Klondike and in other of the more important gold producing districts of Yukon and Alaska. These Schists Gneiss group of rocks underlie the Indian River and Scroggie gold-bearing districts.

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ROCK TYPES LITHOLOGY - G.S.C.

The following description of the PPs_n - Schist Gneiss, PPs_{qm} - Klondike Schist and PP_{qc} - Nasina Quartzite is quoted from the G.S.C. Paper (pp. 20 - 23) 73-41, Reconnaissance Geology of Aishihik Lake, Snag and Part of Stewart River Map-Areas, West-Central Yukon by D. J. Tempelman-Kluit, 1974.

"SCHIST AND GNEISS

An unnamed assemblage of schist and gneiss (P Ps_n) is found in northeastern Snag map-area south of Yukon River and in eastern parts of Stewart River map-area. These rocks are recessive weathering and generally poorly exposed except along the Yukon River and some of its tributaries. Some good exposures are seen on the ridge between the Yukon and White Rivers.

The unit is made up largely of nondistinctive and monotonous muscovite-biotite quartzite and quartz mica schist, but it locally includes granodiorite gneiss and augen gneiss like the Pelly Gneiss. Minor amounts of amphibolite and coarsely crystalline marble are interfoliated with the schists. The rocks are metamorphosed to biotite grade (upper greenschist facies) and have a well-developed schistosity.

The rocks probably represent or include somewhat higher grade metamorphic equivalents of the Klondike Schist and Pelly Gneiss, but on the ridge between the White and Yukon Rivers Klondike Schist apparently overlies (structurally) the Schist-Gneiss unit. Mertie's (1937) Birch Creek Schist (also see Foster, 1970) which is probably equivalent to the Schist Gneiss unit is also thought to include metamorphic equivalents of Foster. The schist and gneiss is equivalent to, and continuous with, map unit E of Bostock (1942). The age of the rocks is unknown, but the unit was metamorphosed with the other rocks and it is therefore probably Paleozoic and/or older.

KLONDIKE SCHIST

The name Klondike Schist (PPs_{qm}) is an informal one first applied by McConnell (1905a) to certain rocks in the Klondike district. The name as used here refers only to the characteristic lithologies and implies nothing regarding the age, thickness or stratigraphic relations of the rocks.

Rocks lithologically like McConnell's Klondike Schist (1905a) occur extensively in west-central Stewart River map-area and two small areas of these rocks are differentiated in northern Snag map-area. The rocks are recessive and weather a rather distinctive orange colour; they are generally poorly exposed even on ridge tops. The best area in which to see these rocks is on the hill at the head of Rice Creek. Similar lithologies are included locally in the Schist-Gneiss unit.

Cockfield (1921, p. 14-18), and Green (1972, p. 109-110) give detailed lithologic descriptions of the Klondike Schist. Rocks of the unit include pale green, fine-grained, chlorite-muscovite-quartz schist with minor augen gneiss and amphibolite. All rocks have a well-developed, rather irregular foliation. Compositional layering, where seen, is a flaser structure that results from strong shearing and granulation. The latest recrystallization of the rocks postdates strong shearing. Metamorphism was of moderate to upper greenschist facies. Lenses and boudins of white quartz are common in the Klondike Schist and may total 5 percent of its volume. Amphibolite, an important constituent of this unit, is interfoliated with the micaceous schists and is itself an actinolite quartz schist.

The unit resembles map-unit B of Dawson map-area (Green, 1971) and map-unit B of Ogilvie map-area (Bostock, 1942). In Alaska similar rocks have been mapped by Foster (1970) as Klondike Schist.

Little is known of the stratigraphic relations of the Klondike Schist, but its spatial association with rocks of the Pelly Gneiss suggests that the two units are broadly contemporaneous. Their metamorphism is probably of the same age.

Cockfield (1921) and others give evidence suggesting that the Klondike Schist is metaigneous, but Green (1972) considers the unit metasedimentary.

Potassium argon age determinations of micas in the Klondike Schist in adjacent areas (Green, 1972, p. 116) suggest that this rock was last metamorphosed about early Mesozoic time and considering similar evidence for the Pelly Gneiss both units are probably pre-Mesozoic.

NASINA QUARTZITE

The name Nasina Quartzite (PPqc), first used by McConnell (1905a) refers to a group of rocks of distinctive lithology. The name is not intended to imply anything regarding age or stratigraphic relations. Nasina-type quartzite is found in small areas in northernmost Stewart River map-area, but in the project area its main exposures are in central Snag map-area. The unit is recessive weathering and good exposure are rare. The best area for study is on Stevenson Ridge where small exposures and plentiful float give a good impression of the unit. Some good exposures of these rocks are also found on Nisling River.

As detailed descriptions of the lithology of the Nasina Quartzite by Cockfield (1921, p. 14-15) and Green (1972, p. 108) are readily available only a summary is given here. Rocks of the Nasina Quartzite are dark grey to black, graphitic and micaceous quartzite with interfoliated graphitic biotite-muscovite schist. Thin colour lamination, the result of alternating layers of light and dark grey quartzite, is common and characteristic. The unit includes local thick lenses of grey laminated marble. The Nasina

rocks are metamorphosed to greenschist facies and are of metasedimentary origin. They have a fairly well-developed schistosity and their recrystallization continued after minor structures were formed.

The Nasina Quartzite, like most other rocks of the Yukon Group, is probably pre-Mesozoic. Its metamorphism, inferred from age determinations of other Yukon Group strata, is probably Triassic. The stratigraphic relations of the Nasina Quartzite are unknown and give no clue about the age of the rocks. Cockfield (1921, p.16) contended that rocks of the Nasina 'series' are the oldest in the Sixtymile district, for they are cut or overlain by all the other rocks'. The writer saw no evidence to support this contention. Green (1972, p. 109) implies that the Nasina Quartzite is Paleozoic on the basis of fossils collected by him and by Mertie (1937). No fossils were found in the present investigation. The area of Nasina Quartzite in central Snag map-area is new and has not previously been studied, unlike the area in northern Stewart River map-area. These rocks have unfortunately yielded no new information on their age. Rocks like those of the Nasina Quartzite are included by Muller (1967, p. 22) in his map-unit 1 which includes equivalents of several map-units described herein. Some quartzite like that of the Nasina is found in northwestern Aishihik Lake map-area where it is included in the Biotite Schist unit."

SIXTYMILE DISTRICT
TABLE OF FORMATIONS - STEWART SHEET

CENOZOIC

EOCENE OR YOUNGER

- eTcv - Carmacks Group - andesite, basalt and flow breccia
- eTvrp - Quartz Feldspar Porphyry

MESOZOIC

CRETACEOUS

- LMqm - Quartz Monzonite

PALEOZOIC

CARBONIFEROUS AND/OR PERMIAN

- Pv - Sheared Greenstone

PERMIAN AND/OR OLDER

- Pt - Chert and Metachert
- PPqmm - Foliated Muscovite Quartz Monzonite

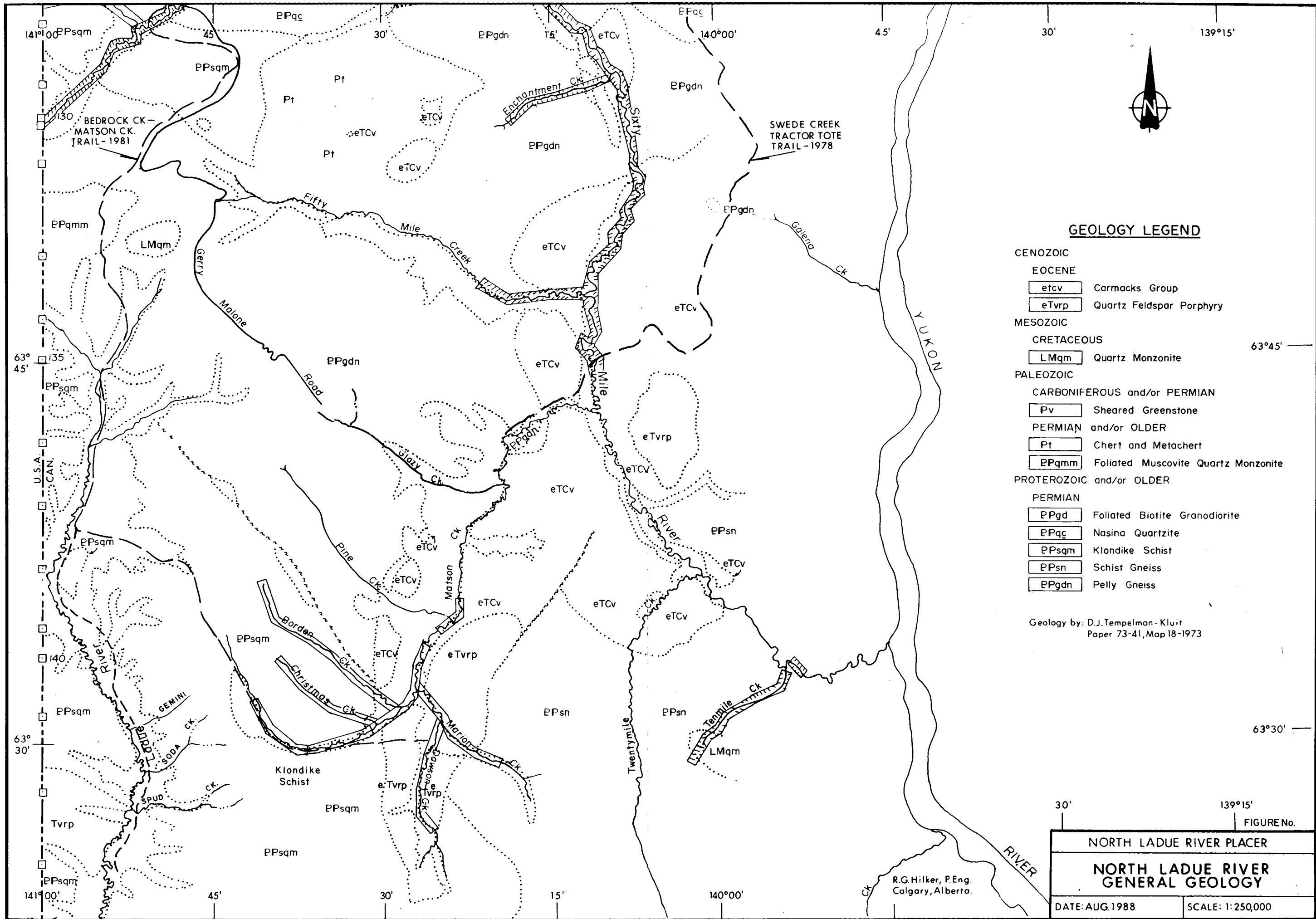
PROTEROZOIC

PERMIAN AND/OR OLDER

- PPgd - Foliated Biotite Granodiorite
- PPqc - Nasina Quartzite
- PPsqm - Klondike Schist
- PPsn - Schist Gneiss
- PPgdn - Pelly Gneiss

After Geology: D.J. Tempelman-Kluit, Paper 73-41, 1974

.../



GEOLOGY LEGEND

- CENOZOIC
- EOCENE
- etcv Carmacks Group
 - eTvrp Quartz Feldspar Porphyry
- MESOZOIC
- CRETACEOUS
- LMqm Quartz Monzonite
- PALEOZOIC
- CARBONIFEROUS and/or PERMIAN
- Pv Sheared Greenstone
- PERMIAN and/or OLDER
- Pt Chert and Metachert
 - PPqmm Foliated Muscovite Quartz Monzonite
- PROTEROZOIC and/or OLDER
- PERMIAN
- PPgd Foliated Biotite Granodiorite
 - PPqc Nasina Quartzite
 - PPsqm Klondike Schist
 - PPsn Schist Gneiss
 - PPgdn Pelly Gneiss

Geology by: D.J.Tempelton-Kluit
Paper 73-41, Map 18-1973

FIGURE No.

NORTH LADUE RIVER PLACER

NORTH LADUE RIVER
GENERAL GEOLOGY

DATE: AUG. 1988

SCALE: 1: 250,000

R.G.Hilker, P.Eng.
Calgary, Alberta.

NORTH LADUE RIVER AREA GEOLOGY

The oldest rocks in the Ladue River, North Ladue River, and Matson Creek area are Precambrian-aged Proterozoic units of Pelly Gneiss, Schist Gneiss and Klondike Schist. The three units were previously contained in the Yukon Group. The Proterozoic-aged Nasina Quartzite occurs on the divide between the Sixtymile and Forty Mile drainage. Immediately north of the left fork of the North Ladue River, a stock of Paleozoic foliated muscovite quartz monzonite occurs. In the north part of the map sheet and located at the head of Boucher Creek, a Permian-aged unit of chert and metochert is exposed. On the right limit of the Ladue River and northwest from the White River, a Carboniferous or Permian-aged sheared greenstone outcrops. Cretaceous-aged quartz monzonite plugs are located on the south end and east side of the North Ladue River and north of the right fork. Two stocks of Cenozoic Eocene-aged quartz feldspar porphyry are located on the North Ladue River and the fork between Matson and Marion Creeks. A large formation of the Carmacks Group andesite, basalt and flow breccia extrudes east of Matson Creek and the Sixtymile River. The North Ladue River drainage system and upper twelve miles of Matson Creek is located within the Klondike Schist unit of metamorphic rocks that are PROTEROZOIC AND/OR PALEOZOIC in age. The lower eighteen miles of Matson Creek is bounded on the north-west side by the Pelly Gneiss unit that is PROTEROZOIC in age; and on the south-east side by CENOZOIC age Carmacks Group volcanics and intrusive Quartz Feldspar Porphyry. The North Ladue River and Matson Creek drainage system is located within approximately 360 square miles of the Klondike Schist rock formation. The area north-west of the confluence of Matson and Pine Creeks is underlain by the Pelly Gneiss and to the south-west by Quartz Feldspar Porphyry. The geology of the area is contained on the Geological Survey of Canada Maps: Ogilvie Map 711A by H. S. Bostock (1935) and Stewart River, Paper 73-41 by D. J. Tempelman-Kluit in 1970-1971-1972. The recent geology mapping is better correlated over large areas and the ages of the formations have been more reliably determined.

CENOZOIC

Eocene or Younger

CARMACKS GROUP: brown-weathering, brown, green and red andesite, basalt and flow breccia.

QUARTZ FELDSPAR PORPHYRY: light coloured acid quartz feldspar porphyry and rhyolite; minor acid tuff breccia, crystal lithic tuff and ignimbrite.

PROTEROZOIC

Permian and/or Older

KLONDIKE SCHIST: black and orange weathering well foliated pale green chlorite muscovite quartz schist; includes augen gneiss and amphibolite.

PELLY GNEISS: strongly foliated to gneissic muscovite chlorite biotite granodiorite; minor augen gneiss; grades locally to garnetiferous amphibolite.

Geology by - D. J. Tempelman-Kluit

The North Ladue River and upper Matson Creek drainage system and tributaries are all situated in the Klondike Schist. The whole of the rich Klondike Gold Field is similarly located in the rock types of the Klondike Schist.

TOPOGRAPHY

The Sixtymile, North Ladue River, and Matson Creek area gold district is situated east of the Alaska-Yukon boundary between latitude 63°15'N to 64°10'N latitude. The area is bounded on the north by the divide between Sixtymile and Forty Mile drainage system; on the east by the Sixtymile and Yukon Rivers; on the south by the White and Ladue Rivers; and on the west by the Alaska boundary. The area is unglaciated and is a Tertiary accordance summit level in that the hill tops or mountain summits over a region have approximately the same elevation. The original peneplain has become naturally dissected by the drainage system over the past 65 million years. The higher ridges in the area are 4,500 feet in elevation. At Matson Creek on the Sixtymile River to Upper Matson Creek the terrain generally rises from an elevation of 1,500 feet to a headwater elevation of 4,000 feet. The valleys are V-shaped in cross-section with interlocking spurs. The creek valleys and spurs are a characteristic type of depression which develop over a long length of time in an unglaciated region.

The position of the creeks to sun exposure during the long daylight hours in the summer months has caused a thawing effect on north and east slopes in the area; consequently, alternate thawing and freezing conditions have caused erosion, land sliding and creeping on the north and east slopes of the unconsolidated gravels. Therefore, any gold-bearing terrace gravels are re-deposited into the creek bottom over previously deposited creek gravels. Alternatively, the south and west facing terrace gravels are in their original deposition position and have been uplifted to their present elevation above the creek valley bottom. The creeks in the area are not cutting deeper into the present valley bottoms due, probably, to bedrock grade and frozen gravel conditions. The valleys in the area have a main terrace and gravels that are located between 50 to 75 feet above the present stream level.

GOLD BEARING GRAVELS

In the Sixtymile area the gold occurs in the present creek bottom gravels, in bench gravels on the terrace and in re-concentrated bench gravels which have been deposited over the creek gravels. The bench terrace gravels contain the original concentrate of gold and the creek or valley gold-bearing gravels are derived from bench gravels and are, therefore, a secondary concentrate. In parts where there have been land slides and creeping of material off the north and east facing slopes, then a third concentrate of gold-bearing gravels occurs.

- 1st concentrate ----- Bench gravels from terrace
- 2nd concentrate ----- Creek gravels
- 3rd concentrate ----- Overlying creek gravels

Terrace - A relatively flat, and sometimes long and narrow, surface commonly bounded by steep upslopes and downslopes on opposite sides. Gravel terraces may be stepped, and they are commonly dissected by traverse drainage patterns.

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PLACER PROPERTY DEVELOPMENT

General

Since the discovery of gold in the Yukon Territory at Forty Mile in 1886, the Sixtymile in 1892, the Klondike in 1896 and at Matson in 1911, the value of gold, method of recovery, and location have determined a placer gravel reserve. The economics of the time period involved had the effect of delineating profitable gravels from non-profitable gravels for the recovery of gold. The method of testing gravels for economic gold content varied with available financing, mining method and quantity of gravel to be mined. The mining method chosen required a low volume or high volume of gravels to be processed; the methods were further affected by the technology available during a specific time period. The operation methods employed since 1881 have varied: river sand-bars by hand-rocking; on creeks and benches by hand-mining from a shaft and drifting laterally; hydraulicking and ground sluicing when water was available; dredging creek gravels; and by mechanical heavy duty equipment. Testing of placer gravels has been by hand-sunk shafts, hammer drilling, hand panning and by test cuts and its excavated by machinery. Generally, because of the heterogeneous nature of placer gold distribution in the gravels, a large volume bulk sample of the gravels being tested is preferable to a small sample. However, placer gold usually occurs on or near the bedrock trap which retains the heavy gold particles and other heavy mineral concentrates; it is therefore necessary to test the surface area of bedrock and at depth into bedrock. When testing bedrock, the best method is to hand-pan bedrock samples that have been taken from surface and a few inches into the host rock. The strike, dip and type of host rock should be noted and recorded. It is essential that, when a specific placer valley or area is studied to determine the 'possible' potential of economic gravel deposits, several procedures must be followed to arrive at a reasonable conclusion.

Placer reserves are reported in the Yukon as values per cubic yard of gravel or in bedrock feet (square feet). Both methods of reporting values are valid as paystreak occurs in overlying gravels, bedrock surface and at depth into bedrock bedding planes and fractures. The position of the paystreak determines the quantity of waste that must be removed to extract pay material for processing.

