

Indian and Northern
Affairs CanadaAffaires indiennes
et du Nord Canada**F A C S I M I L E**

Name: Bill Lebarge
Organization: Geology
Fax: 867-667-3198
Phone: 867-667-3134
From: Jerald Graham
Date: 2 December 1997
Subject: Morrison Creek Invoice
Pages: 2

Comments: Bill this is the invoice that was submitted along with the renewal.[Comments]

120173

TS² CONSULTING INC.

#520, 734 - 7th Ave. S.W.

Calgary, Alberta,

Canada, T2P 3P8

Phone: (403)-237-5914,

Fax: (403)-234-7597

INVOICE

INVOICE NO: 97-17

DATE: September 1, 1997

fax to Harry Zellers

To:

Richardson Bros (Olds) Ltd.
RR# # Site 11, box 19,
Olds, Alberta
T4H 1P4

Ship To:

same

SALESPERSON	P.O. NUMBER	DATE SHIPPED	SHIPPED VIA	F.O.B. POINT	TERMS
Tony Speed	n/a	Sept 1/97	fax	Olds	

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
5	days consulting for visit to placer claims in Yukon and report preparation	\$350	\$1,750.00
Lot	Budget Rent - a - truck for trip to Mayo and Dawson City	\$608.51	\$608.70
Lot	Gasoline for trip to Mayo and Dawson City	\$163.58	\$163.58
Lot	Hotel in Dawson City plus meals in Dawson City and Mayo	\$218.00	\$218.00
Lot	Parking at airport in Calgary	\$60.00	\$60.00
SUBTOTAL			\$2,800.28
GST (# 898548383) (7% of \$1,750.00)			\$122.50
SHIPPING & HANDLING			\$ 0.00
TOTAL DUE			\$2,922.78

TS² CONSULTING INC.

Make all checks payable to:

If you have any questions concerning this invoice, call: Tony Speed, 281-3043

THANK YOU FOR YOUR BUSINESS!

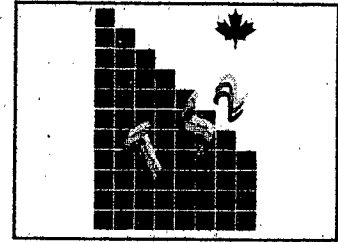
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September 23rd, 1997
Indian and Northern Affairs Canada,
Mining Recorder,
Mayo Mining District,

Attn: Jerald Graham:

Dear Sir:

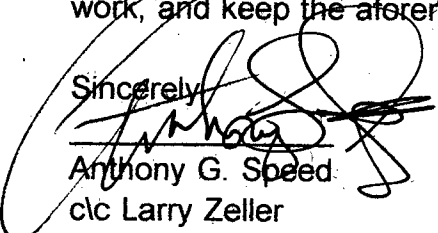
Re: Claim Grouping MP00380, Morrison Creek, Map Sheet 115P-16,
Latitude: 63° 48' 18.4" Longitude: 136° 11' 35.0"

Please find enclosed an **APPLICATION FOR RENEWAL OF GRANT FOR PLACER MINING (FORM 2)**, YUKON PLACER MINING ACT. along with a cheque in the amount of \$100 for the 10 claims grouped under MP00380. The grouped claims are as follows.

Claim Name	No.	Grant No.
Shelly	1	P015577
Rog	1	P015582
M.C.D.	1-2	P015909-P015910
M.C.D.	3	P015911
M.C.D.	4	P015912
M.C.D.	5-7	P015913-P015915
M.C.D.	8	P015916

Also appended are two copies of an Evaluation Survey conducted on said claims in the latter part of August, along with a statement of expenditures for the compilation of the Evaluation Survey. I trust that this report will meet the requirements for assessment work, and keep the aforementioned claims in good standing for one additional year.

Sincerely,


Anthony G. Speed
c/c Larry Zeller

**An Evaluation Survey
for Placer Claims on
Morrison Creek
Mayo Mining District
Yukon Territory**

Claim Name	No.	Grant No.
Shelly	1	P015577
Rog	1	P015582
M.C.D.	1-2	P015909-P015910
M.C.D.	3	P015911
M.C.D.	4	P015912
M.C.D.	5-7	P015913-P015915
M.C.D.	8	P015916

**Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"**

**August 31st, 1997
Anthony G. Speed, P. Eng (Mining)
TS² Consulting Inc.
Suite #520, 734 -- 7th Ave. S.W.
Calgary, Alberta, Canada
T2P 3P8**

TS² CONSULTING INC.

**An Evaluation of
Placer Claims
Mayo Mining District
Morrison Creek
Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"**

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**An Evaluation of
Placer Claims
Mayo Mining District
Morrison Creek
Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"**

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**An Evaluation of
 Placer Claims
 Mayo Mining District
 Morrison Creek
 Map Sheet 115P - 16
 Latitude: 63° 48' 18.4"
 Longitude: 136° 11' 35.0"**

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2	Geological Survey of Canada, Open File Report #1650. Hornbrook & Friske, Regional Stream & Water Geochemical Reconnaissance Data.	6
3	Geological Survey of Canada, Memoir No. 284, Yukon Territory (Selected field reports of the Geological Survey of Canada, 1898 - 1933) H.S.Bostock, 1957.	8
4	Geology of Mayo Lake, Scougale Creek and McQueston Lake, Map Areas, Geological Survey of Canada, Memoir No. 357, L.H. Green, 1971.	2
5A	Yukon Placer Mining Industry, 1991 - 1992 (Catalogue No. R72-215/1992e), Placer Mining Section, Mineral Resources Directorate, Indian and Northern Affairs Canada (DIAND), 1993. Excerpts	5
5B	Certificate of Assay, Loring Labs Ltd, Calgary, Alberta, Canada. Samples 111176 - 111179 inclusive	1

**An Evaluation of
Placer Claims
Mayo Mining District
Morrison Creek
Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"**

1.0 Introduction:

Larry Zeller Enterprises Ltd. holds a contiguous block of placer claims on Morrison Creek in the Mayo Mining District. Exploratory work was conducted on these claims in 1996, and consisted of trenching and test pit excavation. Access is via Hight Creek, which flows into the Stewart River drainage basin. An access trail from Hight Creek climbs over the saddle between Scheelite Dome and the adjacent mountain to the east and provides access to the upper reaches of the Morrison Creek, which flows northward into the McQueston River.

The writer was retained by Richardson Bros. (Olds) Ltd. to inspect the placer claims held by Larry Zeller and investigate the placer gold potential. Accordingly, a visit to the mining recorder's office in Mayo was made on August 27th to ascertain the current status of the claims and this was followed up by a visit to the placer claims on August 29th.

2.0 Location

The general location of these placer claims is shown in Figure 2.1, which follows this page. The statistics pertinent to these claims as provided by DIAND in Whitehorse are as follows:


Claim Name	No.	Grant No.	Expiry Date	Excess	% owned
Shelly	1	P015577	1997/09/30	0	100 %
Rog	1	P015582	1997/09/30	0	100 %
M.C.D.	1-2	P015909-910	1997/09/30	0	100 %
M.C.D.	3	P015911	1997/09/30	1	100 %
M.C.D.	4	P015912	1997/09/30	0	100 %
M.C.D.	5-7	P015913-915	1997/09/30	1	100 %
M.C.D.	8	P015916	1997/09/30	0	100 %

Placer Claims
Mayo Mining District
Morrison Creek
Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"

Figure 2.1 Location Plan, Claim Blocks

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 06 JAN 97
 05 OCT 96
 04 AUG 96
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 02 APR 96
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 98 JULY 95
 97 MAY 95


Indian and Northern Affairs Canada / **Affaires indiennes et du Nord Canada**
Northern Affairs Program / **Programme des affaires du Nord**