The average value of gold contained in the combined volumes of gravel and overlying black muck for the entire Klondike gold fields is reported to be 0.012 oz./cu.yd. or 0.373 gms/cu.yd. (Personal communication-R.L.Debecki).

Drilling Method of Exploration:

1. EXPLORATION DRILLING: When a few holes are drilled on a creek to discover indications of placer gold. The drill holes are located on a drill line perpendicular to the creek and holes are spaced 100 feet apart. Drill samples are processed, heavy concentrate recovered and gold reported in colors or weight (mg).

- 3) PLACER GOLD DEPOSIT: A "creek placer" contains gold bearing gravel deposits in the beds and intermediate flood plains of small streams. When a creek placer is mined an "open cut" is excavated in the stream gravels from the surface to bedrock. The water from the creek and drainage system seeps into the open cut in non-frozen or permafrost frozen gravels. Therefore, a "bedrock drain" trench is required to drain the water downstream from the open cut. The gradient of the creek and bedrock is a critical factor that effects the length of the bedrock drain to be excavated downstream. The gradient of bedrock and the overlying thickness of gravels and muck determines the length of the drain. The bedrock gradient should be approximately 55 - 110 feet per mile or 1.00 - 2.00%. The creek gravels and overburden muck is approximately 20 - 22 feet in depth.

4) Open-Cut Mining/Sluice Box Recovery Plant:

Open-cut mining is an excavation method in which a cut is dug to bedrock. The excavation equipment is usually large crawler tractors or motorized rubber wheel scrapers. The gravels are either pushed by tractors or carried by scrapers to the washing plant. The gravels can also be transported by a continuous conveyor belt. The gravels are placed into the hopper dump box for washing by a front-end loader or conveyor. The open-cut pit must be dry of water to operate the heavy-duty equipment. The open-cut pit can be excavated by two types of equipment: (a) - tractor and loader operation; (b) - rubber wheel scraper and loader operation. There are two types of recovery plants that are available: (a) - elevated vibrating grizzly, trommel and jigs; (b) - Derocker type of sorter and sluice box or screening plant.

- Mining and processing rate of 1,500 cy - 2,000 cy of gravels per 12 hour shift or a total of 275,000 cy per 165 day mining season of May to October 15.

5) Sensitivity Factor

- a) If the grade of gravels change due to the heterogenous distribution of gold or a complex paystreak developed when deposition patterns are changed by creek development.
- b) If the price of gold changes on the world market or when the value of gold drops below \$400 U.S. and the Canadian to U.S. dollar varies below an exchange rate of \$1.27 per U.S. dollar.
- c) If the volume of production changes but the operating costs remain the same.
- d) If the hours of production change or there are changes in operation costs.
- e) When limitations are imposed on placer operations by restricted working capital.
- f) When production of gravels processed decreases because of equipment breakdown. Heavy-duty equipment tractors, scrapers or front-end loaders should be purchased in rebuilt or new condition.

Drilling Method of Exploration:

- 1) EXPLORATION DRILLING: When a few holes are drilled on a creek to discover indications of placer gold. The drill holes are located on a drill line perpendicular to the creek and holes are spaced 100 feet apart. Drill samples are processed, heavy concentrate recovered and gold reported in colors or weight (mg).

DETAIL DRILLING: After the initial exploration drilling has proven gold colors, then a broad spaced drill pattern is required to establish the location of a possible 'paystreak'.

DEVELOPMENT DRILLING: If detail drilling has indicated and broadly delineated a paystreak in a lateral direction, then further detail drilling is required. The development drilling delineates the paystreak in detail to permit accurate calculation of gold grade and volume of gravels in cubic yards.

When drilling has indicated that an economic gold paystreak has been delineated, grade and volume are reported by the criteria, PROVEN-PROBABLE-POSSIBLE paystreak.

- 2) PRE-PRODUCTION DRILLING: Placer drilling is required to sample the creek gravels to determine the grade of gold and delineate the paystreak. The most cost efficient placer drill available is the Drill Systems - AP1000 (diesel hammer and reverse circulation drill). The drill utilizes dual tube rods and air to transfer the cuttings up the inner tube. The hammer-reverse circulation drill is a time proven placer gravel recovery system:

- The cuttings are a representative sample when using 6 5/8" bit.
- Fast and efficient method - the drill production would vary from 120 - 140 feet per 12 hour shift with holes 25 feet in depth.
- Virtually uncontaminated samples are recovered in a "cyclone" each two feet.
- Cost efficient method of drilling - approximately \$115/hour or less on a large contract, plus mobilization, fuel and crew camp costs.

The pre-production drilling information is necessary prior to planning a mining operation. Drilling exploration confirms gravel reserves, delineates paystreak and drill proven grade of gravels. The most cost efficient method of placer mining can then be planned for a continuous operation.

ECONOMIC PLACER EVALUATION

Inferred Gravel Reserves and Grade

A representative placer gold sample is difficult to obtain, as the deposit is a mixture of fine sand, pebbles, cobbles and boulders that vary in the mass of aggregate in different proportions. To collect and test a representative placer sample all of the constituents of a deposit should be in the exact same proportion in which they occur in the aggregate mass. When testing a placer sample, containing heavy concentrate and high valued gold, any error in the gold content of the sample will drastically affect the final result. In an economic placer deposit the amount of gold by volume, may be in the order of one part gold to a hundred million parts of gravel. Placer ground having a gold-gravel ratio of 1:100,000,000 by volume is worth approximately \$1.86 per cubic yard (gold @ \$435/oz.). A single fly speck of gold in a pan of gravel is equivalent to about \$0.17 per cubic yard at \$435/oz. gold - 885 fineness. Theoretically, the problem can be overcome by taking a large bulk sample rather than a few pounds of gravel, but it is seldom practical or possible to take large samples. If the deposit is a large mass of small and uniform size of gravel the gold is more evenly distributed and a few samples are required to estimate the value. If the stream type of deposit contains a variety of material from sands to large boulders, with coarse erratically distributed gold particles, it will affect the number of samples to be taken from the aggregate.

Placer samples yield limited information because of the heterogenous nature of gold-bearing gravels. Correct sample interpretation of the test results depends upon a placer engineer's experienced judgement and geological deduction ability rather than on any set formulae application. A pre-determined optimum sample pattern is difficult to achieve for the purpose of evaluating a placer property. Initial sample evaluation should be flexible enough to determine if a property is not economic, or if good economic potential indicates further work on a closer sample pattern is warranted. However, the desired number of samples can rarely be taken on a placer property due to economics or available equipment. It is noted by the writer that the "placer investor or operator must either reject a property which is not 100% reliable and therefore the investor/operator must accept some degree of risk". The minimum number of samples taken, to evaluate a placer property, must be considered to be the frequency required to keep the risk within acceptable limits.

There are several placer geological features and reported grades per cubic yard of creek or bench gravels, from previous work, that indicate possible economic potential gravel reserves in the Klondike District. The final analysis of the data collected on the placer property is usually based on the placer geological knowledge of the area. The writer has followed the procedure to report precious metal values and sample technique reporting as followed by most Canadian Security Commissions and specified by the policy of the Ontario Securities Commission. The tested value of gravels are reported to indicate "inferred grade" and "possible gravel reserve", that is based on gold recovered from a sluice box washing plant.

Ontario Securities Commission Policy

- 1) Ore and Grade Classification: Canadian Securities Law Reports.
The Ontario Securities Commission states in Policy 2, Statement (54 - 839), that care should be taken in the use of the word "ore", when preparing Engineer's Reports for securities purposes. The term "ore" is defined in the most recent Ontario Regulations as follows:
 - (a) ORE - means a natural aggregate of one or more minerals which, at a specified time and place, may be mined and sold at a profit, or from which some part may be profitably separated;
 - (b) Proven Ore or Measured Ore - means that material for which tonnage is computed from dimensions revealed in outcrops or trenches or underground workings or drill holes and for which the grade is computed from the results of adequate sampling, and for which the sites for inspection, sampling, and measurement are so spaced and the geological character so well defined that the size, shape, and mineral content are established, and for which the computed tonnage and grade are judged to be accurate within limits which shall be stated and for which it shall be stated whether the tonnage and grade of proven ore or measured ore are in situ or extractable, with dilution factors shown, and reasons for the use of these dilution factors clearly explained;
 - (c) Probable Ore or Indicated Ore - means that material for which tonnage and grade are computed partly from specific measurements, samples, or production data, and partly from projection for a reasonable distance on geological evidence, and for which the sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to outline the material completely or to establish its grade throughout;
 - (d) Possible Ore or Inferred Ore - means that material for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements, and for which the estimates are based on an assumed continuity or repetition for which there are reasonable geological indications, which indications may include comparison with deposits of similar type, and bodies that are completely concealed may be included if there is specific evidence of their presence.

Note: Where the word "ore" may not properly be used, such terms as "mineralization", "mineralized bodies" or "concentrations", etc., should be used.

FINESS

The proportion of pure gold in bullion or in a natural alloy, expressed in parts per thousand. Natural gold is not found in pure form; it contains varying proportions of silver, copper and other substances. For example, a piece of natural gold containing 150 parts of silver and 50 parts of copper per thousand, and the remainder pure gold, would be 800 fine. The average fineness of placer gold obtained in the "Matson Creek" area is 775 - 890 fine.

SHAPE/SIZE OF PLACER GOLD

It is generally recognized that the shape and angularity of placer gold may serve as a measure of distance travelled. The heavier and more hackly, the nearer the source. The more water-worn and scaly, the further it has travelled from its source. While this can be accepted as fact, the near-absence of statistical data precludes the formulation of specific rules. The following figures should be used with this in mind.

<u>Distance from Source</u>	<u>*Nature of Gold</u>	<u>Description</u>
5 miles	Rough nuggety	Coarse
8 miles	Small nuggety, water worn	Rough
11 miles	Fine granular	Shotty
25 miles	Fine scaly	Flaky or Fine

* Gold in Adelong Creek, New South Wales. Data from article by N. H. Fisher; *Fineness of Gold With Special Reference to the Morobe Gold Field, New Guinea: Econ. Geol., Vol. 40, No. 7, November, 1945.*

In the Klondike District the gold occurs in small and larger particles that are locally referred to as grains or flakes and smaller particles are named fly specks.

Classification of Gold Colors

Classification of colors: The number of colors are classified in the No. 1, No. 2, and No. 3 sizes. No. 3 is the finest and consists of all particles weighing less than one milligram. No. 2 is the gold consisting of all particles weighing between one milligram and four milligrams. No. 1 gold is any particle weighing over four milligrams. These are colors of gold noted and recorded for the purpose of estimating the weight of gold recovered from a pan of gravels or from the heavy concentrate recovered from a measured quantity of gravel.

Fineness and Relation to Vein Gold

The farther placer gold is transported from source, by a stream, the fineness or purity increases. The increase in fineness is caused by the solution of silver in the gold/silver alloy in the outer layers of the grain, particles and nuggets. The following is quoted from *Mineral Deposits* - by Waldeman Lindgren, 1933 - Page 233.

Fineness and Relation to Vein Gold (Con't)

Fineness and Relation to Vein Gold - The fineness of placer gold (or parts of gold per thousand) varies from about 500 - 999. Silver is always alloyed with the gold, but other metals are rarely prominent; copper is occasionally present. While vein gold may have a fineness of 997 to 999, this is exceptional; far more commonly its fineness ranges from 500, which corresponds to electrum, to about 800 or 850. The placer gold in any district will usually be of higher grade than the vein gold, and its fineness increases with the distance transported and with the decreasing size of the grains. Thus, while in California the vein gold averages 850 fine, the transported placer gold in the Tertiary channels averages 930 to 950. It has been shown that this increase in fineness is due to the solution of the silver in the alloy in the outer layer of the grains by the action of surface waters. McConnell has proved that in the nuggets from the Klondike the outside actually has a greater fineness than the inside. The loss of silver in the outer part was from 5 to 7 percent. This interesting result well illustrates the relative insolubility of gold.

Five assays of selected nuggets made by Mr. Connor in the laboratory of the Geological Survey, Dept. of Mines and Resources, was reported by R. G. McConnell - "The Yukon Territory" Its History and Resources - 1916, P. 29.

		<u>Centre of Nugget</u>	<u>Surface</u>	<u>Location</u>
1.	Silver Gold	35.8 64.2	29.4 70.6	Trail Hill, Bonanza Creek
2.	Silver Gold	39.9 60.1	33.5 66.5	Chechako Hill, Bonanza Creek
3.	Silver Gold	37.3 62.7	30.3 69.7	Bonanza Creek No. 12 Below
4.	Silver Gold	46.1 53.9	41.0 59.0	Treasure Hill, Last Chance Creek
5.	Silver Gold	33.0 67.0	33.5 66.5	Bonanza Creek No. 3 Below

. . . /

GOLD COLOR CLASSIFICATION METHOD

Gold Placer Gravel Sampling

The small test samples obtained from existing gravel exposures can seldom be expected to indicate the actual value of the ground. They may prove or disprove the presence of gold and if correctly interpreted can indicate the range of values to be expected. Most placer engineers agree that, where feasible, all of the material taken from a test pit or shaft should be washed. Where an excavation cannot be measured accurately, it is necessary to weigh the sample material or to measure its loose volume in a box or other container. In either case the indicated gold value will have to be converted to in-place or "bank" value by use of suitable conversion factors. Successful placer mining operators learned long ago to approach placer prospects "cautiously" and to make a few diagnostic tests prior to an expensive sampling program. In many cases a backhoe excavation trench sampling program adapts to preliminary testing.

Gold Color Classification Method

Gravel samples gathered from a placer prospect usually are hand panned and checked for "colors" of gold per pan. Samples are usually collected from test pits, shafts, or dug from creek beds or benches. The "pan factor" is the weight of gravels contained in the standard size pan and must be determined. The pan of gravels can then be related to a portion of a cubic yard of unconsolidated material tested. The gold color classification method, in a pan of gravels, is an estimation of the value per cubic yard of material checked.

Pan Factor:

A standard pan of gravel weighs approximately 25 pounds and there are 135 pans per cubic yard of bank measure gravels, with a weight of 3,300-3,400 pounds.

Gold Colors Classification:

No. 1 - particles over 4 mg (20 mesh particle 6.57 mg)

No. 2 - particles weighing between 1-4 mg (40 mesh particles 0.91 mg)

No. 3 - particles less than one mg (60 mesh particles 0.27 mg)

fs - one "fly speck" of gold is estimated to weigh one milligram (mg), a gram = 1,000 milligrams.

Placer Drill Sampling

A reverse air-circulation-double walled pipe diesel hammer drill (Model H-180) equipped with a 6-5/8 inch O.D. "Permafrost Bit" recovers 65 pounds of gravel, sand and silt cuttings from each two feet drilled. The drill cuttings are hand-processed in a small aluminum sluice box and the heavy concentrates recovered from the Nomad Matting. The heavy concentrates are hand-panned and a count made of gold colors present. The gold particles present are then assigned a weight in mg by the classification of #1-#2-#3 and fs particles. Placer drill hole volume of gravel samples or core obtained is represented by a cylinder whose length is equal to the depth of hole and the diameter of the drill bit. The drill gravel sample can then be calculated to determine inferred gold value and grade per cubic yard.

$$\text{Value per cu.yd.} = \frac{\text{Mg recovered} \times \text{price per Mg}}{\text{Volume (in cu.yds.)}}$$

Uncased Small-Diameter Drill Holes:

Various attempts to sample gold placers by use of uncased or small-diameter drill holes have for the most part generated more problems than they have solved. The volumetric gold-to-gravel ratio in 15¢ ground (gold \$35/oz) is about one to 100,000,000 (1:100,000,000). Calculated drill hole values are extremely sensitive to stray gold particles or "incorrect sample volume". Any sloughing of an uncased drill hole, should it occur in a gold-bearing zone, will tend to upgrade the calculated value by significant amounts. If it could be determined how much excess material entered a sample and exactly where it came from, the discrepancies might be appraised and allowances made during the calculation process. Drilling experience indicates that this is not always practical and that when dealing with the usual gold placer, uncased drill holes do not give reliable results. The placer ground is over-valued and is particularly true when rotary drills are employed, especially those using roller-type bits. The mineral examiner should always view critically any placer evaluation based on gold values obtained from uncased or small-diameter drill holes. Source: Technical Bulletin 4, United States Dept. of the Interior-Bureau of Land Management, July 1969.

Placer Exploration/Development/Production Stages

To explore, develop and place into production a placer property, the following described procedure is necessary and essential:

1) Basic Placer Exploration:

- Exploration Drilling (and/or) - Pit Samples (triangle method)
- Detail Drilling - Open Cut Bulk Sample
- Development Drilling - Payzone Sample (backhoe or cat)

2) Placer Feasibility Study:

- Grade and Volume
- Mining Plan
- Costs/Development Expenditures

3) Placer Production:

- Placer Operation
- Operating Costs

Method of Reporting Reserve Grade

Placer reserves are reported in the Yukon as values per cubic yard of gravel or in bedrock feet (square feet). It is the present and past custom of miners in the Yukon to give values per square foot of bedrock or to the box length of 144 square feet rather than in terms of cubic yard. Both methods of reporting values are valid as paystreak occurs in overlying gravels, bedrock surface and at depth into bedrock bedding planes and fractures. The position of the payzone determines the quantity of waste that must be removed to extract pay material for processing.

1991 PLACER GEOLOGICAL SURVEY

Gemini-Soda-Spud Creeks:

R.G.Hilker travelled from Calgary to Whitehorse and Dawson City, Y.T., during the period September 7-29, 1991. On September 11, 1991 the writer applied to Marion E. Dejean - Dawson District Mining Recorder for permission to conduct a placer geological survey on the creeks that contained the Gem 1-30, Soda 1-40 and Spud 1-40 Yukon Placer claims. The placer proposal was forwarded to S.R. Morison, Chief Geologist, N.A.P., Yukon region and determined to be acceptable. Therefore, the writer proceeded to Dawson City to mobilize for a trip into the North Ladue River area and the Gemini airstrip. During the period September 18-23, 1991 a placer property examination and related field mapping was conducted on Gemini, Soda and Spud creeks.

Placer Project Schedule:

September 7-8, 1991: Pickup truck travel from Calgary to Watson Lake, R.G.Hilker and geological assistant Anne Hilker.

September 9-11, 1991 (6 person days): Vehicle travel from Watson Lake to Whitehorse Sept. 9 and mobilizing of equipment for Dawson City. Application for permission to conduct a placer geological survey on left-limit tributary creeks North Ladue River area.

September 12, 1991 (2 person days): Travel from Whitehorse to Dawson with two pickup trucks and bush gear.

September 12-17, 1991 (10 person days): Mobilization arrangements for travel to the Gemini airstrip campsite, North Ladue River area. Plans to fly into the Gemini airstrip by Cessna 206-Bonanza Aviation and travel by road with two "Honda Fourtrax" ATV 350 x 4x4 bush vehicles. Preparation for travel, communications, information on 1991 road built to Upper-Matson Creek, camp equipment and documentation at Dawson Mining Recorder's office.

September 18-23 (16 person days): R.G.Hilker, with field and camp gear, mobilized to Gemini airstrip by Cessna 206-Bonanza Aviation. Established campsite and traversed ridge adjacent to airstrip and lower Gemini creek to locate Klondike Schist bedrock. Anne Hilker and Brad Callison travelled to Gemini airstrip by two Honda Fourtrax vehicles and one tow trailer with gear and fuel. The Honda Fourtrax were used to travel from the Gemini airstrip campsite to Gemini, Soda and Spud creeks. The Hondas worked very well in the hummocks terrain in the North Ladue River valley and easily travelled the tractor trails adjacent to the

creeks slashed staking "baselines". The writer was able to placer geologically traverse the creeks and locate 1981 drill holes. The Honda Fourtrax was the first experience for the writer to travel within isolated placer valley terrain. The Honda vehicle travel extended a work day considerably and permitted rapid access to every part of the creeks. The creek traverses were completed by mid-day September 23 and the crew demobilized from the Gemini campsite.

The demobilization from Gemini airstrip was accomplished by Brad Callison on one Honda towing a trailer of gear and the two Hilkers on the second Honda. The road system route from Gemini airstrip was by tractor trail to Matson airstrip-campsite, 1991 truck road from Upper Matson Creek to right-fork of the North Ladue River and right-fork to Bedrock Creek on the Sixtymile River. The Honda Fourtrax vehicle trip was 75 miles (121 kilometers-determined by Honda odometer) in length and required 10 hours travel time. The view from the 6500 feet elevation on the 1991 "Murray Orbanski" road was magnificent, the winds in the high country chilling, and a great sense of accomplishment was experienced.

The North Ladue River field crew arrived in Bedrock at 10:00 p.m. and Dawson City at 12:30 a.m., accompanied by a six-day bush odor and extremely fatigued so that a drink of rum would not entice them from a shower and warm bed!

September 24, 1991 (3 person day): Unpacking gear, Hondas and equipment from trailer, resting and drinking "Bacardi Breeze" rum that was missed the previous evening.

September 25, 1991 (2 person day): To Dawson Mining Recorder's office and filed the renewal application for the Gem 1-30, Soda 1-40 and Spud 1-40 Yukon Placer claims and paid \$1,100.00 recording fees. R.G.Hilker would like to acknowledge and thank Marion E. Dejean for her cheerful and kind assistance as Dawson Mining Recorder, that make possible the placer geological survey, conducted within the North Ladue River area tributary creeks.

September 25, 1991: Departed Dawson City on Wednesday evening for Whitehorse in 1980 Ford Pickup truck.

September 26-27, 1991 (2 person days): Demobilization of Yukon trip in Whitehorse and preparing for return trip to Calgary.

September 28-29, 1991: Return trip from Watson Lke to Calgary, Anne Hilker and R.G. Hilker.

Placer Geological Survey Personnel

- R.G. Hilker, P.Eng., Placer Engineer, address 324 Silver Valley Rise N.W., Calgary, Alberta, T3B 4B2; el. 403-288-0090, Fax 286-7375.

Project Yukon Dates: September 9-17, (Whitehorse & Dawson), Sept. 18-23 (Gemini airstrip area), Sept. 24-25 (Dawson City), Sept. 26-27 (Whitehorse & Watson Lake).

Project Report Dates: October 10-20 (Calgary) December 5-8, January 15-February and March, 1992 (Calgary) report preparation, drafting and data compilation 30 professional days.

- Anne J. Hilker, B.A. (Placer geological assistant); address 820 Avenue G. North, Saskatoon, Saskatchewan, S7L 1Z7; tel. 306-653-1137.

Project Yukon Dates: September 9-27, 1991 (19 person days - geological assistant).

- Brad Callison (Project equipment operator and geological assistant). Address, Callison Enterprises, Bag 4000, Dawson City, Yukon, Y0B 1G0; Tel. 403-993-5065, Fax 403-993-6333.

Project Yukon Dates: September 18-23, 1991 (Gemini airstrip area) North Ladue River project.

PLACER HISTORY & DEVELOPMENT

LADUE RIVER (Lat. 60°10'N & Long. 140°20'W) NTS Sheet 115-O & N. A tributary to the White River.

The NORTH LADUE RIVER is a major tributary to the Ladue River and extends 40 miles north from its confluence to headwaters of the left and right forks (NTS Sheets 115-N-7, 10 & 15).

This river was prospected and named in the early 1880s by Joseph LADUE who found some gold on it, as well as on the small creek of the same name which enters the river near its mouth.

Ladue, who came from New York State, was one of the first prospector-entrepreneurs to come to the Yukon, arriving over the Chilkoot Pass in the spring of 1882. Combining prospecting with trading and other enterprises, he was early convinced that a major goldfield would be found in the general area of the Indian and Klondike Rivers. This belief led him to encourage and grubstake prospectors to work there. He grubstaked Robert Henderson in 1894-95 and sent him up Quartz Creek to visit William Redford who was successfully mining there. He himself was one of the first to prospect the Sixtymile and Fortymile districts, although with limited success. He and Jack McQuesten prospected Bonanza Creek in early 1886 but missed the rich gold there. Loosely associated with the ACC, he and Arthur Harper opened a trading post and brought in the first sawmill to the Yukon, at the mouth of the Sixtymile River in 1894. At first called Sixtymile Post, they soon changed the name to that of their friend, William Ogilvie.

In early August 1896 Ladue had, by a remarkable coincidence, decided to remove his sawmill from Ogilvie to the flat at the mouth of the Klondike River, where he intended to set up a small trading post. He arrived there on 28 August and realizing the potential of the new finds, staked the flat land, 160 acres, as a townsite. He set up his sawmill and trading post and quickly built a fortune, becoming a millionaire in the next two years.

He returned to Schuyler Falls, New York in 1897 and married his childhood sweetheart. On 27 June, 1901, suffering from tuberculosis, he died at his home there. Source: Yukon Places & Names, R. Coutts, 1980.

DISCOVERY NORTH LADUE RIVER PLACERS

Sixtymile/North Ladue River Gold District

The Sixtymile district is situated east of the Coast Range and is within the Cordilleran Interior Plateau. The district is further described to be situated in the Western Yukon Plateau and locally forms a part of the Tertiary-aged Klondike Plateau. The topography was formed by uplifting of an undulated plain which formed a series of long branching ridges between intersecting streams and rivers. The topography of the area has an average elevation of 4,000 to 4,800 feet and forms the western part of the Quaternary age Dawson Range. The maximum relief of the Sixtymile, North Ladue and Ladue Rivers district is 4,000 feet.

The most important tributaries of the Sixtymile River are Big Gold, California, Boucher, Fish, Fifty Mile (middle fork) and Matson (south fork) Creek. The main Ladue River tributary is Rice Creek and the important tributaries on the North Ladue River are McElfish, Bakke, Gemini, Soda and Spud Creeks. The Sixtymile, North Ladue and Ladue Rivers district is non-glaciated and lies within the discontinuous zone of permafrost. The valleys are mainly U-shaped and are broad-floored; the stream system has clear water, indicating that they are not presently transporting material. There are approximately fifty "V-shaped" tributary creeks of variable size flowing into the North Ladue River from either the east or west valley ridges at approximately one mile intervals. The majority of these right/left limit tributaries originate in the "Klondike Schists", the most "favourable source for placer gold" in the region.

The North Ladue River and tributaries are within the southern section of the Sixtymile placer gold district. The North Ladue sub-parallel the Alaska-Yukon border along a 40 mile distance between the headwaters and confluence of the Ladue River. The North Ladue River is located 50-65 airmiles southwest of Dawson City, Yukon.

EXPLORATION AND DEVELOPMENT HISTORY

Placer Search North Ladue & Ladue Rivers 1886-1896:

Placer prospecting on the North Ladue River during the period 1886-1896 when the Sixtymile gold camp was active and prior to the discovery of gold in 1897 on Bonanza Creek (Rabbit Creek) in the Klondike. Downstream on the North Ladue River valley from the left and right forks there are remnants of old cabins and "porcupine boilers" that were used for placer exploration in the river gravel floodplain.

The writer notes that the placer prospectors of early days were discouraged by deep ground - depths of 100 feet to bedrock. However, it must be considered that most of the prospecting in those days was done by hand - sinking shafts - or pick-and-shovelling gravel through a small sluice box. Those prospectors were severely handicapped by permafrost, or in some cases, the discontinuously frozen ground. The old type of Keystone drills were not designed to penetrate to depths greater than 30-40 feet.

Matson Creek Discovery 1911-1943:

Matson Creek forms what was formerly referred to as the "South Fork" of the Sixtymile River. The creek is over 30 miles in length and was said to be "discovered" in 1911. Mr. J. Matson worked placer claims near Weide Gulch from about 1911 until his death in 1942; the creek was named after him. Local Dawson folklore recounts that Mr. Matson lived year-round on the creek and was always successful in producing gold from his claims; he had the distinction of being a rugged individual, a generous and hard drinker when in Dawson, and to further describe this colourful character he was married to "Klondike Kate". Mr. Matson was somewhat a man of mystery and he lived and died in the same manner.

The "Discovery Claim" is located towards the head of Matson Creek at the foot of Weide Gulch. The upper portion of the creek is underlain by Proterozoic aged Klondike Schist. Between the forks with Marion Creek a Cenozoic aged Quartz Feldspar Porphyry plug intrudes. The depth of bedrock on Discovery Claim is about 20 feet and on the creek benches about five or six feet. The maximum thickness varies from the creek rim towards the hillsides. Values found in 1911 ranged from \$0.18 to \$1.00 per square foot of bedrock. A cut of 115 feet made across a bench indicated that the paystreak extended the full distance. The total width of paystreak is unknown and lies in the bedrock. Both coarse and fine gold occur on Matson Creek Discovery Claim and show little wear, indicating a short transportation distance. Some "pay" is reported in the creek gravels, which are about 20 feet deep, with irregular distribution. Source: R.G.Hilker report, July 1977.

The "Klondike" sericite and chlorite schists are the main source of placer gold in the Klondike Gold District and the schists underlay Upper-Matson Creek. The headwaters of Matson Creek drain from the same ridge that borders the left-limit or east side of the central part of the North Ladue River. W.E.Cockfield (G.S.C. Memoir 123) reports that the "Discovery Claim" on Matson Creek (estimated to lie eight miles east of the North Ladue River) is underlain by Klondike group decomposed schists. The gold lies on the bedrock and extends into it for a depth of four feet. Values range from 18 cents to \$1.00 per square

foot, (\$1.00 to \$5.00/square foot at \$100.00/ounce), both coarse and fine gold occurs in the bench and creek gravels.

North Ladue-Treadwell Yukon Company - 1920:

Placer prospecting on the Ladue and North Ladue River and tributaries by Sam Espland on behalf of the Treadwell Yukon Company - Mr. L. Werneki. There is no record of placer gold production from the North Ladue River. During the 1920s Sam Espland prospected the Ladue watershed and found that the majority of the tributaries flowing into the North Ladue River carried variable amounts of placer gold. W.E. Cockfield in Memoir 123 (G.S.C.) reports float gold being found in Rice Creek, Deep Creek, Otter Creek and at other points within the Ladue valley.

Espland-Ellingson Ltd. Partnership 1973:

Placer staking of 22 contiguous Yukon Leases to Prospect from the headwaters of the North Ladue River and confluence of the Ladue River.

Espland-Ellingson Drill Program 1975:

The Espland-Ellingson Limited Partnership owns 22 contiguous Yukon Leases To Prospect (placer prospecting leases), that commence at the headwaters of the North Ladue River and extend downstream 55 miles to the mouth of the Ladue River. Mr. Sam Espland initiated the acquisition of the leases, is a veteran prospector who has had many years of placer gold mining experience in Alaska and the Yukon. Espland first became interested in the placer potential of the North Ladue River while prospecting the area during the 1920s for L. Werneki, Manager of the Treadwell Yukon Company. G.C. Gutrath, P.Eng. visited the North Ladue River for the first time with Ken Ellingson and Sam Espland on August 18, 1973. This trip was very brief and only allowed for a cursory examination of the general terrain and the surface gravels in a number of locations along the main river channel. In February 1974, a report on the prospecting leases was completed for the Partnership outlining a reconnaissance churn drilling program. During early August 1975, a Bucyrus Armstrong 23P churn drill, mounted on dual wheels, was mobilized from the Sixtymile placer camp into the North Ladue by a Caterpillar D-7-17A bulldozer. The drill was equipped with ninety feet of 6-inch I.D. casing and 7 ½-inch drive shoe. The first churn drill hole was located 800 feet southwest of the confluence of the east and west forks of the North Ladue River. The hole was drilled to 90 feet without reaching bedrock. The hole could have gone deeper but 90 feet was the maximum depth that could be drilled with the cable available on the drill rig. It was initially planned to drill a line of 3 to 5 holes across the valley from Hole No. 1, but

because bedrock could not be reached it was decided to move further north and closer to the valley wall. Fortunately, Hole No.2 reached bedrock at 82.5 feet. Hole No.3 was drilled 189 feet west of Hole No.2 and it reached bedrock at 72 feet. It was originally planned to drill another one or two holes along this section and then move downstream approximately five miles and drill another five holes across the valley. However, the delay in getting the churn drill operational, and the equipment mobilized to the North Ladue did not leave enough time to complete the program. Source: G.C.Gutrath, P.Eng., October, 1975.

Espland-Ellingson Drill Program 1976:

Basic exploration churn drilling was conducted on the North Ladue River during the summer of 1976. The churn drill used was a Kirk Hillman Airplane Drill, mounted on a pipe sled, that places a 5-inch casing and has a 6.5 inch drive shoe. In an affidavit for assessment work on lapsed PL3658, four 5-inch diameter drill holes were drilled. The depth of drilling was - hole #4-102 ft., hole #5-100 ft., hole #6-approx. 100 ft., hole #7 -71 feet.

The churn drill holes were completed on the North Ladue River, suggest deep overburden to bedrock in the area of lapsed PL3658, within the main valley floor. Further churn drilling near the fork in the North Ladue River, the tributaries and the first tier benches will determine the thickness of overburden on the northern placer prospecting leases. It could reasonably be expected that the benches and tributaries will have approximately 20-40 feet of overburden above bedrock. Source: R.G.Hilker, P.Eng., May 14, 1980.

DISCOVERY NORTH LADUE RIVER PLACERS

Upper Matson Creek Placers 1978-1985:

Goldmark Minerals Ltd., Calgary, Alberta, mobilized placer mining equipment and camp trailers to Matson Creek in 1978. A 1,500 foot airstrip was constructed in 1978 to haul fuel and supplies to the upper part of Matson Creek. Tractor trenching discovered rich placer gravels near the mouth of Bow Pup and Matson Creek. During a ten-day period in early October 1978, 10,000 cubic yards of gravels were sluiced and 315 ounces of placer gold recovered. From the summer of 1978 through 1985, Goldmark continued summer sluicing operations and exploration programs on the upper part of Matson Creek. During the time period of 1978-1985, or in eight summer field seasons, the previous operators sluiced approximately 317,000 cy of gravels, that contained a weighted average of \$8.29/cy gold values. Therefore, previous Matson Creek placer operators have indicated that gravel values have been approximately \$8.29 per cubic yard based on a gold price of \$435 Cdn.

Upper Matson Creek 1991

During the summer field season of 1991 a new road was built from the right fork of the North Ladue River to Upper Matson Creek and Bow Pup. Two placer mining operators have taken a "lay" on placer ground located upstream from the confluence of Pine Creek and the headwaters of Upper Matson Creek. The Matson Creek placer operations have been dormant from 1985-1991 and large scale operations are expected to commence in 1992.

Hilker-Crawford Placer Property Acquisition 1980:

During May 1980, R.G.Hilker prepared a personal evaluation report on the placer potential of the North Ladue River drainage system and tributaries. The writer noted that deep gravels 100 feet thick overlayed Klondike Schist bedrock within the upper part of the North Ladue valley (Gordon Guttrath 1975 & 1976). R.G.Hilker reasoned that the left-limit tributary creeks of the North Ladue River were underlayed by Klondike Schist bedrock and probably contained gravels 30-40 feet thick. The North Ladue River central drainage system was situated adjacent to a common ridge between Upper-Matson Creek. A "glory-hole" placer deposit was discovered in 1978 by R.G.Hilker-Goldmark Minerals Ltd., that produced 4,800 ounces fine gold (1978-1979-1980) at Bow Pup on Matson Creek.

Consequently, R.G.Hilker interested Gary Crawford, Dawson, Y.T. in the placer prospects of the North Ladue tributaries. Crawford and Hilker flew from Dawson to the North Ladue River drainage system in a Bell 206 charter helicopter in early September 1980. The left-limit tributary creeks were placer prospected and panned. It was noted that the creeks all contained Klondike gravels and black sands were present in the creek gravels panned.

Golden Grizzly Placers Ltd, Sept. 1980

R.G.Hilker and G.W.Crawford incorporated Golden Grizzly Placers Ltd. in the Yukon to acquire placer prospecting leases on the North Ladue River drainage system. During September to October 8, 1980 a total of 42 Yukon Prospecting Leases were staked over 175 miles of placer ground overlaying the North Ladue River valley and tributary creeks.

Identification of Tributary Creeks

The North Ladue River extends 40 miles in length adjacent to the Alaska-Yukon international boundary. The left-limit tributaries within the area of 360 square miles contain numerous "unnamed creeks." The problem of unnamed drainage tributaries presented a major problem of identifying a creek for location, navigation and staking purposes. Prior to staking prospecting leases within the North Ladue River drainage system, R.G.Hilker named 14 left-limit tributary creeks and 3 right-limit tributary creeks. The writer named the creeks "locally"

to permit identification of the tributary drainage. Considerable "thought" was exercised by the writer when the choice of a creek name was contemplated. The thought process was accelerated when staggering through three feet high nigger-heads that included a foot of water at the grass base. Therefore, to spare the reader needless repetition or description of the North Ladue River valley terrain conditions, an explanation is offered of names chosen for three left-limit creeks.

GEMINI CREEK - Named for B.D.Gale, Dawson, Yukon, who staked the three mile Gemini #1 lease to prospect, October 8, 1981. The adventurous young woman, who ventured to the North Ladue River valley by helicopter, her horoscope sign was "Gemini".

SODA CREEK: The latter word from "Club Soda" derived from numerous fond memories of the mix that accompanies J.B.Scotch Whiskey. The four mile creek was staked September 30, 1980.

SPUD CREEK The name "Spud" was the nickname of an excellent diamond driller from La Ronge, Saskatchewan. The writer met Spud when development drilling on the Fox-Lake orebody of Sherritt Gordon Mines during 1964 and 1965. The four mile creek was staked September 20, 1980.

The writer used similar ingenuity and "memory-data bank" recollections of a wandering explorationist to name the tributaries of the North Ladue River. The Canadian Geographical Names chosen for topographic features are based on deceased contributors of Canadian prominence. The North Ladue River drainage system encompasses 360 square miles of terrain. The writer has developed a great reverence for the rugged beauty and peaceful serenity of the North Ladue River region. For those who venture to this beautiful valley, do so with admiration of its silence and in respect of its environment. The North Ladue River valley is for the "living" and for those who walk with reverence for the beauty that exists in the Yukon.