Mineral Rights / **Droits miniers**

Canada

MAYO 14 NOV. 88


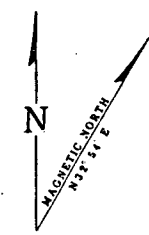
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13 MARCH 84	13 FEBRUARY 84
20 MARCH 84	20 FEBRUARY 84
27 MARCH 84	27 FEBRUARY 84

**115P-16
PLACER**

LATITUDE 63° 45' TO 64° 00'
 LONGITUDE 136° 00' TO 136° 30'

ISSUED UNDER THE AUTHORITY OF THE MINISTER
 OF
 INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

SCALE 1:30,000

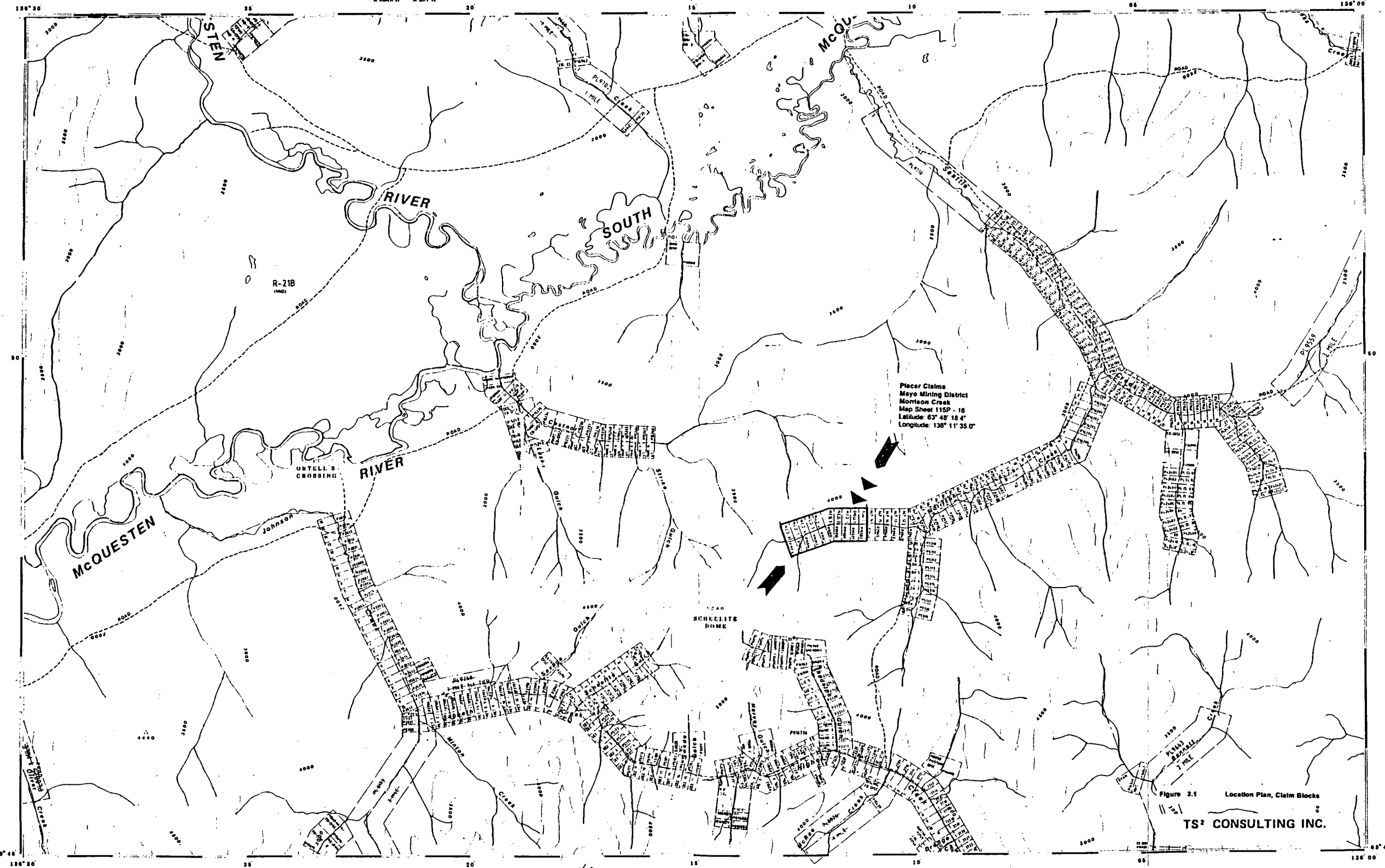



NOTE:
 THIS MAP IS ISSUED AS A PRELIMINARY GUIDE FOR WHICH THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT WILL ACCEPT NO RESPONSIBILITY FOR ANY ERRORS, INACCURACIES OR OMISSIONS WHATSOEVER.
 TOPOGRAPHY COMPILED FROM 1:50,000 NATIONAL TOPOGRAPHIC SERIES. CONTOUR INTERVAL 500 FEET. SURVEY INFORMATION COMPILED FROM LEGAL SURVEYS, BY DRAFTING SERVICES.
 Note: Entry on certain lands is withdrawn from staking in cross-hatched areas to facilitate the settlement of Native Land Claims without prejudice to Existing Surface and Subsurface Rights.

115A-2	115A-1	105D-4
115P-16	115P-16	105M-13
115P-10	115P-9	105M-12

NND = FIRST NATION OF NACHO NYAK DUN

NOTE: FOR QUARTZ CLAIMS SEE 115P-16 QUARTZ



Placer Claims
 Mayo Mining District
 Morrison Creek
 Map Sheet 115P-16
 Latitude: 63° 48' 18.4"
 Longitude: 136° 11' 35.0"

Figure 2.1 Location Plan, Claim Blocks
 TS² CONSULTING INC.

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SEA 13	SEATTLE	P16316
SEA 12	SEATTLE	P16317
SEA 11	SEATTLE	P16318
SEA 10	SEATTLE	P16319
SEA 9	SEATTLE	P16320
SEA 8	SEATTLE	P16321
SEA 7	SEATTLE	P16322

13	C	P16300
14	AD	P16301
15	DOWN	P16302
16	TO	P16303
17	ART 1	P16304
18	ART 2	P16305
19	ART 3	P16306
20	ART 4	P16307
21	ART 5	P16308
22	ART 6	P16309
23	ART 7	P16310
24	ART 8	P16311
25	ART 9	P16312
26	ART 10	P16313
27	ART 11	P16314
28	ART 12	P16315
29	ART 13	P16316
30	ART 14	P16317
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45	ART 29	P16332
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98	ART 82	P16385
99	ART 83	P16386
100	ART 84	P16387

M.C.D. 8	P15582
M.C.D. 7	P15583
M.C.D. 6	P15584
M.C.D. 5	P15585
M.C.D. 4	P15586
M.C.D. 3	P15587
M.C.D. 2	P15588
M.C.D. 1	P15589
ROD 1	P15590
SHELLY 1	P15591
M.C.D. 1	P15592
M.C.D. 2	P15593
M.C.D. 3	P15594
M.C.D. 4	P15595
M.C.D. 5	P15596
M.C.D. 6	P15597
M.C.D. 7	P15598
M.C.D. 8	P15599
M.C.D. 9	P15600
M.C.D. 10	P15601
M.C.D. 11	P15602
M.C.D. 12	P15603
M.C.D. 13	P15604
M.C.D. 14	P15605
M.C.D. 15	P15606
M.C.D. 16	P15607
M.C.D. 17	P15608
M.C.D. 18	P15609
M.C.D. 19	P15610
M.C.D. 20	P15611
M.C.D. 21	P15612
M.C.D. 22	P15613
M.C.D. 23	P15614
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M.C.D. 27	P15618
M.C.D. 28	P15619
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M.C.D. 42	P15633
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M.C.D. 45	P15636
M.C.D. 46	P15637
M.C.D. 47	P15638
M.C.D. 48	P15639
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M.C.D. 50	P15641
M.C.D. 51	P15642
M.C.D. 52	P15643
M.C.D. 53	P15644
M.C.D. 54	P15645
M.C.D. 55	P15646
M.C.D. 56	P15647
M.C.D. 57	P15648
M.C.D. 58	P15649
M.C.D. 59	P15650
M.C.D. 60	P15651
M.C.D. 61	P15652
M.C.D. 62	P15653
M.C.D. 63	P15654
M.C.D. 64	P15655
M.C.D. 65	P15656
M.C.D. 66	P15657
M.C.D. 67	P15658
M.C.D. 68	P15659
M.C.D. 69	P15660
M.C.D. 70	P15661
M.C.D. 71	P15662
M.C.D. 72	P15663
M.C.D. 73	P15664
M.C.D. 74	P15665
M.C.D. 75	P15666
M.C.D. 76	P15667
M.C.D. 77	P15668
M.C.D. 78	P15669
M.C.D. 79	P15670
M.C.D. 80	P15671
M.C.D. 81	P15672
M.C.D. 82	P15673
M.C.D. 83	P15674
M.C.D. 84	P15675
M.C.D. 85	P15676
M.C.D. 86	P15677
M.C.D. 87	P15678
M.C.D. 88	P15679
M.C.D. 89	P15680
M.C.D. 90	P15681
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M.C.D. 98	P15689
M.C.D. 99	P15690
M.C.D. 100	P15691