The North Ladue River tributary "local-names" are required for location, navigation and staking of placer creeks, therefore R.G.Hilker requests names chosen be used in the Dawson Mining Recorder's office.

Summary of Placer Property 1980

It appears likely that placer ground is presently available to be worked on the creeks in the Sixtymile and North Ladue district. Many of the creeks are known to contain gold and a steady production could be expected for a number of years of placer operations. It is further probable that not all of the economic placer gold deposits have been discovered in the district. The main areas which have been prospected are located around the outer ring or limits of the Sixtymile region; the interior section drainage system has received very little or no exploration work, according to records. The two main interior sections of the Sixtymile having a possible unproven reserve of placer gold are the North Ladue River and Matson Creek, and their tributaries. It is reasonable to expect that considerable gold-bearing placer ground remains to be delineated on the North Ladue River and Matson Creek. Therefore, the North Ladue River and Matson Creek and their benches, gulches and pups can all be considered to be virgin placer gold areas within the Sixtymile district. The area can be referred to as "virgin" since no large heavy equipment has worked the frozen ground or moved large quantities of material in sluicing operations on the creeks or tributaries prior to 1978 on Matson Creek.

DISCOVERY NORTH LADUE RIVER PLACERS

Golden Grizzly Placers Ltd. Exploration 1981:

Preamble:

The Sixtymile Creek drainage system contains several mining operations developed during the period 1976-1980. A large-scale mining operation was started on Matson Creek in 1978 after the discovery of economic placer gold on the upper right limit of the creek. The North Ladue River drainage system tributaries are all situated in the Klondike Schist. The Whole of the rich Klondike Gold Field is similarly located in the rock types of the Klondike Schist. The North Ladue River drainage system project consists of approximately 175 miles of creek and bench Yukon Prospecting Leases. The entire creek claims are within the Klondike Schist and cover an area of about 360 square miles. Placer gold is reported to occur in several locations in the North Ladue River valley and tributary creeks. A mining operation on the upper part of Matson Creek, within two miles of the North Ladue River drainage system, has produced 4,700 ounces of fine gold during 1978, 1979 and 1980.

Placer Exploration 1981:

- April/May 1981: Mobilization of a D7G tractor to the North Ladue River valley from the Moosehorn Range by "French Lavoie". The Gemini airstrip (2500 feet) was built and located between Gemini and Soda Creeks. The Cassidy airstrip (2600 feet) was constructed south of Cassidy Creek. The airstrips permitted much needed access to the North Ladue River valley from Dawson by single engine fixed-wing aircraft. The airstrips are suitable for Cessna 185 & 206-B aircraft and the always reliable DeHavilland Beaver aircraft.

- July/August 1981: Mobilization of D6D tractor and 15 man Nodwell tracked camp to the north end of the North Ladue River valley.

- September 1-15 1981: Mobilization of Drill Systems - diesel hammer drill mounted on a Bombardier Carrier to the upper end of the North Ladue River Valley.

- August/September/October 15: Line-cutting creek baselines and marking posts by seven line-cutters during August and September. Conversion of leases to placer claims, related staking forms, expenditure sheets and sketches submitted to the Dawson Mining Recorder's Office, October 1-15. A total of 1744 placer claims were recorded October 15, 1981 and recording fees paid.

- September 15/October/November 5, 1981: Placer drilling on the North Ladue River valley and left-limit tributary creeks.

SUMMARY 1981 DRILLING

- A total of 90 holes that totalled 3987 feet of placer drilling within the North Ladue River valley and 10 tributary creeks.

- Excellent placer gold payzones were discovered by drilling on Gemini, Soda and Spud creeks.

- The average depth of black muck on 10 tributary creeks drilled was "eleven" (11) feet at 71 hole locations.

- The average depth of Klondike gravels situated above Klondike Schist bedrock on Gemini, Soda and Spud Creeks drill holes were 30-40 feet thick. The average total depth of 25 drill

holes located on Gemini, Soda and Spud creeks, was 41 feet and included in parts 3-4 feet of bedrock.

- Matson Creek is in close proximity to Gemini, Soda and Spud creeks and overlay Klondike Schist bedrock. Placer studies conducted on Matson Creek by R.G.Hilker, Placer Engineer, indicates that similar modes of placer gold deposits occur on Gemini, Soda & Spud creeks. Therefore, the size, shape and fineness (885) of placer gold discovered on Gemini, Soda & Spud creeks are similar to the Matson Creek placer gold.

NORTH LADUE RIVER PLACERS

Discovery Gemini/Soda/Spud Creeks - 1981

The North Ladue River gold placer region extends over an area of approximately 360 square miles. The drainage system is roughly forty (40) miles long, in a north-south direction and eight (8) miles wide. The placer ground is located in the main valley gravels 90-110 feet deep and within 17 tributary creeks with gravels 30-40 feet thick. During the summer and fall of 1981, placer gold exploration was conducted on the North Ladue River and adjoining tributaries. The exploration programme consisted of tractor trenching in creek and bench gravels, and placer hammer drilling in the main valley and on 10 of the tributary creeks. The basic placer exploration was accomplished in the central section of the North Ladue River drainage system. The 1981 placer drilling indicated excellent placer gold gravels on three left-limit tributaries. Placer gold payzone areas were identified by single drill lines located on Gemini, Soda and Spud creeks. The left-limit tributary creeks are located on the west side of a north-west bearing ridge that produces the drainage into the North Ladue River system. The Upper-Matson Creek placer gold gravels are located on the east side of a 10 mile long north-west ridge. The placer gold gravels, within the upper part of Matson creek, are situated about two miles east of the placer gold gravels within Gemini, Soda and Spud tributary creeks. The placer gold mode of occurrence on the North Ladue River left-limit tributary creeks possibly are relative to the placer gold on Upper-Matson Creek.

The North Ladue River and Upper-Matson Creek drainage system is located within approximately 360 square miles of the Klondike Schist rock formation. The lower eighteen miles of Matson Creek downstream from the confluence of Pine Creek is underlayed by Pelly Gneiss and Cormacks Group volcanic units. The placer gold Klondike Gravels that have been discovered to date on Upper-Matson Creek and Gemini/Soda and Spud Creeks overlay Klondike Schist bedrock.

Glory-Hole Deposit - Matson Creek

The richest placer gravels discovered to date occurred within an ancient bend of Upper-Matson Creek and the mouth of Bow Pup. The "glory hole" collected a total of 4,515 ounces of gold valued at \$1,738,000 Cdn. (\$435/oz.). The previous operators on Matson Creek were prevented from further development work on the creek gravels because of water use regulations and were forced to develop reserves on bench ground away from the creek drainage. The exploration, development and mining was conducted on the south side of Matson Creek between Bow Pup and Donna Pup over a distance of 1.7 miles downstream

from the initial 1978 disocrey cut at Bow Pup. The bench gravels proved to be low grade deposits with recovered values of \$3.65 - \$2.20 - \$6.94/cubic yard. However, the 1981 cut contained abundant fine gold that was approximately one mg or less in size and consequently was floated out of the sluice box.

Therefore, previous Upper-Matson Creek operations have proven that high grade rich pockets or "glory holes" occur in select areas of creek gravels. The upper benches or terraces contain spotty low grade paystreak gravels.

Gemini/Soda/Spud: "Glory Hole" Potential

R.G.Hilker, P.Eng., recommends that future exploration on Gemini, Soda and Spud creeks be concentrated in areas favorable for "glory-hole" type of placer gold deposits. The glory-hole area will be small in size, perhaps 1,000 feet x 100 feet or 100,000 bedrock feet of payzone. The Klondike Schist bedrock will be overlayed by an average of 11 feet of black muck, 15-25 feet of waste gravels and 2-10 feet of gravel/bedrock payzone. The high grade deposit area could probably contain 15,000 cy of payzone material with an inferred value of \$22.00 - \$84.00/cy and possibly contain 7,000-8,000 ounces of recoverable gold.

NORTH LADUE RIVER ECONOMIC GEOLOGY

1981 Drill Hole Review

The North Ladue River valley and ten tributary creeks were placer drilled September 7-November 5, 1981. Exploration drilling was conducted to collect the maximum amount of basic placer data within the drainage system. The 1981 drilling conducted in 90 locations in the North Ladue River valley and on ten tributary creeks indicated gold bearing paystreaks. There was a total of 3,987 feet of drilling completed in 90 holes. Three of the left-limit tributary creeks drilled indicated a possible gold payzone.

Gemini Creek - excellent gold colours

Soda Creek - excellent gold colours

Spud Creek - favourable gold indications

The drill cuttings were processed in a small aluminum long-tom or small sluice box and the heavy concentrates recovered from the nomad matting. The heavy concentrates were hand-panned and a count was made of gold colours present. The small sample was then dried and placed in plastic containers with snap-on lids. The dried sample was checked for magnetite content and other minerals present, and the container labelled with hole number, footage of sample, number of gold colours when present, and creek name. A drill log was made of each hole and all pertinent data noted and documented. The samples require to be further checked by a geologist, using a binocular microscope to further identify heavy minerals that may be present in the concentrate.

- Two feet of 6-5/8" OD drill hole produced approximately 65 pounds of gravel, sand and silt cuttings.
- Each drill hole provided useful placer data such as thickness of black muck and gravels, type of gravels, bedrock depth and composition, clay layers, and amount of heavy concentrate.

1) Summary of Placer Drill Program:

Total number of holes completed.....	90 holes
Total footage drilled on 11 creeks.....	3,987 feet
Total number of days drilled.....	33 days
Average number of holes drilled/day.....	2.73 holes/day
Average footage drilled/day.....	120.8 feet/day

2) Model H-180 Hammer Drill:

The drill used on the North Ladue River Project was a "DRILL SYSTEMS" model H-180 diesel hammer drill with 6-5/8" O.D. drill bit and double-walled rods.

- Permafrost bit 6-5/8" O.D.
- Double-walled rods, 4" I.D.
- Dual-walled rods with reverse air circulation for returning cuttings when percussion drilling. Air circulation between the two walls of pipe and the cuttings are forced through the inner pipe to the surface. The outer part of the pipe "cases" the hole.
- Cuttings recovered in a "cyclone" and placed in plastic bags.
- Diesel hammer.

3) Drill Samples Gold Color Method:

Placer drill hole volume of samples or core obtained is represented by a cylinder whose length is equal to the depth of hole and the diameter of the drill bit.

$$\text{Value per cubic yard} = \frac{\text{mgs gold recovered} \times \text{price per mg}}{\text{volume (in cubic yards)}}$$

Classification of Colors:

- No. 1 - particles over 4 mg (20 mesh particle 6.57 mg).
- No. 2 - particles weighing between 1-4 mg (40 mesh particles 0.91 mg).
- No. 3 - particles less than one mg (60 mesh particles 0.27 mg).
- fs - one fly speck of gold is estimated to weigh one mg or less.

4) Calculation Factors - Gemini/Soda/Spud Creeks

- a) Volume in cu.yds. per ft. depth is 0.0085355 cy (6-5/8 inch O.D. permafrost bit).
- b) Tributary creeks inferred fineness 885 (based on Matson Creek placer gold).
- c) Calculated values based on gold price of Cdn. \$435 per ounce and 885 fineness.
- d) Calculated Gold Values:
 - Gemini/Soda/Spud Creeks placer gold 885 fineness
 - Placer Gold Value - \$385 per ounce
 - Gold Value is \$12.38 per gram (gm) and 1.238 cents per milligram (mg).

NORTH LADUE RIVER PROJECT
1981 Placer Drilling Summary
September 07 - November 5, 1981

<u>Drill Hole #</u>	<u>Location</u>	<u>Total Depth</u>	<u>Black Muck</u>	<u>Gravels</u>	<u>Bedrock</u>
		<u>Ft.</u>	<u>Ft.</u>	<u>Ft.</u>	<u>Ft.</u>
<u>Gemini Creek</u>					
G 81-1	GEMINI #10	54	0-13	13-40	40-54
G 81-1	GEMINI #10	42	0-6	6-42	---
<u>Soda Creek</u>					
S 81-1	SODA #13	36	0-12	12-28	28-36
S 81-2	SODA #13	51	0-10	10-48	48-51
S 81-3	SODA #13	50	0-4.5	4.5-50	---
<u>Spud Creek</u>					
SP 81-1	SPUD #11	40	0-4	4-36	36-40
SP 81-2	SPUD #11	50	0-14	14-43	43-50
SP 81-3	SPUD #11	27	0-12	12-26	26-27
SP 81-4	SPUD #16	38	0-4	4-36	36-38
SP 81-5	SPUD #16	40	0-12	12-38	38-40
SP 81-6	SPUD #16	42	0-11	11-42	---
SP 81-7	SPUD #22	24	--	0-22	22-24
SP 81-8	SPUD #22	44	0-12	12-44	---
SP 81-9	SPUD #22	54	0-12	12-52	52-54
SP 81-10	SPUD #22	58	0-22	22-58	---
SP 81-11	SPUD #25	20	0-7	7-19	19-20
SP 81-12	SPUD #25	38	0-12	12-36	36-38
SP 81-13	SPUD #25	56	0-22	22-56	---
SP 81-14	SPUD #35	32	0-14	14-30	30-32
SP 81-15	SPUD #35	30	0-10	10-28	28-30
SP 81-16	SPUD #35	40	0-12	12-34	34-40
SP 81-17	SPUD #36	34	0-4	4-29	29-34
SP 81-18	SPUD #36	40	0-8	8-37	37-40
SP 81-19	SPUD #36	44	0-4	4-44	---
SP 81-20	SPUD #36	38	0-18	18-38	---

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ECONOMIC GEOLOGY
Summary of Gold Colours - Drill Cuttings
North Ladue River Project

<u>Drill Hole #</u>	<u>Location</u>	<u>Total Depth Ft.</u>	<u>Sample Footage</u>	<u>Sample Length Ft.</u>	<u>Colours</u>	<u>Remarks</u>
<u>Gemini Creek</u>						
G 81-1	GEMINI #10	54	13-30	17	1 large	Black sands
			30-40	10	22 clrs	Black sands
			40-54	14	nil	Black sands
G 81-2	GEMINI #10	42	6-36	30	---	Minor conc.
			36-42	6	50 clrs	Abd. blk. sands
<u>Soda Creek</u>						
S 81-1	SODA #13	36	12-36	24	9 clrs	Black sands
S 81-2	SODA #13	51	10-36	26	8 clrs	Abd. blk. sands
			36-51	15	---	Abd. blk. sands
			30-48	18	Possible	platinum mineral
S 81-3	SODA #13	50	4.5-36	31.5	4 clrs	Black sands
			36-50	14	15 clrs	Black sands
<u>Spud Creek</u>						
SP 81-1	SPUD #11	40	4-28	24	29 clrs	Black sands
			28-40	12	nil	---
SP 81-2	SPUD #11	50	14-38	24	3 f.s.	---
			38-50	12	nil	Minor blk. sands
SP 81-3	SPUD #11	27	16-27	11	3 clrs & 4 f.s.	---
SP 81-4	SPUD #16	38	7-26	19	2 f.s.	Black sands
			26-38	12	---	Minor blk. sands
SP 81-5	SPUD #16	40	12-28	16	10 f.s.	Black sands
			28-40	12	10 f.s. & 1 colour	Black sands
SP 81-7	SPUD #22	24	0-24	24	1 f.s.	Minor blk. sands
SP 81-8	SPUD #22	44	12-30	18	1 colour	Minor blk. sands
			30-44	14	---	Minor blk. sands
SP 81-9	SPUD #22	54	12-26	14	3 f.s. & 1 colour	Black sands
			26-40	14	3 f.s. & 4 clrs	Black sands
			40-54	14	3 f.s.	Black sands
SP 81-10	SPUD #22	58	22-42	20	5 f.s.	Black sands
			42-52	10	1 lrg clr	Black sands
			52-58	6	---	Minor blk. sands

Gold Colours/Drill Cuttings Summary - Continued

<u>Drill Hole #</u>	<u>Location</u>	<u>Total Depth</u>	<u>Sample Footage</u>	<u>Sample Length</u>	<u>Colours</u>	<u>Remarks</u>
SP 81-11	SPUD #25	20	7-20	13	9 f.s.	Black sands
SP 81-13	SPUD #25	56	22-46	24	6 f.s.	Minor blk. sands
			46-56	10	4 f.s.	Minor blk. sands
SP 81-15	SPUD #35	30	10-20	10	2 f.s.	Minor blk. sands
			20-30	10	1 colour & 6 f.s.	Minor blk. sands
SP 81-16	SPUD #35	40	12-26	14	1 colour & 6 f.s.	Black sands
			26-40	14	1 f.s.	Minor blk. sands
SP 81-17	SPUD #36	34	10-24	14	3 f.s.	Minor blk. sands
			24-34	10	---	Minor blk. sands
SP 81-18	SPUD #36	40	8-30	22	8 f.s.	Minor blk. sands
			30-40	10	10 f.s.	Minor blk. sands
SP 81-19	SPUD #36	44	12-24	12	10 f.s.	Minor blk. sands
			34-44	10	2 f.s.	Minor blk. sands
SP 81-20	SPUD #36	38	18-38	20	5 f.s.	Black sands

Note: f.s. = fine specks
clr = colour
clrs = colours

The gold recovered at the Matson Creek placer operation has an average fineness of 885 and varies to highs of 887 - 892. The North Ladue River tributaries Gemini-Soda and Spud creeks are located approximately six miles west of the Matson Creek placer mining operation. For calculation purposes the writer will assume that the Gemini-Soda and Spud creeks gold recovered in the drill cuttings during 1981 has a fineness similar to the Matson Creek gold. Therefore, the Gemini-Soda and Spud creeks gold has an inferred fineness of 875.

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GRADIENT OF TRIBUTARY CREEKS

Gemini/Soda/Spud Creeks

<u>Location</u>	<u>Creek Slope</u>	<u>Creek Gradient</u>
<u>Gemini Creek</u>		
Gem 1-10	200 ft/mile	3.78%
Gem 10-20	200 ft/mile	3.78%
Gem 20-30	400 ft/mile	7.57%
<u>Soda Creek</u>		
Soda 1-10	175 ft/mile	3.31%
Soda 10-20	200 ft/mile	3.78%
Soda 20-30	300 ft/mile	5.68%
Soda 30-40	550 ft/mile	10.42%
<u>Spud Creek</u>		
Spud 1-10	100 ft/mile	1.89%
Spud 10-20	175 ft/mile	3.31%
Spud 20-30	175 ft/mile	3.31%
Spud 30-40	200 ft/mile	3.78%

Bedrock Drain/Placer Open Cut

A "creek placer" contains gold bearing gravel deposits in the beds and intermediate flood plains of small streams. When a creek placer is mined an "open cut" is excavated in the stream gravels from the surface to bedrock. The water from the creek and drainage system seeps into the open cut in non-frozen or permafrost frozen gravels. Therefore, a "bedrock drain" trench is required to drain the water downstream from the open cut. The gradient of the creek and bedrock is a critical factor that affects the length of the bedrock drain to be excavated downstream. The gradient of bedrock and the overlying thickness of gravels and muck determines the length of the drain. The bedrock gradient should be approximately similar to the creekbed gradient as the tributary creeks are not eroding or cutting into the surface material. The black muck, Klondike gravels and payzone gravels overlying Klondike Schist bedrock varies between 32-36-40-42-44 feet in total thickness (surface to bedrock).