HILDA 1	P5310
HILDA 2	P5311
HILDA 3	P5312
HILDA 4	P5313
HILDA 5	P5314
HILDA 6	P5315
HILDA 7	P5316
HILDA 8	P5317
HILDA 9	P5318
HILDA 10	P5319

MUFFET 2	P16975
MUFFET 1	P16974
JARRET 2	P16973
JARRET 1	P16972
CORIE 2	P16971
CORIE 1	P16970
BRENDIN 2	P16969
BRENDIN 1	P16968
GINGER 2	P16967
GINGER 1	P16966
LIZ 5	P2342
LIZ 4	P2341
LIZ 3	P2340
LIZ 2	P2339
LIZ 1	P2338

ROAD

ITE

000

H

These placer claims straddle the west branch of Morrison Creek and are 500 feet in width and 1,000 feet in distance, either side of the central baseline that follows the creek, with two posts marking the claims, with metal tags affixed, denoting the claim (grant number). See figure 2.2 showing the No.2 claim post for Grant No. P015577. Refer to the "Staking Guidelines" (Reference No. 4) for details on locating claim posts.

3.0 Prior Work

Work in prior years appears to have been undertaken in the late 1970's or early 1980's, based on the derelict equipment left on the claims. The equipment includes two John Deere 1010 tracked loaders (one yard bucket), an International Harvester, one tonne pick-up truck and a plywood sluice box as well as some 12 foot lengths of 16 inch diameter pipe, see figures 3.1 and 3.2 for particulars.. Several segments of riffle made from 20 lb. rail were in evidence at a cabin, which was the residence for earlier miners located on the headwaters of the south branch of Morrison Creek. The cabin is approximately one mile south-east of the claims. See figure 3.3 for a photograph of the Cabin. The sluice appears to have been gravity fed with water from Morrison Creek.. Past placer mining does not appear to have been extensive, since the sole identifiable remnant is a small sediment pond. In general the surface disturbance of note consists of windrows of humus and topsoil to permit the gravel and glacial till to be exposed, see figure 3.4. A ground cover now consists of willows and fireweed in most of the disturbed area. The entire disturbance occurs in an alpine meadow at an elevation of approximately 3500 to 4000 feet and covers approximately 5 acres. No trees appear to have been logged off on the fringes of the meadow.

Larry Zeller conducted some trenching on the claims in 1996 and this is shown in figure 3.5. Some panning for gold of the trench material was conducted and it is verbally reported that several nuggets were retrieved as well as flakes of gold.

4.0 Current Status of Claims

A discussion with Jerald Graham, the mining recorder in Mayo and a listing (see Appendix 1) acquired by John Mar of Mar Consulting Inc. (Whitehorse/Victoria) from the Whitehorse mining recorders office shows that the majority of the placer claims held by Larry Zeller on Morrison Creek will lapse on September 30, 1997; unless some assessment work is performed prior to that date and appropriate notice filed with the mining recorder. Under the current placer mining regulations, \$200 work has to be performed on each claim to keep it in good standing for one year. Since the claims are grouped, then assessment work on one claim, can be spread over adjoining claims, eliminating the need for assessment work to be performed on each individual claim.



•Figure 2.2 No.2 claim post, Grant No. P015577



•Figure 3.1 Derelict equipment left on the claims



•Figure 3.3 Miner's Cabin on Morrison Creek,



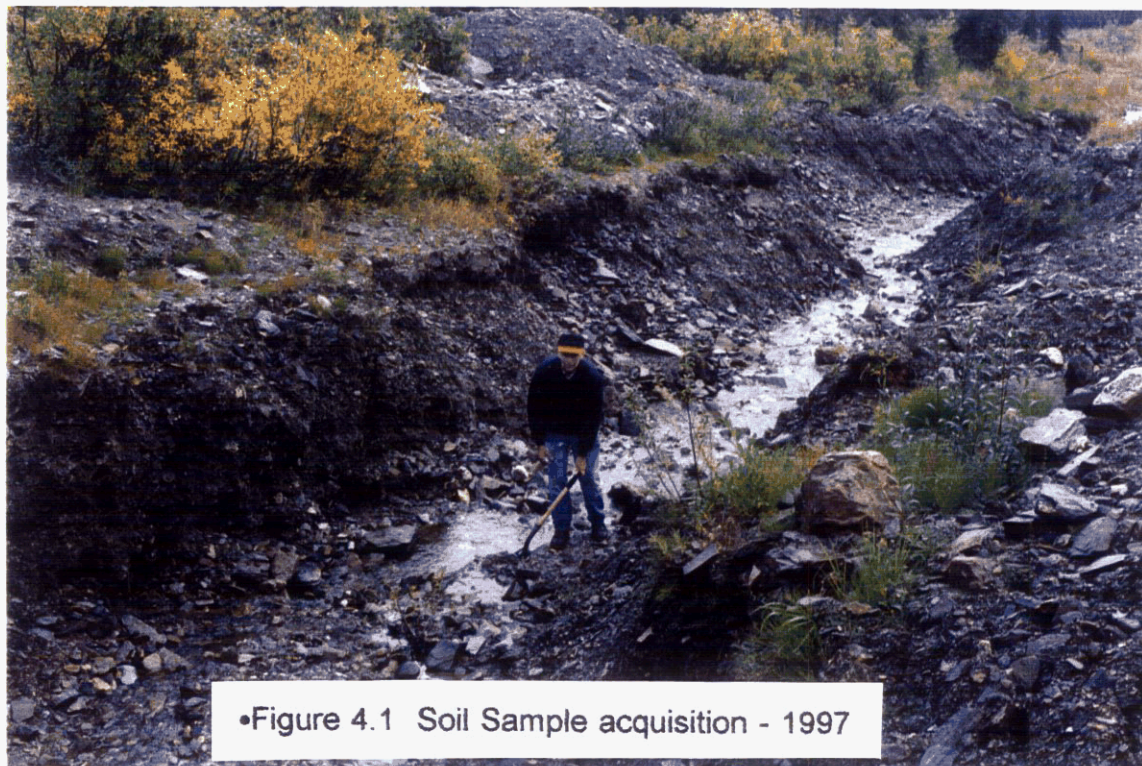
•Figure 3.2 Derelict equipment left on the claims



•Figure 3.4 Surface Disturbance, consisting of windrows of topsoil



•Figure 3.5 Trenching - Exploration program - 1996



•Figure 4.1 Soil Sample acquisition - 1997

The writer took four (4) soil samples from the property on a visit on August 29th. See figure 4.1. These were subsequently submitted to Loring Labs in Calgary for Fire Assay determination of the gold and silver content. The assay results are as follows:

Sample #	Description	Location: Lat. & Long.	Claim Grant No	Gold ppb	Silver ppm
111176	Bottom of trench beside Creek	63° 48' 18.3" 136° 11' 55.2"	M.C.D. 4 P015912	38	0.5
111177	Bottom of trench beside Creek	63° 48' 18.3" 136° 11' 55.2"	M.C.D. 4 P015912	14	0.4
111178	Ford across Creek	63° 48' 18.4" 136° 11' 35.0"	M.C.D. 1 P015909	<5	0.4
111179	Floor of test pit near claim post	63° 48' 18.8" 136° 10' 50.5"	Rog. P015582	14	0.4

The Certificate of Assay is shown in Appendix 5B. These results show elevated levels of gold in the soil for sample 111176. The remainder (111177-79) trend toward the background levels in the region as indicated in geochem samples for the region, and shown in Geological Survey of Canada, Open File Report #1650, **Regional Stream & Water Geochemical Reconnaissance Data** by Hornbrook & Friske, 1988. Refer to Appendix 2 for pertinent excerpts.

5.0 Geochemistry

In general, the area has been glaciated and glacial till covers the area. Sand, silt and gravel from a fluvial environment occur in the valleys and abandoned terraces. Gold which was released from the bedrock, when glaciers abraded the North, led to the liberation of gold and dispersement amongst the glacial material. Subsequent reworking of the gravels concentrated the gold and economic placer deposits were formed. This mechanism has been described by several writers, notably H.S. Bostock, in his Geological Survey of Canada, Memoir No.284, which was published in 1957. Copies of this report are no longer available, but excerpts are included in Appendix 3. Geological Survey of Canada, Memoir No.357, *Geology of Mayo Lake, Scougale Creek and McQueston Lake Map areas*, by L.H. Green, 1971. describes the general geology of the area. Excerpts are shown in Appendix 4. In the economic geology section, the placer gold mining potential in the area was dismissed. However, since this work focused primarily on the Keno Hill area, and not Scheelite Dome or the McQueston River drainage basin, it must be taken in that context. More recently (1988), work conducted by the Geological Survey of Canada, in conjunction with the Yukon Government, led to the publishing of Open File Report #1650, which is a compilation of reconnaissance geochemical sampling on a wide basis. Pertinent

samples for the locale are excerpted and shown in Appendix 2.

6.0 Geomorphology

In general, abandoned terraces and reworked gravels along valley floors are sites that have yielded placer gold in the Yukon. At the present time, over 100 creeks are being actively worked in the Yukon and the annual production of placer gold in recent years peaked at approximately 150,000 ounces. A cursory view of placer gold operations in the adjacent Hight Creek area, some 2 miles to the south of the claims held by Larry Zeller, show that they occur at an elevation of approximately 3500 to 4000 feet. Claims appear to be constrained to these elevations on the south flank of Scheelite Dome and again on the north and east flank of the dome. Prospectors in the Dawson City area along Bonanza and Hunker creek noted that terraces at approximately the same elevation, where the White Channel occurs are good targets for locating placer gold. This practical approach to locating placer gold, can be applied to the Morrison and Hight Creek areas. An inspection of both the Hight and Morrison Creek areas show that the surficial material and land forms are similar. The current mining activities on Hight Creek occur close to the headwaters in a narrow valley at an elevation of approximately 3500' to 4000', although placer mining in earlier days is evident along the lower reaches of the creek where the valley broadens out, similar to the location of the claims held by Larry Zeller on Morrison Creek.

7.0 Adjacent Mining

Placer gold production in the Hight Creek area, immediately to the south of the claims held by Larry Zeller is documented in the report by Indian and Northern Affairs Canada (DIAND) entitled Yukon Placer Mining Industry, 1991 - 1992 (Catalogue no. R72-215/1992e), published in 1993. Excerpts from the report are shown in Appendix 5A. A brief summary for three active placer operations on Hight Creek from the report follows:

Mine Operator	NTS Map Sheet Location (Lat/Long)	Equipment
Erl Enterprises	115P-16 63° 43'N 136° 12'W	Wet Grizzly and Sluice Box.
Sasha Mining	115P-16 63° 43'N 136° 12'W	Trommel and Sluice Box
Bleiler Placers Ltd.	115P-16 63° 43'N 136° 06'W	Wet Grizzly and Ross Sluice Box

See figure 7.1 for a photo of the current mining activity at Hight Creek. Reported gold production from Hight Creek is as follows:

Year	ounces of crude gold.	Average Price per ounce US dollars	Approximate gold production @ 820-845 fine US dollars
1992	4,466	US\$334	\$1.2 million
1991	2,506	US\$362	\$0.7 million
1990	3,498	US\$380	\$1.1 million
1989	3,460	US\$400	\$1.1 million
1988	3,042	US\$450	\$1.1 million
1987	2,233	US\$400	\$0.7 million
1986	1,735	US\$330	\$0.5 million
1985	2,192	US\$315	\$0.6 million

Gold pricing for 1991-92 year was derived from Yukon Placer Mining Industry, 1991 - 1992 (Catalogue No. R72-215/1992e), Placer Mining Section, Mineral Resources Directorate, Indian and Northern Affairs Canada (DIAND), 1993. Gold pricing for prior years was derived from the handbook: "Mining Explained" - Northern Miner Press (1996), Reference No. 2.

8.0 Proposed work program

The work to date has consisted of some limited mining in the late 1970's or early 1980's. There is no written record of this work and at the present time, the historical gold production on the claims is unknown, but for now can be assumed to be negligible. Furthermore the work conducted by Larry Zeller which comprised a trench parallel to Morrison Creek and several test pits has not been recorded in written form and no record is available. If the claims are to be developed, then the placer gold potential must be ascertained. At the present time, the bedrock resources (Quartz Claims) have been staked by Homestake Canada, who have fielded a work program this past summer.

The most economical and accurate method of ascertaining placer resources on the claims is to pan gravel samples excavated from test pits. A one week program of trenching with a backhoe and gold panning would quickly tell whether placer gold occurs on the claims. This could be supplemented by a pilot scale test program, with a backhoe feeding the excavated material into a portable trommel and attendant sluice. This prospecting work is permitted under the regulations applicable to placer claims. Activities using water and/or discharging waste may require a water license.



•Figure 7.1 Current mining activity on Hight Creek

Placer Claims
Mayo Mining District
Morrison Creek
Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"

Figure 7.1 Current mining activity on Hightet Creek

This would be followed up by drilling at a later date, for reserve extrapolation

Work conducted in a exploration program would also stand as representation work for the purpose of renewing placer claims. At the current time, stripping and trenching by mechanical means is valued at \$2.00 per cubic yard, whereas test pits by backhoe are valued at \$10.00 per vertical foot, if excavated to a minimum depth of 8 feet or bedrock, whichever comes first.

9.0 Summary

The results of work conducted on the placer claims currently held by Larry Zeller enterprises is unknown and the preliminary grab samples of soil on a site inspection on August 29th, have indicated that gold values are at anomalous levels, indicating that gold occurs on the claims. However, whether or not placer gold of economic proportions occurs is unknown.

10.0 Conclusion

Historical mining on the claims held by Larry Zeller and test pits and trenches recently excavated on the placer claims connotes that placer gold occurs. Adjacent placer mines on Hight Creek and Johnson Creek on the other side of the mountain at approximately the same elevation are positive indications that placer gold of economic levels is capable of being exploited. The only question that cannot be answered on the basis of present information, is whether economic placer gold deposits occur on the claims held by Larry Zeller. This can only be answered by doing some exploratory work using a backhoe and dozer for trenching, along with a gold pan to check for gold values. This should be followed up by bulk sampling, employing a small, portable trommel and sluice box for areas with indications of gold, based on gold panning.