ECONOMIC GEOLOGY L-L TRIBUTARY CREEKS

INFERRED GRADE AND VALUE

GEMINI CREEK

Drill Hole Number	Gravel Footage	Sample Length (feet)	Gold Colours	Estimated Weight (Mg)	Value (cubic yards)	Inferred Grade oz/cy
G 81-1	13-30	17	#1 - 1 lg	25	\$2.15	0.005
	30-40	10	#1 - 22	154	\$22.30	0.051
	(40-54)	BR				
G 81-2	6-36	30	---	---	---	
	36-42	6	#1 - 50	350	\$84.60	0.195
	(42 -)	BR				

SODA CREEK

S 81-1	12-36	24	#1 - 9	63	\$3.80	0.009
	(28-36)	BR	---	---	---	
S 81-2	10-36	26	#1 - 8	56	\$3.10	0.007
	36-48	12	---	---	---	
	(48-51)	BR				
S 81-3	4-36	32	#1 - 4	28	\$1.30	0.003
	36-50	14	#1 - 15	105	\$10.90	0.025
	(48-50)	BR				

Note: Inferred value per cubic yard (cy) of gravels based on the gold price of Cdn. \$435/oz and placer gold 885 fineness value of Cdn. \$385/oz.

SPUD CREEK

Drill Hole Number	Gravel Footage	Sample Length (Feet)	Gold Colors	Estimated Weight (Mg)	Value (cubic yards)	Inferred Grade (oz/cy)
SP 81-1	4-28	24	#1 - 29	203	\$12.25	0.028
	28-36	8	---	---	---	
	(36-40)	BR				
SP 81-2	14-38	24	3fs	03	---	---
	38-43	5	---	---	---	---
	(43-50)	BR				
SP 81-3	12-16	4	---	---	---	---
	16-27	11	#1 - 3	25	\$3.30	0.007
	(26-27)	BR				

Note: Inferred value per cubic yard (cy) of gravels based on the gold price of Cdn. \$435/oz and placer gold 885 fineness value of Cdn. \$385/oz.

HYPOTHESIS TRIBUTARY CREEK PLACER GOLD

Gemini-Soda-Spud Creeks

Heavy Concentrate: Matson Creek/Bow Pup

The heavy concentrate recovered from Matson Creek contains heavy grains of various minerals, that have a dark colour, and accompany gold in alluvial deposits. The Matson heavy minerals consist mainly of magnetite and hematite and are associated with minor garnet, rutile and possibly ilmenite. The heavy concentrate consists of 50-60% magnetic minerals and 40-50% partial or non-magnetic minerals.

The writer estimates there are approximately 25 pounds of heavy concentrate per cubic yard of gravels, or about one ton of concentrate per 132 cubic yards of creek gravels.

Placer Gold: Matson Creek/Bow Pup

The Matson Creek gold has an average fineness of 885, the fineness occurs to highs of 887-892. The main impurity in the 885 fineness gold is silver. The Matson gold varies in size, shape and weight; the coarse-medium gold to 20 mesh size tends to semi-rounded flat nuggets and ellipsoidal shaped, and the fine gold is flaky shaped. The following gold size classification describes the Matson Creek placer gold.

- Coarse Gold - gold particles that vary in size and weight, that are partially rounded to ellipsoidal in shape (ASTM Standard #4-6-8-10 mesh screens).
- Medium-Size gold - gold of an approximate size that will pass through a 10-mesh screen and remain on a 20-mesh screen (ASTM Standard 12-14-16-18-20 mesh screens).
- Fine Gold - small gold particles which would pass through a 20-mesh screen but remain on a 40-mesh screen.
- Flaky gold - very thin scale shaped or pieces of gold.
- Scaly Gold - gold particles that are small, rounded and flattened; when broken the scaly particles tend to have jagged edges; usually quite thin in proportion to their diameter.
- Micron-Size gold - extremely small size gold that is 1,000 part of one millimeter or a particle of diameter between 0.01 and 0.0001 millimeter. Micron gold referred to in placer mining and recovery plants usually refers to one millimeter to a micron in size. A sluice box washing system does not recover fine to micron size gold and losses probably vary between 40-80% of the total gold content contained in placer gravels. The Matson placer gold recovered varies considerably in size, there is approximately 20-35% coarse and medium particles, and the remainder is fine to micron gold particles.

PLACER MINING OPERATION EQUIPMENT

General Description

The essential major mining equipment for a 275,000 cy per season operation is listed as follows:

Heavy Equipment:

- Two Caterpillar D8K tractors, ripper and wench
- Two 980C loaders or 988 loaders
- Sluice box and screening plant
- Derocker
- 10/12 diesel pump or 10 x 12 Morris trash pump
- Feed conveyor to dump box
- Stacker for tailings or 980C loader

Miscellaneous Equipment:

- 30 KVA electric plant
- 800' of 10" steel pipe
- 30,000 gallons fuel storage at camp (3-10,000 gal.tanks)
- Camp, which includes bunkhouse, washroom, kitchen/diner
- Gold room and clean-up equipment
- Two 4 x 4 pick-ups and a 5-ton flatbed diesel truck
- Fuel trailer
- Repair shop equipment and miscellaneous tools

The 45,000 gallons of diesel required for a 4½ month summer operation on Gemini Creek could be economically transported from Dawson City by truck tanker. The expected cost of fuel delivered to storage tanks at Gemini airstrip from Dawson City is about \$2.72 per imperial gallon.

- a) Price fuel \$0.50 litre and 4.55 litres per gallon.
- b) 300 miles return trip from Dawson City to Gemini airstrip.
- c) 4,000 gallon tanker cost of approximately \$3.00 per mile (possible to have a tanker and pup to haul 6-8,000 gallons per trip?).
- d) 300 miles X \$6.00/mile = \$1,800 total cost/trip.
- e) \$1,800 ÷ 4,000 gallons = \$0.45 per gallon.
- f) \$0.50/litre X 4.55 litres/gallon = \$2.27 per gallon.
- g) \$2.27/gallon plus \$0.45/gallon = \$2.72 per gallon delivered to Gemini airstrip.

The possible seasonal time period for exploration and sluicing on a placer operation in the North Ladue area is from May 20th to October 10th. This time period can vary, it depends on the yearly seasonal fluctuations. All main creeks in the North Ladue area appear to contain an abundant supply of water.

ESTIMATED PLACER PRODUCTION COSTS- GENERAL PAYZONE

The production costs are estimated on a 165 day mining season at an average of 2,000 cubic yards of gravel processed per day or a total 275,000 cubic yards per season. The inferred grade is 0.05 oz cy (fine) of gravel, therefore there is a factor of 20 cubic yards of gravel per ounce of gold produced (total material inferred grade).

<u>Production Costs</u>	<u>Cost/Cubic Yard</u>	<u>Cost/Ounce Gold(f20)</u>
1. Mining	\$1.00	\$20.00
2. Processing	0.75	15.00
3. Tailings	0.40	8.00
4. Refining	0.35	7.00
5. Maintenance	0.70	14.00
6. Water Line	0.10	2.00
7. Camp	0.18	3.60
8. Site Vehicles	0.15	3.00
9. Field Office	0.08	1.60
10. Supervision	0.20	4.00
11. Head Office	0.10	2.00
12. Management	0.15	3.00
13. Liability Insurance	0.16	3.20
14.* Fuel	0.44	8.80
15.**Depreciation	1.00	20.00
16. Contingency	<u>0.74</u>	<u>14.80</u>
Total Production Cost	<u>\$6.50/cy</u>	<u>\$130.00/ounce gold</u>

* Diesel fuel costs are based on \$2.72 per imperial gallon delivered to property from Dawson City - approximately 50,000 gallons of fuel required per season.

** Depreciation on the production equipment and other mining assets is based on a replacement capital cost of \$1,375,000 and depreciated at 20% per year for 5 years.

Price of gold based on Cdn \$435.00 ounce.

ESTIMATED PLACER PRODUCTION COSTS- KLONDIKE DISTRICT

The production costs are estimated on a 165 day mining season at an average of 2,000 cubic yards of gravel processed per day or a total 275,000 cubic yards per season. The inferred grade is 0.012 oz cy (fine) of gravel, therefore there is a factor of 83.33 cubic yards of gravel per ounce of gold produced.

<u>Production Costs</u>	<u>Cost/Cubic Yard</u>	<u>Cost/Ounce Gold(f83.33)</u>
1. Mining	\$1.00	\$83.33
2. Processing	0.75	62.49
3. Tailings	0.40	33.33
4. Refining	0.35	29.16
5. Maintenance	0.70	58.33
6. Water Line	0.10	8.33
7. Camp	0.18	15.00
8. Site Vehicles	0.15	12.50
9. Field Office	0.08	6.67
10. Supervision	0.20	16.67
11. Head Office	0.10	8.33
12. Management	0.15	12.50
13. Liability Insurance	0.16	13.33
14.* Fuel	0.44	36.66
15.**Depreciation	1.00	83.33
16. Contingency	<u>0.74</u>	<u>6.17</u>
Total Production Cost	<u>\$6.50/cy</u>	<u>\$486.00/ounce gold</u>

* Diesel fuel costs are based on \$2.72 per imperial gallon delivered to property from Dawson City - approximately 50,000 gallons of fuel required per season.

** Depreciation on the production equipment and other mining assets is based on a replacement capital cost of \$1,375,000 and depreciated at 20% per year for 5 years.

Price of gold based on Cdn \$435.00 ounce.

ESTIMATED PLACER PRODUCTION COSTS- MATSON PRODUCTION

The production costs are estimated on a 165 day mining season at an average of 2,000 cubic yards of gravel processed per day or a total 275,000 cubic yards per season. The inferred grade is 0.019 oz cy (fine) of gravel, therefore there is a factor of 52.63 cubic yards of gravel per ounce of gold produced.

<u>Production Costs</u>	<u>Cost/Cubic Yard</u>	<u>Cost/Ounce Gold(f52.63)</u>
1. Mining	\$1.00	\$52.63
2. Processing	0.75	39.47
3. Tailings	0.40	21.05
4. Refining	0.35	18.42
5. Maintenance	0.70	36.84
6. Water Line	0.10	5.26
7. Camp	0.18	9.47
8. Site Vehicles	0.15	7.89
9. Field Office	0.08	4.21
10. Supervision	0.20	10.52
11. Head Office	0.10	5.26
12. Management	0.15	7.89
13. Liability Insurance	0.16	8.42
14.* Fuel	0.44	23.15
15.**Depreciation	1.00	52.63
16. Contingency	<u>0.74</u>	<u>38.95</u>
Total Production Cost	<u>\$6.50/cy</u>	<u>\$342.00/ounce gold</u>

* Diesel fuel costs are based on \$2.72 per imperial gallon delivered to property from Dawson City - approximately 50,000 gallons of fuel required per season.

** Depreciation on the production equipment and other mining assets is based on a replacement capital cost of \$1,375,000 and depreciated at 20% per year for 5 years.

Price of gold based on Cdn \$435.00 ounce.

GEMINI CREEK PLACER ECONOMICS & GEOLOGY

Placer History and Development

Gemini Creek (Lat 63°31' N - Long 140°50' W), a left-limit tributary of the North Ladue River, located on NTS Sheet 115-N-10, Dawson Mining District, Y.T.

Gemini Creek 1980 & 1981:

- Yukon Lease To Prospect Gemini #1 placer staked October 8, 1980, recorded in the Dawson Mining Recorder's Office and transferred to Golden Grizzly Placers Ltd.
- Yukon Lease To Prospect Gemini #1-PL 5641 converted to Yukon Placer Claims Gemini 1-30, P18508-537, October 15, 1981. The Gemini 1-30 placer claims lapsed on the anniversary date of October 15, 1982.
- Gemini #10 Yukon Placer claim drilled September 22, 1981. Gemini Creek drill hole G81-1 (54 ft) and drill hole G81-2 (42 ft) - Placer gold payzone 100-150 feet wide discovered by drilling on placer claim Gemini #10. A copy of the placer drill log that documents hole G81-1 and G81-2 is included in the "Appendix" of this report.

Gemini Creek 1987 & 1988

- Yukon Lease To Prospect Gemini Creek PL7791 issued September 22, 1987 granted to Roxanne Hilker; anniversary date PL7791 September 22, 1988.
- Placer Gold Evaluation Report - North Ladue River Tributary, Gemini Creek, Yukon Lease Prospect PL7791 - Assessment Work 22 Sept. 1987 to 22 Sept. 1988, NTS Sheet 115-N-10, for Roxanne Hilker; by R.G.Hilker, P.Eng., Tron Duik Consultants Ltd. - Effective date August 29, 1988.

Leases To Prospect - North Ladue River Area

Gemini	PL #7791	3 miles	Roxanne Hilker	22 Sept. 1988
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On the 28 of August 1988, the 3 mile Lease To Prospect PL7791 was converted to Yukon Placer Claims and Gem 1-30 (incl.) placer claims were staked over the boundaries of the lease by Roxanne Hilker. The Affidavit Of Expenditure On Prospecting Lease-PL7791, for work conducted on the lease to the value of at least \$3,000.00, was filed and received 29 August 1988, at the Mining Recorder's Office, Dawson, Y.T.

Gemini Creek Assessment Work 1988:

The anniversary date of PL7791 is the 22 September, 1988 and expenditures of at least \$3,000.00 for assessment work was filed on the lease the 29 August 1988. Roxanne Hilker travelled from Calgary to Whitehorse and Dawson City, Y.T. on August 25. On August 28 the lease owner assisted in testing creek gravels on Gemini Creek by hand panning samples from four test sites. Commencing at Post #1-PL7791, on August 26 and 27, a 15,000 foot baseline was cut and chained each 1 + 00 feet on the lease by linecutting contractor Denis Jacob-Coureur Des Bois Ltd., Whitehorse. On August 26 and 28 R.G. Hilker, P.Eng., examined PL7791 and hand panned gravels at four test sites. Transportation expenditures to the North Ladue River property were incurred August 26 and 28. The Gemini baseline was cut and chained for location of placer test sites and future location of placer test sites and future exploration work on Gemini Creek.

<u>Test Site</u>	<u>B.L. Location</u>	<u>Approx. Wt.</u>	<u>Gold Colors</u>	<u>Concentrate</u>
G-01	20 + 00 ft.	125#	3 f.s.	Magnetite
G-02	25 + 00	100#	1 f.s.	Magnetite
G-03	45 + 00	100#	1 f.s.	Magnetite
G-04	60 + 00	100#	Nil	Magnetite

Note: all samples panned were creek "Klondike Gravel". One pan of creek gravels weighs approximately 25 lbs. and there are approximately 132 pans of gravel per cubic yard-3,300 lbs.

- Gemini Creek, Baseline - 15,000 ft. (3 miles) contract cost of \$400/mile or \$1,200.00 (included all camp, travel and labour costs). Two linecutters slashed and chained the creek baseline.
- Rotary blade helicopter flying costs to Gemini and Soda creeks - North Ladue River area - Trans North Air August 26-\$1,287.30 and August 28-\$1,042.10 or (pro-rated for expense on Gemini Creek-\$1,164.70). Placer Gold Evaluation Report - Effective Date- August 29, 1988 (pro-rated expenditure - \$3,116.15). Field Travel Whitehorse-Dawson, Y.T., Roxanne Hilker August 25/September 1, 1988-\$437.40.

Mr. R.H. Whittingham-Mining Recorder, Dawson Mining District, Y.T. - Roxanne Hilker requests that the contents of this Placer gold Evaluation Report-Effective date August 29, 1988 be "CONFIDENTIAL" until such time as the placer claims Gem 1-30 (incl.) reverts to the Crown.

Surface Stripping/Drill Lines Preparation 1989

R.G.Hilker travelled from Calgary to Dawson City by vehicle August 17-18-19, 1989. In Dawson a D6G tractor, Nodwell fuel trailer and portable camp was contracted to conduct mechanical physical work on the Gem 1-30 placer claims located on Gemini Creek. During the period of August 24-25-26, drill pads and stripping was performed on the Gem #4-9-10-11-12-13-14 & 15 placer claims with a total value of \$19,800.00. The assessment work was applied to the Gem 1-30 (Grouping Certificate DP01600) and the placer claims to a common anniversary date of November 29, 1990. Two years excess work was banked on each of the Gem 1-30 claims.

Mariposa Gold Corporation 1989:

Mariposa Gold Corporation, Calgary, Alberta exercised an Acquisition Agreement October 31, 1989, with Roxanne Hilker for the Gem 1-30 claims located on Gemini Creek.

- Memorandum of Acquisition Agreement, between Roxanne Hilker, dated October 31, 1989, and recorded November 6, 1989, as instrument #PD77813, Dawson Mining District, relating to claims Gem 1-30 inclusive.

Gem 1-30 Assessment Work 1990:

The Gem 1-30 P34674-703, Soda 1-40 P34634-673 and the Spud 1-40 P34728-767 placer claims located on Gemini, Soda and Spud creeks were "grouped" together and a Placer Grouping Certificate DP01726 was issued to Mariposa Gold Corporation on August 8, 1990. On November 7, 1990 application for renewal of the Gem 1-30 claims and one year excess work was filed to an anniversary date of November 29, 1991.

Transfer Gem 1-30 Claims March 4, 1991:

The Gem 1-30 placer claims were transferred by Mariposa Gold Corporation to Roxanne Hilker by default of Acquisition Agreement of October 31, 1989.

Gem 1-30 Assessment Work 1991:

The Gem 1-30 claims were grouped by Grouping Certificate #DP01805 issued May 22, 1991 to Roxanne Hilker. R.G. Hilker travelled to the Yukon during the period September 7-29, 1991. A placer geological survey was conducted on the North Ladue River tributary creeks during the period Sept. 18-23, 1991 for the purpose of preparing a placer report on the properties. The placer report was to be submitted to the Dawson Mining Recorder for assessment work on behalf of the owners. The renewal application of the Gem 1-30, Soda 1-40 and Spud 1-40 claims were filed September 25, 1991 and fees paid. The placer report and related costs for assessment work filed was for \$22,000.00.

GEMINI CREEK PLACER POTENTIAL/GOLD CONTENT

Gemini Creek Placer Potential

Potential CY Placer Vol.	Waste CY Material	Projected Vol. Pay-zone CY	Inferred Grade (oz cy)	Inferred Value CY	Potential Gold Content
(1,800,000)	(1,460,000)	355,000	0.105 (8 ft)	\$45.25	37,000 oz
1,800,000	(1,460,000)	---	0.022 (41 ft)	\$9.57	39,000 oz
* 200,000	(162,000)	(38,000)	0.022	9.57	4,400 oz
* 300,000	(243,000)	(57,000)	0.022	9.57	6,600 oz
* 400,000	(324,000)	(76,000)	0.022	9.57	8,800 oz

Note: * denotes placer mining volume rate per season.