**An Evaluation of
Placer Claims
Morrison Creek
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"**

STATEMENT OF QUALIFICATIONS

I, Anthony G. Speed of Calgary in the Province of Alberta, DO HEREBY CERTIFY:

1. THAT I am a Consulting Mining Engineer with offices at #520, 734 - 7th Ave. S.W., Calgary, Alberta.

2. THAT I am a 1968 graduate of the University of Saskatchewan with a Bachelor of Science Degree in Mining Engineering.

3. THAT I am currently registered and in good standing as a Professional Engineer with the Association of Professional Engineers, Geologists and Geophysicists of Alberta,

4. THAT my 30 years of continuous experience in mining have exposed me to a broad knowledge of mining and geological environments and allowed considerable familiarization with the exploration and production of placer gold deposits in similar geological and physiographic settings

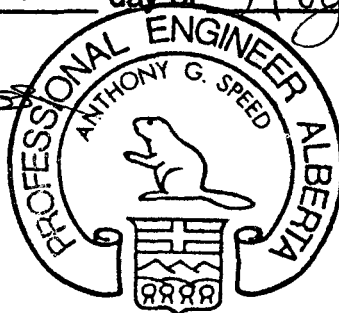
5. THAT this report is based on my visit to the properties described in this report and my personal collection of soil samples.

6. THAT I have no interest, direct or indirect in the properties or securities of **LARRY ZELLER ENTERPRISES INC.**, nor **RICHARDSON BROS (OLDS) LIMITED**, nor do I expect to receive or acquire any.

7. THAT I consent to the use of this report in support of a filing for a Renewal of a Grant for Placer Claims.

Dated at Calgary, Alberta, this 31st day of August, 1997


Anthony G. Speed, P. Eng



**An Evaluation of
Placer Claims
Mayo Mining District
Morrison Creek
Map Sheet 115P - 16
Latitude: 63° 48' 18.4"
Longitude: 136° 11' 35.0"**

References

No.	Description	Author
1	The use of nuclear tracers to evaluate the gold recovery efficiency of sluiceboxes. CIMM Bulletin, April 1994	Clarkson, R.R NEW ERA Eng. Corp. Whitehorse, Yukon
2	"Mining Explained". Handbook on Mining. Gold Pricing. 1972-1995. Courtesy of Richardson Greenshields.	James Whyte and Thomas Brockelbank, Northern Miner Press, Don Mills, Ontario, pps 89 - 90
3	Engineering & Mining Journal, March 1997 issue.. Annual Commodities Review issue. "Gold - Price in Doldrums, Production Sets Record".	Stewart Murray, Gold Fields Mineral Services. Intertec Publishing, Chicago, Illinois, U.S.A. pps 13-16
4	"Staking Guidelines" with details on locating claim posts	Excerpts from An Act Respecting placer mining in the Yukon Territory, R.S. 1985, Amended 1991

**An Evaluation of
 Placer Claims
 Mayo Mining District
 Morrison Creek
 Map Sheet 115P - 16
 Latitude: 63° 48' 18.4"
 Longitude: 136° 11' 35.0"**

Appendices

Appendix	Description	Pages
1	Status of claims, listing from the mining recorder at the Department of Indian and Northern Affairs in Whitehorse, 1997/01/10	2
2	Geological Survey of Canada, Open File Report #1650. Hornbrook & Friske, Regional Stream & Water Geochemical Reconnaissance Data.	6
3	Geological Survey of Canada, Memoir No. 284, Yukon Territory (Selected field reports of the Geological Survey of Canada, 1898 - 1933) H.S.Bostock, 1957.	8
4	Geology of Mayo Lake, Scougale Creek and McQueston Lake, Map Areas, Geological Survey of Canada, Memoir No. 357, L.H. Green, 1971.	2
5A	Yukon Placer Mining Industry, 1991 - 1992 (Catalogue No. R72-215/1992e), Placer Mining Section, Mineral Resources Directorate, Indian and Northern Affairs Canada (DIAND), 1993. Excerpts	5
5B	Certificate of Assay, Loring Labs Ltd, Calgary, Alberta, Canada. Samples 111176 - 111179 inclusive	1

1997/01



Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

We are able to confirm the status of the following claims:

Claim Name	Claim No.	Grant No.	Expiry Date	Registered Owner	Excess	% Ownd
Shelly	1	P015577	1997/09/30	LARRY ZELLER ENTERPRISES INC	0	100
Rog		P015582		LARRY ZELLER ENTERPRISES INC	0	100
M.C.D.	1 - 2	P015909 - P015910		LARRY ZELLER ENTERPRISES INC	0	100
	3	P015911		LARRY ZELLER ENTERPRISES INC	1	100
	4	P015912		LARRY ZELLER ENTERPRISES INC	0	100
	5 - 7	P015913 - P015915		LARRY ZELLER ENTERPRISES INC	1	100
	8	P015916		LARRY ZELLER ENTERPRISES INC	0	100

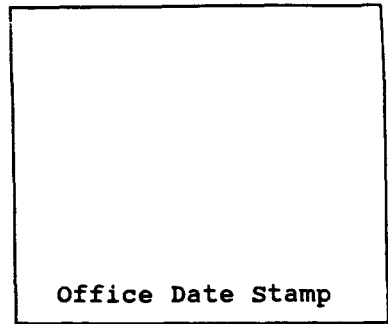


Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

APPLICATION 4287

APPLICATION TO GROUP PLACER CLAIMS
(SECTION 51)
YUKON PLACER MINING ACT



MAYO MINING DISTRICT

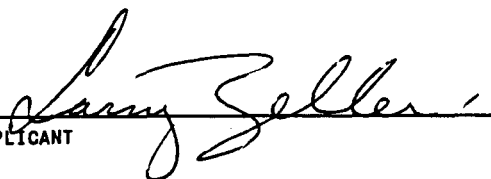
Office Date Stamp

The undersigned owner(s) or agent of the owner(s) of the following claims give notice of intention to group the said claims for the performance of work and do hereby apply for a grouping certificate under the provisions of Section 51 of the Yukon Placer Mining Act.

Grant No.	Claim Name	Location
P015577	Shelly 1	Morrison Creek
P015582	Rog 1	Morrison Creek
P015909 - P015916	M.C.D. 1 - 8	Morrison Creek

The above claims are located on Map Number(s) 115P16 as shown on the attached sketch.

Dated at Mayo
8 day of August, 1996.



APPLICANT

APPLICANT

APPLICANT

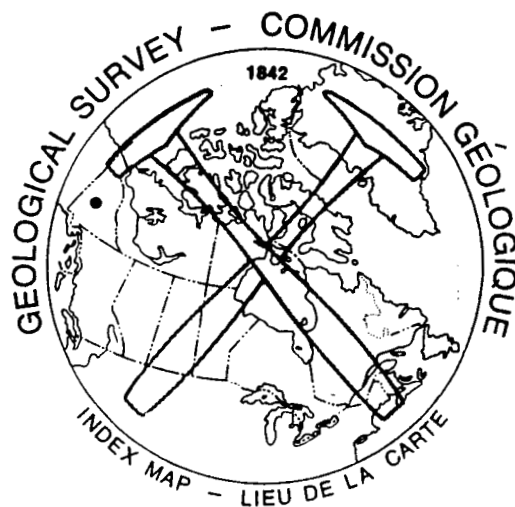
APPLICANT

GEOLOGICAL SURVEY OF CANADA OPEN FILE 1650

(115P, part of 105M)

CANADA – YUKON MINERAL DEVELOPMENT AGREEMENT (1985 – 1989)

REGIONAL STREAM SEDIMENT AND WATER GEOCHEMICAL DATA, CENTRAL YUKON



Project Director: E.H.W. Hornbrook
Project Coordinator: P.W.B. Friske
Subproject Leaders: J.J. Lynch, H.R. Schmitt
Members: S. Cook, C.C. Durham, A. Galletta, H. Gross, M. McCurdy, D. Wright

August, 1988

National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data. Yukon 1988, GSC OF-1650, NGR-115-1988, NTS 105M 115P
Field Data

Map	Sample ID	ZN	UTM		Rock		Stream			Sample	Bank	Water	Flow	Sed	Sed	Pcpt	Bank	Strm	Drain	Stream		Water	
			Easting	Northing	Type	Age	Wid	Dep	RS	Type	Type	Col	Rate	Col	Comp	Col	Stain	Phys	Ptrn	Type	Class	Source	
115P	871002	8	448328	7063628	Mvr	61	8	20	00	Sed/Wat	0	7	Clear	Slow	Bn	013	None	None	3	1	1	1	2
115P	871003	8	447996	7067012	Hqp	07	15	20	00	Sed/Wat	1	4	Clear	Mod	Bn	220	None	None	3	1	1	2	2
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115P	871007	8	447381	7076846	Hqp	07	10	20	00	Sed/Wat	2	2	Clear	Mod	Bn	103	None	None	3	1	1	1	2
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115P	871009	8	445467	7076598	Hqp	07	14	10	00	Sed/Wat	1	2	Clear	Mod	Bn	103	None	None	3	1	1	1	2
115P	871010	8	442609	7074734	Kqm	52	15	21	10	Sed/Wat	2	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871011	8	442609	7074734	Kqm	52	15	22	20	Sed/Wat	2	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
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115P	871016	8	446275	7079198	Hqp	07	13	10	00	Sed/Wat	2	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	1	2
115P	871017	8	445227	7080506	JKKH	51	-	-	00	Sed	2	2	-	-	Bn	003	None	None	3	1	2	1	-
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115P	871031	8	441547	7095597	Hqp	07	10	20	00	Sed/Wat	9	2	Clear	Mod	Bn	210	None	None	3	1	1	1	2
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115P	871044	8	444056	7087485	Hqp	07	10	10	00	Sed/Wat	2	2	Clear	Slow	Bn	310	Wh-Bf	None	3	1	1	1	2
115P	871045	8	448104	7088519	Hqp	07	15	10	00	Sed/Wat	0	2	Clear	Slow	Bn	220	Wh-Bf	None	3	1	1	1	2

MORRISON
CREEK

National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data. Yukon 1988, GSC OF-1650, NGR-115-1988, NTS 105M 115P
Field Data

HIGMET CREEK

Map	Sample ID	ZN	UTM		Rock		Stream		Sample	Bank	Water	Flow	Sed	Sed	Pcpt	Bank	Strm	Drain	Stream		Water		
			Eastng	Northing	Type	Age	Wid	Dep	RS	Type	Cont	Type	Col	Rate	Col	Comp	Col	Stain	Phys	Ptrn	Type	Class	Source
115P	871046	8	450082	7088161	Hqp	07	15	20	00	Sed/Wat	1	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871047	8	449000	7090769	Hqp	07	25	20	00	Sed/Wat	2	4	Clear	Mod	Bn	130	Wh-Bf	None	3	1	1	1	2
115P	871049	8	445650	7062057	Hqp	07	9	10	00	Sed/Wat	0	2	Clear	Slow	Bn	310	None	None	3	1	1	1	2
115P	871050	8	443593	7066172	Hqp	07	10	10	00	Sed/Wat	2	2	Clear	Mod	Bn	310	None	None	3	1	1	1	2
115P	871051	8	442377	7069099	Hqp	07	21	10	00	Sed/Wat	4	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871052	8	441645	7070335	Hqp	07	10	10	00	Sed/Wat	4	2	Clear	Mod	Bn	310	None	None	3	1	1	1	2
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115P	871056	8	436642	7072632	Hqp	07	20	20	00	Sed/Wat	4	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2
115P	871057	8	433801	7071765	Hqp	07	15	11	10	Sed/Wat	4	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	1	2
115P	871058	8	433801	7071765	Hqp	07	15	12	20	Sed/Wat	4	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	1	2
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115P	871060	8	430767	7069124	Hqp	07	10	20	00	Sed/Wat	0	2	Clear	Mod	Rd-Bn	030	None	None	3	1	1	1	2
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115P	871068	8	433113	7082382	Hqp	07	7	10	00	Sed/Wat	2	4	Clear	Stag	Bn	130	None	None	3	1	1	1	2
115P	871069	8	429073	7074759	Hqp	07	12	20	00	Sed/Wat	0	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
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115P	871071	8	426725	7078730	Hqp	07	15	22	20	Sed/Wat	0	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	2	2
115P	871072	8	424582	7080802	Hqp	07	8	20	00	Sed/Wat	0	2	Clear	Slow	Bn	003	None	None	3	1	1	1	2
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115P	871086	8	440493	7085197	Hqp	07	-	-	00	Sed	0	2	-	-	Bn	103	None	None	3	1	1	1	-
115P	871087	8	425703	7091778	OSDR	19	12	30	00	Sed/Wat	1	2	Clear	Slow	Bn	121	None	None	3	1	1	1	2
115P	871088	8	425914	7094777	OSDR	19	15	10	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2
115P	871089	8	424641	7095781	OSDR	19	20	20	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2
115P	871090	8	421600	7095617	OSDR	19	25	20	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2

National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data. Yukon 1988, GSC OF-1650, NGR-115-1988, NTS 105M 115P
Field Data