Placer Potential Factors - Gemini Creek

1) Creek Placer Potential Gravels/Paystreak Gravels:

- Creek placer length.....12,000 feet
- Average depth black muck 8.5 feet
- Waste gravel thickness.....24.5 feet
- Payzone gravels width 100 feet
- Payzone gravel thickness.....8.0 feet
- Average depth to bedrock 41 feet
- Thickness waste material 33 feet

2) Placer Potential Calculations:

- Potential Placer Volume = $\frac{12000 \times 100 \times 41 \text{ cf}}{27 \text{ cf/cy}}$ = 1,800,000 cy
- Volume Waste Material = $\frac{12000 \times 100 \times 33 \text{ cf}}{27 \text{ cf/cy}}$ = 1,460,000 cy
- Volume Black Muck = $\frac{12000 \times 100 \times 8.5 \text{ cf}}{27 \text{ cf/cy}}$ = 377,000 cy

- Volume Waste Gravels = $\frac{1200 \times 100 \times 24.5 \text{ cf}}{27 \text{ cf/cy}} = 1,080,000 \text{ cy}$
- Potential Payzone Volume = $\frac{12000 \times 100 \times 8 \text{ cf}}{27 \text{ cf/cy}} = 355,000 \text{ cy}$

INFERRED WEIGHTED AVERAGE GRADE PAYZONE

Potential Placer Inferred Grade

- Bedrock payzone gravels (6 ft) inferred grade 0.195 oz cy and inferred value \$84.60 cy
- Bedrock payzone gravels (10 ft) inferred grade 0.051 oz cy and inferred value \$22.30
- Payzone based on drill line holes G81-1 and G81-2 spaced 150 feet apart and suggests a 100 feet wide payzone located on Gem #10 claim.
- Weighted Average Inferred Grade Payzone (8 ft) 0.105 oz cy and Inferred Value \$45.65

SURFACE/BEDROCK PLACER MATERIAL

Inferred Grade Placer Material

- Gemini Creek surface to bedrock material averages (41 ft); includes black muck (8.5 ft), waste gravels (24.5 ft) and payzone gravels (8 ft).
- Weighted Average Inferred Grade 0.022 oz cy and Inferred Value \$9.57 cy.

NOTE:

The reader is cautioned by the writer that the calculations of the placer potential gravel volume and inferred grade is based on single line two drill hole data. The creek requires further drilling to confirm and drill delineate additional economic payzone gravels. However, the calculations of the limited drill hole data demonstrates that the creek does in parts contain economic placer gold zones.



ESTIMATED PLACER PRODUCTION COSTS- GEMINI PAYZONE

The production costs are estimated on a 165 day mining season at an average of 2,000 cubic yards of gravel processed per day or a total 275,000 cubic yards per season. The inferred grade is 0.105 oz cy (fine) of gravel, therefore there is a factor of 9.52 cubic yards of gravel per ounce of gold produced.

<u>Production Costs</u>	<u>Cost/Cubic Yard</u>	<u>Cost/Ounce Gold(f9.52)</u>
1. Mining	\$1.00	\$ 9.52
2. Processing	0.75	7.14
3. Tailings	0.40	3.81
4. Refining	0.35	3.33
5. Maintenance	0.70	6.66
6. Water Line	0.10	0.95
7. Camp	0.18	1.71
8. Site Vehicles	0.15	1.43
9. Field Office	0.08	0.76
10. Supervision	0.20	1.90
11. Head Office	0.10	0.95
12. Management	0.15	1.43
13. Liability Insurance	0.16	1.52
14.* Fuel	0.44	4.19
15.**Depreciation	1.00	9.52
16. Contingency	<u>0.74</u>	<u>7.04</u>
Total Production Cost	<u>\$6.50/cy</u>	<u>\$62.00/ounce gold</u>

* Diesel fuel costs are based on \$2.72 per imperial gallon delivered to property from Dawson City - approximately 50,000 gallons of fuel required per season.

** Depreciation on the production equipment and other mining assets is based on a replacement capital cost of \$1,375,000 and depreciated at 20% per year for 5 years.

Price of gold based on Cdn \$435.00 ounce.

ESTIMATED PLACER PRODUCTION COSTS- GEMINI CREEK

The production costs are estimated on a 165 day mining season at an average of 2,000 cubic yards of gravel processed per day or a total 275,000 cubic yards per season. The inferred grade is 0.022 oz cy (fine) of gravel, therefore there is a factor of 45.45 cubic yards of gravel per ounce of gold produced (total material inferred grade).

<u>Production Costs</u>	<u>Cost/Cubic Yard</u>	<u>Cost/Ounce Gold(f45.45)</u>
1. Mining	\$1.00	\$45.45
2. Processing	0.75	34.09
3. Tailings	0.40	18.18
4. Refining	0.35	15.91
5. Maintenance	0.70	31.81
6. Water Line	0.10	4.55
7. Camp	0.18	8.18
8. Site Vehicles	0.15	6.82
9. Field Office	0.08	3.64
10. Supervision	0.20	9.09
11. Head Office	0.10	4.55
12. Management	0.15	6.82
13. Liability Insurance	0.16	7.27
14. * Fuel	0.44	20.00
15. **Depreciation	1.00	45.45
16. Contingency	<u>0.74</u>	<u>33.63</u>
Total Production Cost	<u>\$6.50/cy</u>	<u>\$295.45/ounce gold</u>

* Diesel fuel costs are based on \$2.72 per imperial gallon delivered to property from Dawson City - approximately 50,000 gallons of fuel required per season.

** Depreciation on the production equipment and other mining assets is based on a replacement capital cost of \$1,375,000 and depreciated at 20% per year for 5 years.

Price of gold based on Cdn \$435.00 ounce.

SODA CREEK PLACER ECONOMICS & GEOLOGY

Placer History and Development

Soda Creek (Lat. 60°30'N - Long 140°50'W) a left-limit tributary of the North Ladue River, located on NTS Sheet 115-N-7/10, Dawson Mining District, Y.T.

Soda Creek 1980 & 1981:

- Yukon Lease To Prospect Soda #1 placer staked September 30, 1980, recorded in the Dawson Mining Recorder's Office and transferred to Golden Grizzly Placers Ltd.
- Yukon Lease To Prospect Soda #1-PL 5642 converted to Yukon Placer Claims Soda 1-40, P18666-704, October 15, 1981. The Soda 1-40 placer claims lapsed on the anniversary date of October 15, 1982.
- Soda #13 Yukon Placer claim drilled September 22-23, 1981. Soda Creek drill holes S81-1 (36 ft), S81-2 (51 ft) and drill hole S81-3 (50 ft) - Placer gold payzone 100 feet wide discovered by drilling on placer claim Soda #13. A copy of the placer drill log that documents hole S81-1, S81-2 and S81-3 is included in the "Appendix" of this report.

Soda Creek 1987 & 1988

- Yukon Lease To Prospect Soda Creek PL7792 issued September 22, 1987 granted to R.G. Hilker; anniversary date PL7792 September 22, 1988.
- Placer Gold Evaluation Report - North Ladue River Tributary, Gemini Creek, Yukon Lease Prospect PL7792 - Assessment Work 22 Sept. 1987 to 22 Sept. 1988, NTS Sheet 115-N-10, for R.G. Hilker; by R.G.Hilker, P.Eng., Tron Duik Consultants Ltd. - Effective date August 29, 1988.

Leases To Prospect - North Ladue River Area

Soda	PL #7792	4 miles	R.G. Hilker	22 Sept. 1988
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On the 28 of August 1988, the 4 mile Lease To Prospect PL7792 was converted to Yukon Placer Claims and Soda 1-40 (incl.) placer claims were staked over the boundaries of the lease by R.G. Hilker. The Affidavit Of Expenditure On Prospecting Lease-PL7792, for work conducted on the lease to the value of at least \$4,000.00, was filed and received 29 August 1988, at the Mining Recorder's Office, Dawson, Y.T.

Soda Creek Assessment Work 1988:

The anniversary date of PL7792 is the 22 September 1988, and expenditures of at least \$4,000.00 for assessment work were filed on the lease the 29 August 1988. Robert G. Hilker Travelled from Calgary, Alberta on August 21-23 to Whitehorse and to Dawson City on August 25. On August 26 and 28, R.G.Hilker examined the lease PL7792 and hand panned creek gravels from four test sites. Commencing at Post #1-PL7792, on August 27 and 28, a 20,000 foot baseline was cut and chained each 1+00 feet on the lease by linecutting contractor Denis Jacobs - Coureur Des Bois Ltd., Whitehorse. Transportation expenditures to the North Ladue property were incurred August 26 and 28, 1988. The Soda baseline was cut and chained for location of placer test sites and future exploration work on Soda Creek.

- Soda Creek baseline 20,000 feet (4 miles) contract cost of \$400/mile or \$1,600.00 (included all camp, travel and labour costs). Two line-cutters slashed and chained the creek baseline.
- Rotary blade helicopter flying costs to Gemnini and Soda creeks, North Ladue River area
 - Trans North Air August 26 - \$1,287.30 and August 28 - \$1,042.10 or (pro-rated for expenses on Soda Creek - \$1,164.70).
- Placer Gold Evaluation Report - Effective Date - August 29, 1988 (pro-rated expenditure \$3,116.15).

Surface Stripping/Drill Lines Preparation 1989

R.G.Hilker travelled from Calgary to Dawson City by vehicle August 17-18-19, 1989. In Dawson a D6G tractor, Nodwell fuel trailer and portable camp was contracted to conduct mechanical physical work on the Soda 1-40 placer claims located on Soda Creek. During the period of August 24-25-26, drill pads and stripping was performed on the Soda #12-22-23, 24 and 25 placer claims with a total value of \$21,000.00. The assessment work was applied to the Soda 1-40 (Grouping Certificate DP01601) and the placer claims to a common anniversary date of November 29, 1990. One year excess work was banked on each of the Soda 1-40 claims.

Mariposa Gold Corporation 1989:

Mariposa Gold Corporation, Calgary, Alberta exercised an Acquisition Agreement October 31, 1989, with Robert G. Hilker for the Soda 1-40 claims located on Soda Creek.

- Memorandum of Acquisition Agreement, between R.G. Hilker, dated October 31, 1989, and recorded November 6, 1989, as instrument #PD77814, Dawson Mining District, relating to claims Soda 1-40 inclusive.

Soda 1-40 Assessment Work 1990:

The Gem 1-30 P34674-703, Soda 1-40 P34634-673 and the Spud 1-40 P34728-767 placer claims located on Gemini, Soda and Spud creeks were "grouped" together and a Placer Grouping Certificate DP01726 was issued to Mariposa Gold Corporation on August 8, 1990. On November 7, 1990 application for renewal of the Soda 1-40 claims and one year excess work was filed to an anniversary date of November 29, 1991.

Transfer Soda 1-40 Claims March 4, 1991

The Soda 1-40 placer claims were transferred by Mariposa Gold Corporation to Robert G. Hilker by default of Acquisition Agreement of October 31, 1989.

Soda 1-40 Assessment Work 1991

The Soda 1-40 claims were grouped by Grouping Certificate #DP01803 issued May 22, 1991 to Robert G. Hilker. The writer travelled to the Yukon during the period September 7-29, 1991. A placer geological survey was conducted on the North Ladue River tributary creeks during the period September 18-23, for the purpose of preparing a placer report on the properties. The placer report was to be submitted to the Dawson Mining Recorder for assessment work on behalf of the owners. The renewal application of the Gem 1-30, Soda 1-40 and Spud 1-40 claims were filed September 25, 1991 and filing fees paid. The placer report and related costs for assessment work filed was for \$22,000.00.

SODA CREEK PLACER POTENTIAL

Soda Potential Placer Zones (* 300 ft. and ** 100 ft. payzones)

Potential CY Placer Vol.	Waste CY Material	Projected Vol. Payzone CY	Inferred Grade (oz cy)	Inferred Value CY	Potential Gold Content
* 3,500,000	900,000	2,600,000	0.007	\$3.04	24,000 oz
** (1,850,000)	---	520,000	0.025	10.90	13,000 oz
(1,850,000)	---	1,180,000	0.003	4.30	3,500 oz
1,850,000	150,000	1,700,000	0.010	4.35	18,500 oz

Placer Potential Factors - Soda Creek

1) Creek Placer Potential Gravels/Paystreak Gravels

- Creek placer length 10,000 feet
- Average depth black muck 9 feet
- Average depth bedrock 41 feet

2) - Payzone gravel width..... 300 feet

- Gold content gravels 32 feet
- Waste gravel thickness 4 feet
- Depth black muck 4 feet

- Payzone gravel width 100 feet

- Depth black muck 4 feet
- Gold content gravels..... 32 feet
- Payzone gravels 14 feet
- Depth surface/bedrock 48 feet

2) Placer Potential Calculations: (300 ft and 100 ft)

- Potential Gold Volume = $\frac{10000 \times 300 \times 32 \text{ cf}}{27 \text{ cf/cy}} = 3,500,000 \text{ cy}$
- Volume Waste Gravel = $\frac{10000 \times 300 \times 4 \text{ cf}}{27 \text{ cf/cy}} = 440,000 \text{ cy}$
- Volume Black Muck = $\frac{10000 \times 300 \times 4 \text{ cf}}{27 \text{ cf/cy}} = 440,000 \text{ cy}$

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- Potential Payzone Volume = $\frac{10000 \times 100 \times 14 \text{ cf}}{27 \text{ cf/cy}} = 520,000 \text{ cy}$
- Upper Gold Content volume = $\frac{10000 \times 100 \times 32 \text{ cf}}{27 \text{ cf/cy}} = 1,180,000 \text{ cy}$
- Volume Waste Material = $\frac{10000 \times 100 \times 4 \text{ cf}}{27 \text{ cf/cy}} = 150,000 \text{ cy}$

INFERRED WEIGHTED AVERAGE GRADE

Potential Placer Inferred Grade (100 ft) Payzone:

- Bedrock payzone gravels (14 ft) inferred grade 0.025 oz cy and inferred value \$10.90 cy.
- Upper gold content payzone gravels (32 ft) inferred grade 0.003 oz cy and inferred value \$4.30 cy.
- Weighted Average Inferred Grade Payzone Gravels (46 ft) 0.01 oz cy and Inferred Value \$4.35 cy.
- Gold content gravels inferred grades were based on drill hole S81-3 and a 100 feet wide payzone. The writer notes that closer spaced drilling adjacent to hole S81-1 may possibly indicate a different payzone configuration. Further drilling below the confluence of Anne Pup on Soda Creek is recommended.

SURFACE/BEDROCK PLACER MATERIAL

Potential Placer Inferred Grade (300 ft) Payzone

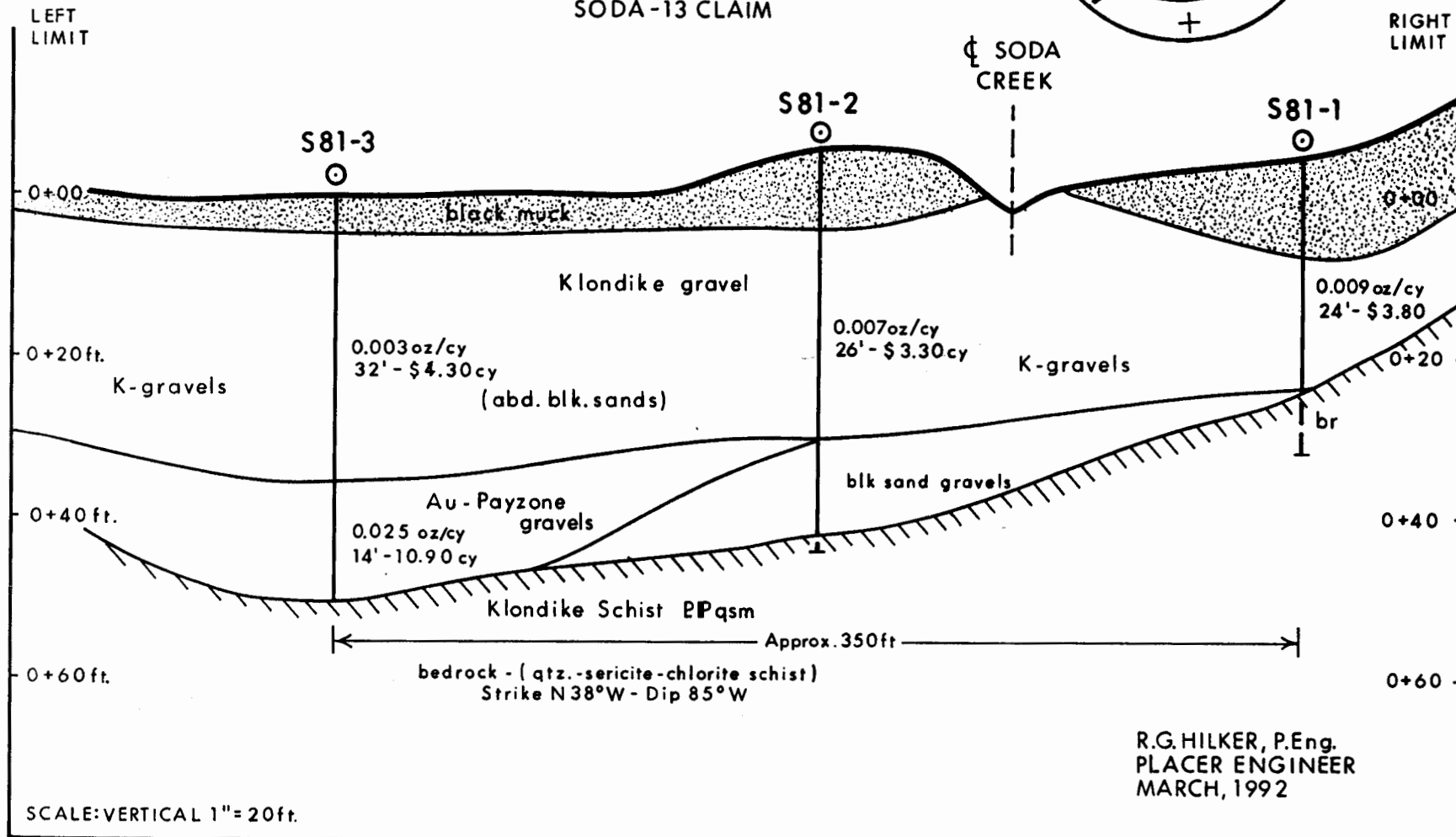
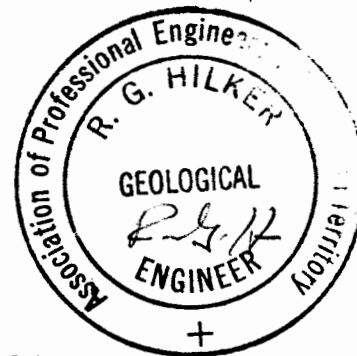
- Soda Creek surface to bedrock material delineated in drill holes S81-1, S81-2 and S81-3 averages (41 ft); includes black muck (8.5 ft), waste gravels (4 ft) and gold content gravels (32 ft). The three drill holes drilling depth documented on the geology logged drill reports includes bedrock penetration up to 6 feet.
- Soda Creek Weighted Average Inferred Grade Gold Content and Payzone Gravels (41 ft) 0.007 oz cy and Inferred Value \$3.04 cy.
- The writer notes that Soda Creek possibly includes higher grade gold content values upstream to Roxy Pup and downstream of Anne Pup.