ALICNET CREEK

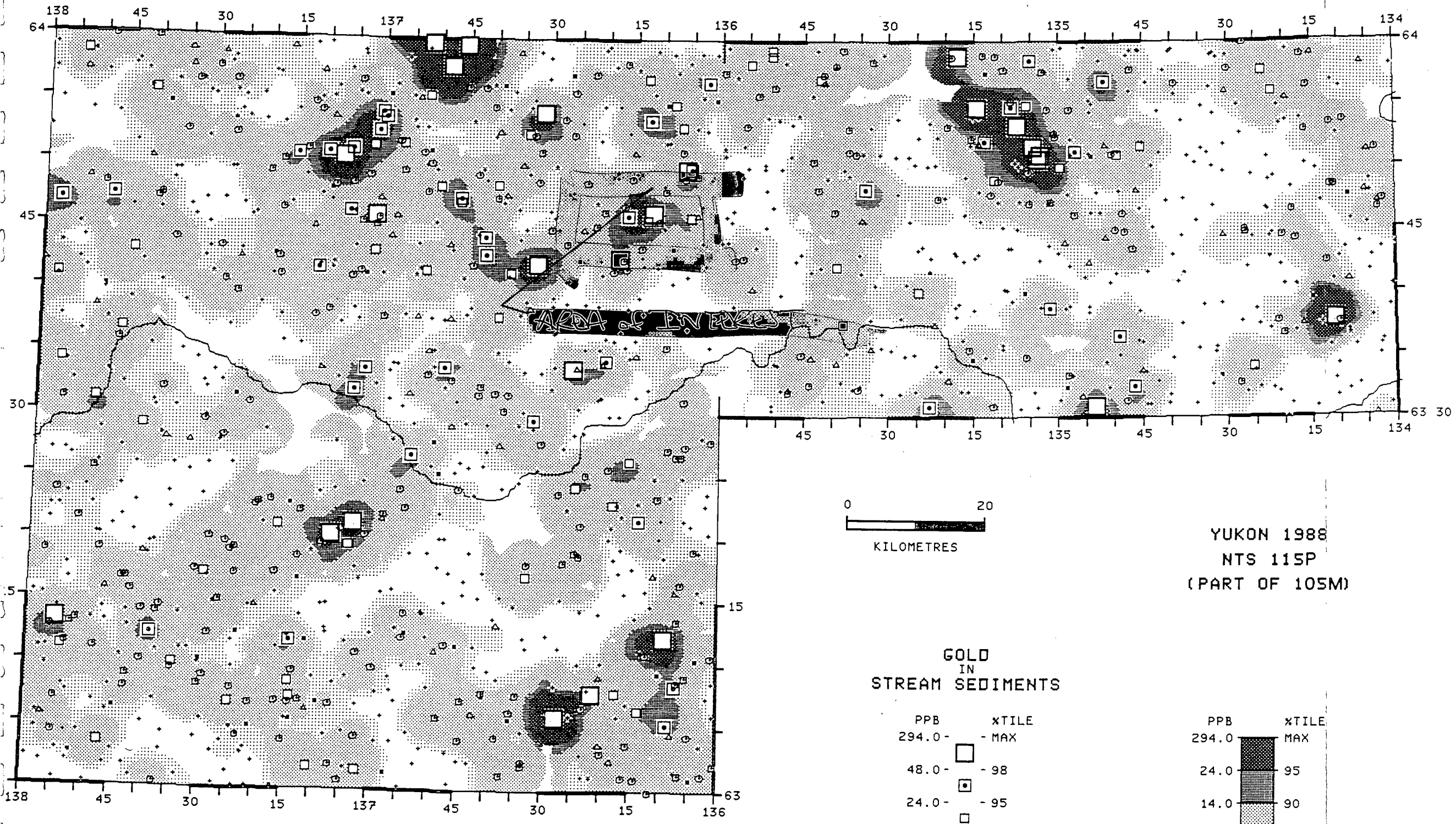
Map	Sample ID	ZN	UTM		Rock		Stream		Sample	Bank	Water	Flow	Sed	Sed	Pcpt	Bank	Strm	Drain	Stream	Water			
			Eastng	Northing	Type	Age	Wid	Dep	RS	Type	Cont	Type	Col	Rate	Col	Comp	Col	Stain	Phys	Ptrn	Type	Class	Source
115P	871046	8	450082	7088161	Hqp	07	15	20	00	Sed/Wat	1	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871047	8	449000	7090769	Hqp	07	25	20	00	Sed/Wat	2	4	Clear	Mod	Bn	130	Wh-Bf	None	3	1	1	1	2
115P	871049	8	445650	7062057	Hqp	07	9	10	00	Sed/Wat	0	2	Clear	Slow	Bn	310	None	None	3	1	1	1	2
115P	871050	8	443593	7066172	Hqp	07	10	10	00	Sed/Wat	2	2	Clear	Mod	Bn	310	None	None	3	1	1	1	2
115P	871051	8	442377	7069099	Hqp	07	21	10	00	Sed/Wat	4	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871052	8	441645	7070335	Hqp	07	10	10	00	Sed/Wat	4	2	Clear	Mod	Bn	310	None	None	3	1	1	1	2
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115P	871054	8	439982	7070423	Hqp	07	7	10	00	Sed/Wat	4	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871055	8	437042	7071146	Hqp	07	10	20	00	Sed/Wat	4	2	Clear	Mod	Bn	103	None	None	3	1	1	1	2
115P	871056	8	436642	7072632	Hqp	07	20	20	00	Sed/Wat	4	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2
115P	871057	8	433801	7071765	Hqp	07	15	11	10	Sed/Wat	4	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	1	2
115P	871058	8	433801	7071765	Hqp	07	15	12	20	Sed/Wat	4	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	1	2
115P	871059	8	432450	7069722	Hqp	07	12	20	00	Sed/Wat	0	2	Clear	Mod	Bn	103	None	None	3	1	1	1	2
115P	871060	8	430767	7069124	Hqp	07	10	20	00	Sed/Wat	0	2	Clear	Mod	Rd-Bn	030	None	None	3	1	1	1	2
115P	871062	8	432540	7073187	Hqp	07	-	-	00	Sed	4	2	-	-	Bn	310	None	None	3	1	2	1	-
115P	871063	8	431172	7076119	Hqp	07	13	10	00	Sed/Wat	4	4	Clear	Slow	Bn	130	None	None	3	1	1	4	2
115P	871064	8	435597	7076806	Hqp	07	10	20	00	Sed/Wat	0	2	Clear	Mod	Bn	003	None	None	3	1	1	2	2
115P	871065	8	437755	7076703	Hc	07	13	20	00	Sed/Wat	0	2	Clear	Mod	Bn	103	None	None	3	1	1	2	2
115P	871066	8	438379	7077389	Hc	07	20	10	00	Sed/Wat	9	2	Bn Trans	Slow	Bk	022	None	None	3	1	1	1	2
115P	871067	8	438190	7080432	Hqp	07	12	10	00	Sed/Wat	9	4	Clear	Mod	Bn	103	None	None	3	1	1	1	2
115P	871068	8	433113	7082382	Hqp	07	7	10	00	Sed/Wat	2	4	Clear	Stag	Bn	130	None	None	3	1	1	1	2
115P	871069	8	429073	7074759	Hqp	07	12	20	00	Sed/Wat	0	2	Clear	Mod	Bn	220	None	None	3	1	1	1	2
115P	871070	8	426725	7078730	Hqp	07	15	21	10	Sed/Wat	0	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	2	2
115P	871071	8	426725	7078730	Hqp	07	15	22	20	Sed/Wat	0	2	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	2	2
115P	871072	8	424582	7080802	Hqp	07	8	20	00	Sed/Wat	0	2	Clear	Slow	Bn	003	None	None	3	1	1	1	2
115P	871073	8	423590	7083361	Hqp	07	8	20	00	Sed/Wat	0	2	Clear	Mod	Bn	003	None	None	3	1	1	1	2
115P	871074	8	422800	7083486	Hqp	07	18	20	00	Sed/Wat	0	2	Clear	Mod	Bn	103	None	None	3	1	1	1	2
115P	871075	8	425080	7086651	Hqp	07	20	30	00	Sed/Wat	9	2	Clear	Mod	Bn	211	None	None	3	1	1	2	2
115P	871077	8	428000	7085600	Hqp	07	10	20	00	Sed/Wat	0	7	Bn Trans	Slow	Bn	130	None	None	3	1	1	1	2
115P	871078	8	429294	7083265	Hqp	07	25	10	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	1	2
115P	871079	8	430483	7084964	Hqp	07	25	20	00	Sed/Wat	2	4	Clear	Mod	Bn	220	Wh-Bf	None	3	1	1	1	2
115P	871080	8	433811	7087443	OSDR	19	8	20	00	Sed/Wat	0	2	Clear	Mod	Bn	130	Wh-Bf	None	3	1	1	1	2
115P	871083	8	435919	7087405	Hqp	07	8	10	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	1	2
115P	871084	8	437432	7083345	Hqp	07	20	21	10	Sed/Wat	2	4	Clear	Slow	Bn	220	None	None	3	1	1	2	2
115P	871085	8	437432	7083345	Hqp	07	20	22	20	Sed/Wat	2	4	Clear	Slow	Bn	220	None	None	3	1	1	2	2
115P	871086	8	440493	7085197	Hqp	07	-	-	00	Sed	0	2	-	-	Bn	103	None	None	3	1	1	1	-
115P	871087	8	425703	7091778	OSDR	19	12	30	00	Sed/Wat	1	2	Clear	Slow	Bn	121	None	None	3	1	1	1	2
115P	871088	8	425914	7094777	OSDR	19	15	10	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2
115P	871089	8	424641	7095781	OSDR	19	20	20	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2
115P	871090	8	421600	7095617	OSDR	19	25	20	00	Sed/Wat	0	2	Clear	Mod	Bn	310	None	None	3	1	1	2	2

National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data. Yukon 1988, GSC OF-1650, NGR-115-1988, NTS 105M 115P
Analytical Data