NOTE:

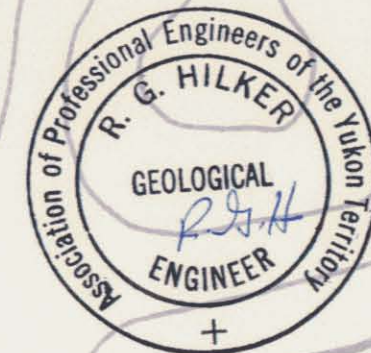
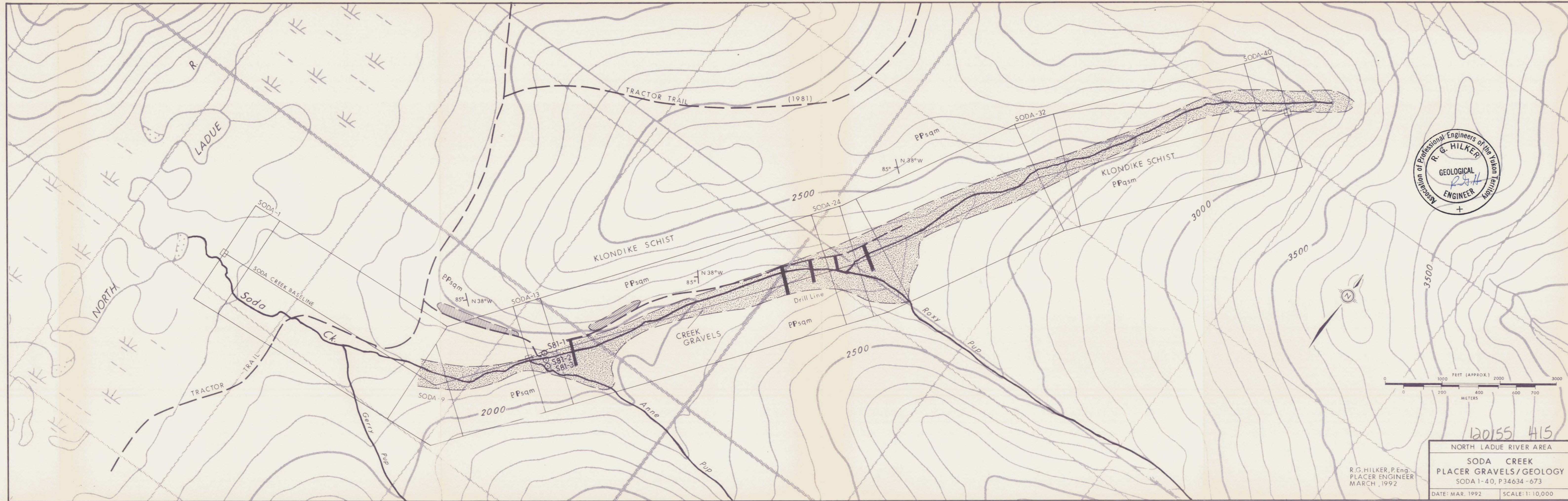
The reader is cautioned by the writer that the calculations of the placer potential gravel volume and inferred grade is based on single line three drill hole data. The creek requires further drilling to confirm and drill delineate additional economic payzone gravels. However, the calculations of the limited drill hole data demonstrates that the creek does in parts contain economic placer gold zones.

"SODA CREEK"

Cross Section
1981 DRILL HOLES
SODA-13 CLAIM



SODA PLACER FIGURE-1



R.G. HILKER, P.Eng.
PLACER ENGINEER
MARCH, 1992

120155 415	
NORTH LADUE RIVER AREA	
SODA CREEK PLACER GRAVELS/GEOLOGY	
SODA 1-40, P34634-673	
DATE: MAR. 1992	SCALE: 1: 10,000

SPUD CREEK PLACER ECONOMICS & GEOLOGY

Placer History and Development

Spud Creek (Lat. 63°30'N - Long 140°50'W) a left-limit tributary of the North Ladue River, located on NTS Sheet 115-N-7, Dawson Mining District, Y.T.

Spud Creek 1980 & 1981:

- Yukon Lease To Prospect Spud #1 placer staked September 30, 1980, recorded in the Dawson Mining Recorder's Office and transferred to Golden Grizzly Placers Ltd.
- Yukon Lease To Prospect Spud #1-PL 5644 converted to Yukon Placer Claims Spud 1-40, P18367-404, October 15, 1981. The Spud 1-40 placer claims lapsed on the anniversary date of October 15, 1982.
- Spud #11 Yukon Placer claim drilled September 30, 1981. Spud Creek drill holes SP81-1 (40 ft), SP81-2 (50 ft) and drill hole SP81-3 (27 ft) - Placer gold payzone 100 feet wide discovered by drilling on placer claim Spud #11. A copy of the placer drill log that documents hole SP81-1, SP81-2 and SP81-3 is included in the "Appendix" of this report.

Spud Creek 1987 & 1988

- Yukon Lease To Prospect Spud Creek PL7802 issued October 9, 1987 granted to Gary Crawford; anniversary date PL7802 October 9, 1988.
- Placer Gold Evaluation Report - North Ladue River Tributary, Spud Creek, Yukon Lease Prospect PL7802 - Assessment Work 9 Oct. 1987 to 9 Oct. 1988, NTS Sheet 115-N-7, for Gary Crawford; by R.G.Hilker, P.Eng., Tron Duik Consultants Ltd. - Effective date September 6, 1988.

Leases To Prospect - North Ladue River Area

Spud	PL #7802	4 miles	Gary Crawford	October 9, 1988
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On the 1st of September 1988, the 4 mile Lease To Prospect PL7802 was converted to Yukon Placer Claims and Spud 1-40 (incl.) placer claims were staked over the boundaries of the lease by Gary Crawford. The Affidavit Of Expenditure On Prospecting Lease-PL7802, for work conducted on the lease to the value of at least \$4,000.00, was filed and received 8 September 1988, at the Mining Recorder's Office, Dawson, Y.T.

Spud Creek Assessment Work 1988:

The anniversary date of PL7802 is the 9 October 1988, and expenditures of at least \$4,000.00 for assessment work were filed on the lease the 6 September 1988. Gary W. Crawford flew by helicopter to the Spud Creek property PL7802 on 2 September 1988 and reported testing the creek gravels at three sites. R.G.Hilker examined the PL7802, located on Spud Creek, on the 28 August 1988. Commencing at Post #1 of PL7802, a 20,000 feet baseline was cut and chained each 1 + 00 feet on August 29-September 2. The linecutting contractor was Denis Jacobs - Coureur Des Bois Ltd., Whitehorse. Transportation expenditures to the North Ladue property were incurred September 2, 1988. The Spud baseline was cut and chained for location of placer test sites and future exploration work on Spud Creek. Gary Crawford reported the hand panned gravel test work to the writer.

- Spud Creek baseline 20,000 feet (4 miles) contract cost of \$400/mile or \$1,600.00 (included all camp, travel and labour costs). Two line-cutters slashed and chained the creek baseline.
- Rotary blade helicopter flying costs to Spud creeks, North Ladue River area - Trans North Air September 2 - \$1,042.10.
- Placer Gold Evaluation Report - Effective Date - September 6, 1988 (pro-rated expenditure \$3,116.45).

Transfer of Spud 1-40 Claims August 30, 1989:

Gary W. Crawford transferred 100% interest in the Spud 1-40, P34728-767 placer claims to R.G. Hilker for the sum of \$12,500.00 on August 30, 1989.

Surface Stripping/Drill Lines Preparation 1989

R.G.Hilker travelled from Calgary to Dawson City by vehicle August 17-18-19, 1989. In Dawson a D6G tractor, Nodwell fuel trailer and portable camp was contracted to conduct mechanical physical work on the Spud 1-40 placer claims located on Spud Creek. During the period of August 30-31, drill pads and stripping was performed on the Spud #12-25 placer claims with a total value of \$21,000.00. The assessment work was applied to the Spud 1-40 (Grouping Certificate DP01622) and the placer claims to a common anniversary date of November 29, 1990. One year excess work was banked on each of the Spud 1-40 claims.

Mariposa Gold Corporation 1989:

Mariposa Gold Corporation, Calgary, Alberta exercised an Acquisition Agreement October 31, 1989, with Robert G. Hilker for the Spud 1-40 claims located on Spud Creek.

- Memorandum of Acquisition Agreement, between R.G. Hilker, dated October 31, 1989, and recorded November 6, 1989, as instrument #PD77815, Dawson Mining District, relating to claims Spud 1-40 inclusive.

Spud 1-40 Assessment Work 1990:

The Gem 1-30 P34674-703, Soda 1-40 P34634-673 and the Spud 1-40 P34728-767 placer claims located on Gemini, Soda and Spud creeks were "grouped" together and a Placer Grouping Certificate DP01726 was issued to Mariposa Gold Corporation on August 8, 1990. On November 7, 1990 application for renewal of the Spud 1-40 claims and one year excess work was filed to an anniversary date of November 29, 1991.

Transfer Spud 1-40 Claims March 4, 1991

The Spud 1-40 placer claims were transferred by Mariposa gold Corporation to Robert G. Hilker by default of Acquisition Agreement of October 31, 1989.

Spud 1-40 Assessment Work 1991

The Spud 1-40 claims were grouped by Grouping Certificate #DP01804 issued May 22, 1991 to Robert G. Hilker. The writer travelled to the Yukon during the period September 7-29, 1991. A placer geological survey was conducted on the North Ladue River tributary creeks during the period September 18-23, for the purpose of preparing a placer report on the properties. The placer report was to be submitted to the Dawson Mining Recorder for assessment work on behalf of the owners. The renewal application of the Gem 1-30, Soda 1-40 and Spud 1-40 claims were filed September 25, 1991 and filing fees paid. The placer report and related costs for assessment work filed was for \$22,000.00.

SPUD CREEK PLACER POTENTIAL

Spud Potential Placer Zones/Value

Potential CY Placer Volume	Waste CY Material	Projected Vol. Payzone CY	Inferred Grade (oz cy)	Inferred Value CY	Potential Gold Content
1,260,000	370,000	890,000	0.028	\$12.25	25,000 oz
2,600,000	---	---	0.007	\$3.04	18,000 oz

Placer Potential Factors - Spud Creek

1) Creek Placer Potential Gravels

- Creek placer length.....10,000 feet
- Average depth black muck 10 feet
- Average depth bedrock 35 feet
- Payzone width 100 feet
- Payzone gravel thickness 24 feet
- Inferred grade gravels 0.028 oz cy

2) Placer Potential Calculations

- Potential Gold Volume = $\frac{10,000 \times 100 \times 24 \text{ cf}}{27 \text{ cf/cy}} = 890,000 \text{ cy}$
- Volume waste black much = $\frac{10,000 \times 100 \times 10 \text{ cf}}{27 \text{ cf/cy}} = 370,000 \text{ cy}$
- Total volume placer material = $\frac{100,000 \times 100 \times 34 \text{ cf}}{27 \text{ cf/cy}} = 1,260,000 \text{ cy}$

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- Potential Volume Gravels $\frac{10,000 \times 200 \times 35 \text{ cf}}{27 \text{ cf/cy}} = 2,600,000 \text{ cy}$

INFERRED WEIGHTED AVERAGE GRADE

Potential Placer Inferred Grade: (100 feet payzone)

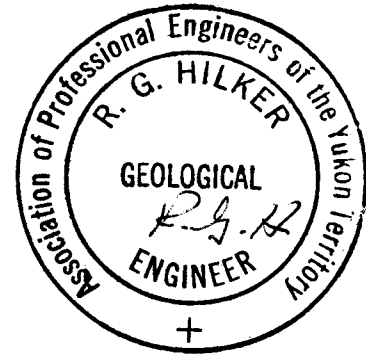
- Upper gold content payzone gravels (24 feet) inferred grade 0.028 oz/cy and inferred value \$12.25 cy.
- Gold content gravels inferred grade were based on drillhole SP81-1 and a 100 feet wide payzone. The payzone gravels identified overlay 8 feet of waste gravels and above bedrock. Refer to Spud Placer Figure-1.

Weighted Average Gold Content

- Spud Creek weighted average inferred grade gold content of surface to bedrock material:
 - Inferred Grade 0.007 oz cy and value \$3.04 oz.

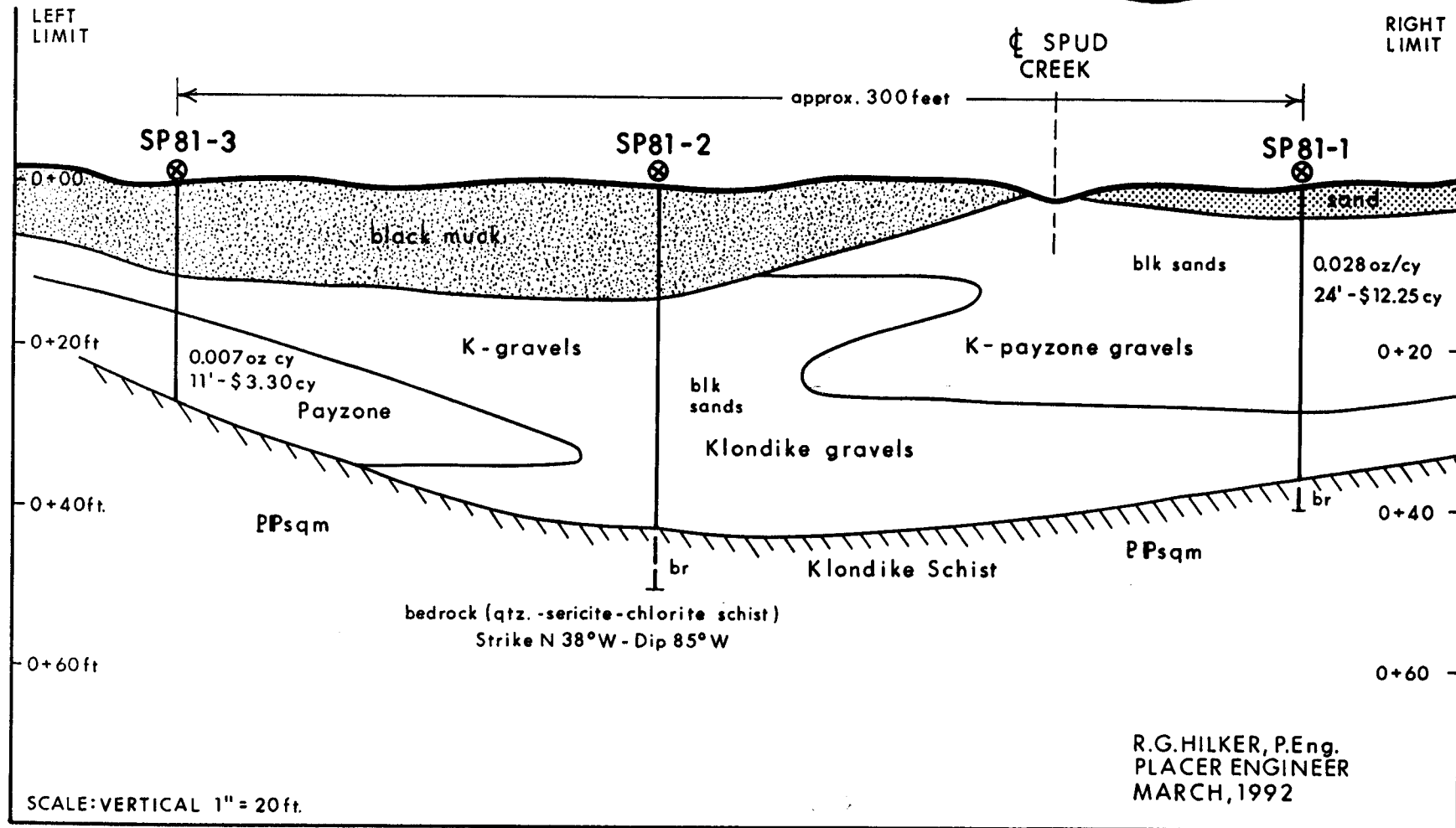
NOTE:

The reader is cautioned by the writer that the calculations of the placer potential gravel volume and inferred grade is based on single line three drill hole data. The creek requires further drilling to confirm and drill delineate additional economic payzone gravels. However, the calculations of the limited drill hole data demonstrates that the creek does in parts contain economic placer gold zones.

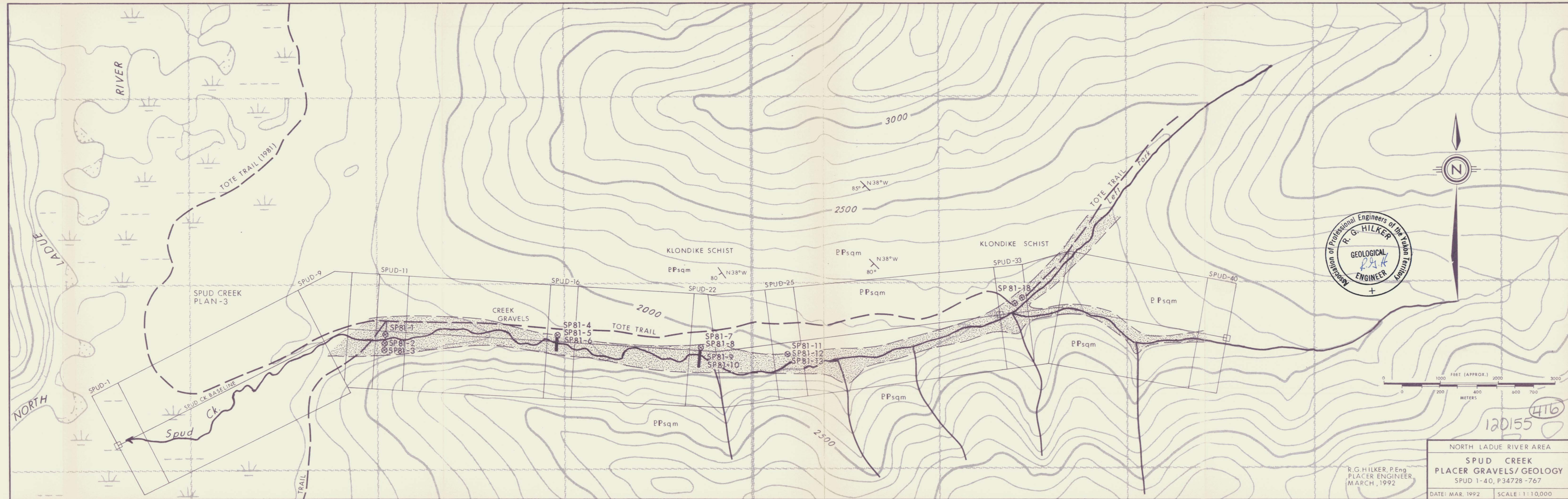


"SPUD CREEK"

Cross-Section
1981 DRILL HOLES
SPUD-11 CLAIM



SPUD PLACER FIGURE-1



PLACER ECONOMICS/PRICE GOLD

Average Value Klondike Placer Gravels

The average value of placer gravels per cubic yard volume varies with the price of gold. Therefore, the variable gold price has a direct influence on the economics of a placer operation. The Klondike Gold District average gold content is reported to be 0.012 fine ounces per cubic yard of material from surface into bedrock.

<u>Year</u>	<u>Cdn.Ave.Gold</u>	<u>Cdn.Value (0.012)</u>
1901-1935	\$20.67/oz.	\$0.25 cy
1935-1971	\$35.00/oz.	\$0.42 cy
1985	\$433.16/oz	\$5.20 cy
1986	\$507.16/oz.	\$6.09 cy
1987	\$594.26/oz.	\$7.13 cy
1988	\$537.96/oz.	\$6.45 cy
1989	\$451.94/oz.	\$5.42 cy
1990	\$447.66/oz.	\$5.37 cy
1991	\$413.00/oz.	\$4.96 cy
1992		
1993		
1994		
1995		

ECONOMIC COMPARISON GOLD VALUES

An economic comparison of inferred grade, gold values and cost to produce an ounce of fine gold is based on a mining cost of \$6.50 cy and gold price of Cdn \$435.00 ounce.

KLONDIKE AVERAGE: 0.012 OZ.CY. - \$5.22 CY - \$486.00 OZ

MATSON PRODUCTION: 0.019 OZ.CY. - \$8.29 CY - \$342.00 OZ

MATSON GLORY-HOLE: 0.056 OZ CY - \$24.35 CY (\$116.00) OZ

GEMINI WT. AVE. PAY: 0.105 OZ CY - \$45.65 CY - \$62.00 OZ

GEMINI AVERAGE: 0.022 OZ CY - \$9.57 CY - \$295.00 OZ

SODA PAYZONE: 0.025 OZ CY - \$10.90 CY (\$260.00) OZ

SODA AVERAGE: 0.007 OZ CY - \$3.04 CY - (\$928.00) OZ

SPUD PAYZONE: 0.028 OZ CY - \$12.25 CY - (\$231.00) OZ

SPUD AVERAGE: 0.007 OZ CY - \$3.04 CY (\$928.00) OZ

ECONOMIC COMPARISON GOLD GRADE/VALUE

Variable Gold Price/Gold Grades-Value CY

Klondike District/Matson-Gemini-Soda-Spud Creeks

<u>CDN. PRICE</u> <u>GOLD</u>	<u>KLONDIKE</u> <u>0.012 oz cy</u>	<u>MATSON</u> <u>0.019 oz cy</u>	<u>GEMINI</u> <u>0.104 oz cy</u>	<u>S O D A</u> <u>0.025 oz cy</u>	<u>S P U D</u> <u>0.028 oz cy</u>
\$390.00 oz	\$4.68 cy	\$7.41 cy	\$40.56 cy	\$9.75 cy	\$10.92 cy
\$400.00 oz	\$4.80 cy	\$7.60 cy	\$41.60 cy	\$10.00 cy	\$11.20 cy
\$410.00 oz	\$4.92 cy	\$7.79 cy	\$42.64 cy	\$10.25 cy	\$11.48 cy
\$420.00 oz	\$5.04 cy	\$7.98 cy	\$43.68 cy	\$10.50 cy	\$11.76 cy
\$430.00 oz	\$5.16 cy	\$8.17 cy	\$44.72 cy	\$10.75 cy	\$12.04 cy
\$440.00 oz	\$5.28 cy	\$8.36 cy	\$45.76 cy	\$11.00 cy	\$12.32 cy
\$450.00 oz	\$5.40 cy	\$8.55 cy	\$46.80 cy	\$11.25 cy	\$12.60 cy
\$475.00 oz	\$5.70 cy	\$9.02 cy	\$49.40 cy	\$11.87 cy	\$13.30 cy
\$500.00 oz	\$6.00 cy	\$9.50 cy	\$52.00 cy	\$12.50 cy	\$14.00 cy

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- 1) Canadian Price gold determined by the London close fix and the Cdn/US exchange rate.
- 2) Klondike Gold District: Total placer material grade of 0.012 oz cy based on district average.
- 3) Matson Creek: Weighted average gold grade 0.019 oz cy based on production figures 1978-1985, determined by R.G.Hilker, P.Eng., December 14, 1985, Lode Resources Corporation report. Values and grade calculated on Matson Creek is based on \$435 oz and to fine ounces by 885 fineness factor.
- 4) Gemini Creek: Weighted average 0.104 oz cy "inferred gold grade" calculated to fine ounces by 885 fineness factor. Calculations of 100-150 ft. wide payzone based on two drill holes G81-1 and G81-2 drilled September 22, 1981 on the Gemini #10 or Gem #10 Yukon Placer Claim. Refer to Cross-section, Gemini Placer Figure-1.

- 5) Soda Creek: Payzone 14 feet thick "inferred grade" 0.025 oz cy calculated to fine ounces by 885 fineness factor. Calculations of payzone based on one drill hole S81-3 drilled September 23, 1981 and located on Soda #13 Yukon Placer Claim. The bedrock payzone is overlayed by Klondike gravels that included inferred gold values in drill hole S81-3 (32 ft-0.003 oz cy, value \$4.30 cy); drill hole S81-2 (26 ft-0.007 oz cy, value \$3.30 cy) and drill hole S81-1 (24 ft-0.009 oz cy, value \$3.80 cy). Inferred gold values for the three Soda drill holes are based on Cdn \$435 oz gold. Refer to Cross-Section Soda Placer Figure -1.

- 6) Spud Creek: Payzone 24 ft thick "inferred grade" 0.028 oz cy calculated to fine ounces by 885 fineness factor. Calculations of payzone based on one drill hole SP81-1 drilled September 30, 1981 and located on Spud #11 Yukon Placer Claim. Refer to Cross-Section Spud Placer Figure-1.

ESTIMATED COST OF PROGRAM

The estimated costs of a Stage-1 Drilling Development Program and contingent Stage-2 Mining Operation is recommended for the Gemini-Soda-Spud placer properties - North Ladue River.

STAGE-1 PLACER DRILLING DEVELOPMENT

1) Track Mounted Contract Drill - AP-1000	\$140,000
- Drill Mobilization	\$ 15,000
- Crew Mobilization	2,000
- Contract 2 months	100,000
- Demobilization	15,000
- Contingency	<u>8,000</u>
2) Nodwell 110 Carrier	25,000
- Rental 2 months	\$ 10,000
- Operator 2 months	10,000
- Misc. Expenses	<u>5,000</u>
3) Diesel Fuel and Transportation	18,000
- 5,000 gals. @ \$3.00/gal.	\$ 15,000
4) Placer Samplers	16,000
- 2 samplers @ \$4,000/m - 2 months	
5) Placer Sampling Processing Equipment	10,000
6) Placer Testing Camp Costs	27,000
- 6 men for 60 days (360 days @ \$75/day)	
7) Flying Costs	15,000
- Fixed Wing @ \$15,000	
8) Field Travel Costs - Yukon	15,000
- Pick-up truck, hotels, meals, etc.	
9) Placer Engineer Supervision	36,000
- Monthly rate for summer field season \$12,000/m (3 months)	
10) Tractor Rental/Costs (D6 & D7)	30,000
11) Contingency	<u>38,000</u>
Total Estimated Stage-1 Program	<u>\$370,000</u>

ESTIMATED COST OF PROGRAM (cont'd)

STAGE-2

Contingent on favourable drill results that delineate drill proven gravel reserves and economic grade, the writer recommends that a mining operation be conducted in the area of proven gold bearing gravel reserves.

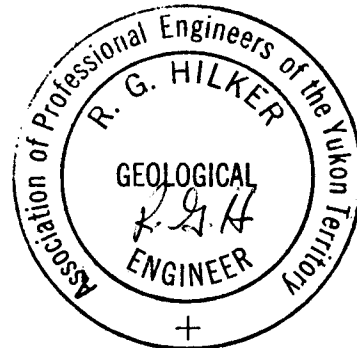
1) Open-Cut Mining Operation.....\$400,000.00

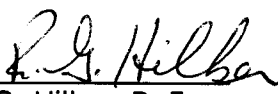
a) 50,000 cubic yards @ \$8.00 cy

2) Continuation of Open-Cut Mining Operation 400,000.00

a) 50,000 cubic yards @ \$8.00 cy

Total Estimated Stage-2 Mining Operation\$800,000.00




R.G. Hilker, P. Eng.
Calgary, Alberta
March 31, 1992.

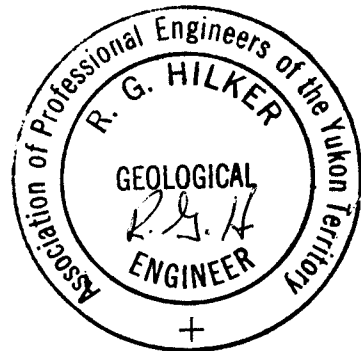
CERTIFICATION

I, ROBERT G. HILKER, of 324 Silver Valley Rise N.W., in the City of Calgary, in the Province of Alberta, Canada, DO HEREBY CERTIFY:

1. THAT I am a Consulting Geological Engineer with an office located at 324 Silver Valley Rise N.W., in the City of Calgary, in the Province of Alberta, T3B 4B2.
2. THAT I am a graduate of Michigan Technological University located at Houghton, Michigan, U.S.A., where I obtained a Bachelor of Science Degree in Geological Engineering (Exploration Option) in 1962.
3. THAT I am a registered Professional Engineer (Geological); in the Association of Professional Engineers, Geologists and Geophysicists of Alberta-#38356; The Association of Professional Engineers of the Yukon Territory-#98; The Association of Professional Engineers of British Columbia-#16724; and a Member of the Society of Mining Engineers-#1436600 (The Society For Mining, Metallurgy, and Exploration, Inc.).
4. THAT I have practised my profession as an engineer and geologist for the past thirty years.
5. THAT I have personally examined Gemini Creek-Gem 1-30, Soda Creek Soda 1-40 and Spud Creek-Spod 1-40 placer property during the period September 18-23, 1991 and traversed the creeks for the purpose of geological placer research. I HAVE personally managed a placer drill program on the North Ladue River and the left-limit tributaris Gemini, Soda and Spud Creeks during the summer field season of 1981; examined sections of Matson Creek and mining operations at Tenmile Creek and the Sixtymile River area in 1978, 1979, 1980 and 1981; THAT I have visited several other placer properties and mining operations located on several creeks in the Klondike, Sixtymile and Scroggie Districts, for the prupsoe of evaluation of placer gold exploration and development of placer properties during the time period of 1972 to the present.

6. THAT I have personally prepared the Compilation Placer Reports-1991 Placer Geological Survey; Effective Date November 29, 1991, located on Gemini, Soda and Spud Creeks, Dawson Mining District, NTS Sheets 115-N-7 & 10. The writer prepared documented report data by creek examination, reference to private reports within the Sixtymile and North Ladue River area and by researching placer literature.
7. THAT I have a direct and contingent interest in the Gem 1-30, Soda 1-40 and Spud 1-40 Yukon Placer Claims located on Gemini, Soda and Spud Creeks.

Dated this 31st day of March 1992 and Effective Date of Report 29 November 1991, at the City of Calgary,, in the Province of Alberta, Canada.



R. G. Hilker

R.G. Hilker, P.Eng.

TRON DUIK CONSULTANTS LTD.
324 Silver Valley Rise N.W.
Calgary, Alberta T3B 4B2

Report Expenditures,
North Ladue River Property,
Gemini-Soda-Spud Creeks,
Dawson Mining District, Y.T.

March 31, 1992

INVOICE #

Field travel Calgary/Watson Lake September 7-8, 1991; Watson Lake/Whitehorse Sept. 9-11; Dawson City Sept. 12-17; Gemini airstrip campsite Sept. 18-23; Dawson City Sept. 24-25; Whitehorse Sept. 26-27; field travel Watson Lake to Calgary Sept. 28-29, 1991. Placer geological survey on Gemini, Soda, Spud Creeks on Yukon Placer Claims Gem 1-30, Soda 1-40 & Spud 1-40. Placer Gold Evaluation Report Effective Date 29 November 1991.

1)	Field Travel Yukon (Sept. 9-27).....	\$1,875.00
	- Watson Lake (Whitehorse) Dawson	
	- Vehicle rental 19 day/\$50.....	\$ 950
	- Mileage 1900 miles \$0.25	475
	- Vehicle fuel.....	<u>450</u>
2)	Travel Expenses (Sept. 9-27)	1,425.00
	- Accommodation Expenses (19 days)...	\$ 475
	- Meals 19 days x \$50.....	<u>950</u>
3)	Field Camp Expenses (Sept. 18-23).....	4,285.00
	Honda Fourtrax (12 days x 200)....	\$2,400
	Bonanza Aviation.....	285
	Camp Equipment.....	300
	Field Equipment.....	300
	Field Groceries (20 days x \$50) ...	<u>1,000</u>
4)	Geological Assistants	2,625.00
	Anne Hilker 19 days x \$75.....	\$1,425
	Brad Callison 6 days x 200.....	<u>1,200</u>
5)	R.G.Hilker Prof. Fees	6,200.00
	- Field Travel 6 x \$2.....	\$1,200
	- Field days 10 x \$400.....	<u>4,000</u>
6)	Report Preparation (25 days)	5,250.00
	R.G. Hilker 15 days X \$350.....	\$5,250

TRON DUIK CONSULTANTS LTD.
324 Silver Valley Rise N.W.
Calgary, Alberta T3B 4B2

7)	Tron Duik Consultants	650.00
	- Office report expenses	
8)	Disbursements	1,425.00
	R.G. Salloway-drafting.....	\$675.
	Judy Swan-word processing.....	500
	Report duplication	<u>250</u>
	TOTAL INVOICE	<u>\$23,735.00</u>

Note: Report costs of \$23,735.00 is prorated Gem 1-30 (\$6,000), Soda 1-40 (\$8,000) and Spud 1-40 (\$8,000).

APPENDIX
NORTH LADUE RIVER PLACERS

R.G.HILKER, P.ENG.
MARCH 31, 1992
EFFECTIVE DATE
29 NOVEMBER 1991

R.G. HILKER
CONSULTING GEOLOGIST
WHITEHORSE YUKON TERRITORY

PROPERTY <u>NORTH LADUE RIVER - GEMINI CREEK</u>	Claim No. <u>GEMINI #10</u>	Strike _____	Lat. _____	Hole No. <u>G 81-1</u>
Date <u>September 25 19 81</u>	Section No. _____	Dip <u>Vertical</u>	Dep. _____	Total Depth <u>54 ft.</u>
Logged By <u>R. G. HILKER</u>	Plan No. _____	Level _____	Elev. _____	Page No. <u>1 of 2</u>

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R.G. HILKER
CONSULTING GEOLOGIST
WHITEHORSE YUKON TERRITORY

PROPERTY _____	Claim No. <u>GEMINI #10</u>	Strike _____	Lat. _____	Hole No. <u>G 81-1</u>
Date _____ 19 _____	Section No. _____	Dip _____	Dep. _____	Total Depth _____
Logged By _____	Plan No. _____	Level _____	Elev. _____	Page No. <u>2 of 2</u>

[illegible]

WHITEHORSE YUKON TERRITORY

Page No. 1 of 2[illegible]

WHITEHORSE YUKON TERRITORY

Page No. 2 of 2

50 colours

R.G. HILKER

CONSULTING GEOLOGIST

WHITEHORSE YUKON TERRITORY

PROPERTY NORTH LADUE RIVER - SODA CREEK

Claim No. SODA #13

Swiko

Let

Hole No. S 81-1

Date September 25 19 81

Section No.

Def

Vertical

Due

Total Depth 36 ft.

Logged By R. G. HILKER

Plan No. _____

Level

File:

Page No. 1 of 1

FOOTAGE

ROCK CLASSIFICATION

EPID. DIOP. GARN. SERP. QTZ/SIL. ACTINO TREMO. CHLO.

CRYSTALLINE SNEARING VEINS FRACTURING FOLIATION GRAIN SIZE TEXTURE

MINERALIZATION

ASSAY DATA

TYPE

SAMPLE NO.

WIDTH

REC'D

7Cu

2FA

MOLY

	AU/A
--	-------------

S	INSOL
---	-------

Drill: 6-5/8" O.D. bit

Hole drilled September 22, 1981

0	12	12	Black muck
---	----	----	------------

12	20	8	Gravels - of the Klondike Schist rock types, fine-coarse magnetite black sands, brown colour, clay
----	----	---	--

20	28	8	Gravels - brown colour gravels, 22-24' clay layer, abundant milky quartz pebbles which are angular
----	----	---	---

24 Sample 12-36' (9 colours and black sands)

Colours

12-36'

19-c

28	36	8	Bedrock - quartz chlorite/sericite schist - hard, platy and parts break into angular fragments
----	----	---	---

12 bags drill cuttings @ 2' intervals

R.G. HILKER
CONSULTING GEOLOGIST
WHITEHORSE YUKON TERRITORY

PROPERTY <u>NORTH LADUE RIVER - SODA CREEK</u>	Claim No. <u>SODA #13</u>	Strike _____	Lat. _____	Hole No. <u>S 81-2</u>
Date <u>September 25 19 81</u>	Section No. _____	Dip <u>Vertical</u>	Dep. _____	Total Depth <u>51 ft.</u>
Logged By <u>R. G. HILKER</u>	Plan No. _____	Level _____	Elev. _____	Page No. <u>1 of 2</u>

[illegible]

WHITEHORSE YUKON TERRITORY

Page No. 2 of 2

21 bags of drill cuttings @ 2' intervals

R.G. HILKER
CONSULTING GEOLOGIST
WHITEHORSE YUKON TERRITORY

PROPERTY <u>NORTH LADUE RIVER - SODA CREEK</u>	Claim No. <u>SODA #13</u>	Strike _____	Lat. _____	Hole No. <u>S 81-3</u>
Date <u>September 25 19 81</u>	Section No. _____	Dip <u>Vertical</u>	Dep. _____	Total Depth <u>50 ft.</u>
Logged By <u>R. G HILKER</u>	Plan No. _____	Level _____	Elev. _____	Page No. <u>1 of 1</u>

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**R.G. HILKER
CONSULTING GEOLOGIST
WHITEHORSE YUKON TERRITORY**

PROPERTY <u>NORTH LADUE RIVER - SPUD CREEK</u>	Claim No. <u>SPUD #11</u>	Strike _____	Lot. _____	Hole No. <u>SP 81-2</u>
Date <u>October 29 19 81</u>	Section No. _____	Dip <u>Vertical</u>	Dep. _____	Total Depth <u>50 ft.</u>
Logged By <u>R. G. HILKER</u>	Plan No. _____	Level _____	Elev. _____	Page No. <u>1 of 1</u>

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R.G. HILKER
CONSULTING GEOLOGIST
WHITEHORSE YUKON TERRITORY

PROPERTY <u>NORTH LADUE RIVER - SPUD CREEK</u>	Claim No. <u>SPUD #11</u>	Strike _____	Lat. _____	Hole No. <u>SP 81-3</u>
Date <u>October 29 19 81</u>	Section No. _____	Dip <u>Vertical</u>	Dep. _____	Total Depth <u>27 ft.</u>
Logged By <u>R. G. HILKER</u>	Plan No. _____	Level _____	Elev. _____	Page No. <u>1 of 1</u>

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