Element: Units: Detection Limit: Analytical Method:	Sediment																				Water						
	Zn	Cu	Pb	Ni	Co	Ag	Mn	As	Mo	Fe	Hg	LOI	U	F	V	Cd	Sb	W	Ba	Sn	Au	Au	Au	Au	F-W	pH	U-W
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	pct	ppb	pct	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	gm	ppb	gm	ppb	ppb
	2	2	2	2	2	.2	5	1.0	2	.02	10	1.0	.5	20	5	.2	.2	2	40	1	1-var	1-var	1-var	1-var	20		0.05
	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS	GRAV	NADNC	ISE	AAS	AAS	AAS	COL	DCP	AAS	FA-NA		rpt	rpt	ISE	GCM	LIF
115P 871046	60	16	10	18	8	<	516	22.0	<	1.78	50	5.2	3.1	320	16	<	1.8	2	640	2	1	10.0	-	-	100	7.9	14.10
115P 871047	52	19	15	18	8	<	245	25.0	<	1.93	30	4.4	2.2	340	14	<	4.0	2	462	2	26	10.0	-	10.0	70	8.0	3.50
115P 871049	39	10	6	13	6	<	104	7.0	<	1.47	50	2.4	3.7	345	11	<	0.3	2	868	4	<	10.0	-	-	120	7.7	0.56
115P 871050	54	13	7	15	8	<	192	18.0	<	1.97	20	6.8	4.1	280	14	<	4.1	2	685	2	<	10.0	-	-	60	7.7	1.40
115P 871051	53	20	14	18	8	<	217	70.0	<	2.11	30	6.0	4.4	385	14	<	17.0	2	736	1	<	10.0	-	-	50	7.7	0.91
115P 871052	46	28	11	20	9	<	200	230.0	<	2.16	25	3.2	3.6	325	15	<	5.0	2	742	1	10	10.0	-	-	40	7.0	<
115P 871053	62	23	10	21	10	<	329	465.0	<	2.42	25	4.2	5.5	315	18	<	13.0	4	682	2	94	10.0	164	10.0	40	7.0	<
115P 871054	48	18	8	15	8	<	164	335.0	<	2.01	25	5.8	3.9	350	17	<	3.4	2	670	1	17	10.0	98	10.0	40	7.4	<
115P 871055	66	29	13	22	11	<	397	600.0	<	2.82	30	8.4	5.7	330	20	<	8.0	4	700	1	38	10.0	95	10.0	40	7.2	0.14
115P 871056	54	12	11	14	7	<	242	226.0	4	2.23	20	6.2	15.7	345	23	<	5.7	60	760	1	8	10.0	-	-	40	7.4	2.10
115P 871057	58	21	18	18	8	<	203	50.0	<	2.13	25	2.4	3.2	280	16	<	6.0	2	559	1	9	10.0	18	10.0	40	7.8	0.28
115P 871058	56	20	18	18	8	<	199	80.0	<	2.13	20	3.6	3.2	255	16	<	7.4	2	583	1	35	10.0	13	10.0	50	7.8	0.33
115P 871059	71	16	15	17	11	<	406	12.0	<	2.37	25	8.0	4.7	340	14	<	2.9	2	715	2	11	10.0	-	-	40	7.7	0.22
115P 871060	101	29	32	25	18	0.2	358	3.0	<	3.42	55	9.0	4.8	470	24	<	1.1	2	998	1	2	10.0	-	-	30	7.3	<
115P 871062	81	21	20	20	8	<	186	28.0	<	2.02	25	2.8	4.0	375	13	<	0.8	2	772	1	<	10.0	-	-	-	-	-
115P 871063	70	19	18	19	11	<	440	80.0	<	2.21	20	3.2	3.7	350	15	<	3.8	8	628	1	5	10.0	-	-	90	7.7	0.50
115P 871064	249	20	38	27	16	0.2	706	18.0	<	3.10	50	8.4	4.1	395	20	0.9	1.0	6	796	3	<	10.0	-	-	90	7.7	0.20
115P 871065	92	16	18	19	10	<	270	42.0	<	2.43	25	7.2	5.0	365	20	0.2	0.9	8	816	1	4	10.0	-	-	60	7.7	0.26
115P 871066	72	18	10	30	11	<	234	8.0	<	2.26	20	7.0	3.5	290	18	<	0.2	2	840	1	<	10.0	-	-	80	7.7	0.93
115P 871067	84	20	14	33	13	<	504	10.0	<	2.63	25	8.4	4.0	375	20	<	0.4	4	912	33	2	10.0	-	-	70	7.3	<
115P 871068	77	18	23	22	8	0.2	227	10.0	<	2.19	30	4.8	2.7	365	14	<	0.9	2	885	4	<	10.0	-	-	50	7.4	<
115P 871069	68	22	15	18	8	<	217	29.0	<	2.18	20	3.6	3.2	330	14	<	1.9	2	693	3	<	10.0	-	-	70	8.0	1.30
115P 871070	103	16	17	17	9	<	184	12.0	<	2.19	20	3.0	4.2	305	13	0.2	0.7	2	572	9	<	10.0	-	-	70	8.1	0.63
115P 871071	99	16	17	17	8	0.3	170	16.0	<	2.15	20	3.8	3.8	305	14	0.2	0.4	2	572	5	<	10.0	-	-	70	7.6	0.58
115P 871072	111	18	16	18	10	0.4	400	24.0	<	2.50	30	10.2	4.2	350	20	1.1	0.4	2	634	6	5	10.0	-	-	70	7.7	0.28
115P 871073	139	21	19	22	17	0.5	712	14.0	<	2.56	50	9.2	4.7	290	15	1.5	0.4	2	739	4	3	10.0	-	-	60	7.7	0.75
115P 871074	155	23	17	25	19	0.3	640	24.0	<	2.65	20	7.8	4.3	310	20	2.1	0.4	4	628	52	18	10.0	9	10.0	60	7.4	0.08
115P 871075	74	17	12	17	9	<	212	9.0	<	1.99	15	3.8	4.5	310	15	<	0.9	2	606	104	85	10.0	54	10.0	60	7.5	0.12
115P 871077	75	33	16	25	13	<	341	8.0	<	2.62	10	4.4	3.3	270	19	<	0.9	2	615	3	3	10.0	-	-	60	7.8	<
115P 871078	92	16	16	17	8	<	246	8.0	<	1.83	20	2.7	2.7	355	14	<	0.5	2	670	7	9	10.0	-	-	90	8.2	2.80
115P 871079	50	17	9	21	9	<	184	4.0	<	1.82	20	3.0	3.0	310	12	<	0.6	2	562	1	<	10.0	-	-	100	8.3	2.60
115P 871080	47	16	11	15	8	<	276	3.0	<	1.77	25	5.0	3.4	400	12	<	0.3	2	568	1	<	10.0	-	-	110	7.9	2.20
115P 871083	60	20	14	21	10	<	218	5.0	<	2.29	50	4.8	3.0	315	15	<	0.6	2	555	1	<	10.0	-	-	150	8.3	2.10
115P 871084	62	21	14	20	9	<	272	8.0	<	1.93	20	2.2	2.2	320	16	<	0.9	2	504	4	<	10.0	-	-	110	8.4	3.10
115P 871085	65	20	14	19	8	<	287	8.0	<	1.96	20	3.0	2.2	245	16	<	1.0	2	514	6	<	10.0	-	-	100	8.3	2.70
115P 871086	93	23	24	22	11	<	397	21.0	<	2.86	25	10.0	4.7	395	14	<	1.3	6	634	10	46	10.0	19	10.0	-	-	-
115P 871087	61	15	13	16	8	<	224	6.0	<	1.89	30	4.4	3.2	300	14	<	0.4	2	746	<	<	10.0	-	-	70	8.2	0.89
115P 871088	70	18	14	20	10	<	431	5.0	<	2.38	70	5.6	2.6	315	17	<	0.3	2	641	3	<	10.0	-	-	60	8.1	1.70
115P 871089	79	18	18	20	11	<	317	24.0	<	2.52	50	4.0	3.9	385	15	<	2.5	2	585	3	<	10.0	-	-	60	7.9	0.50
115P 871090	88	20	18	20	12	<	451	43.0	<	2.41	30	5.0	3.8	370	13	0.3	3.0	2	745	2	2	10.0	-	-	60	7.7	0.17

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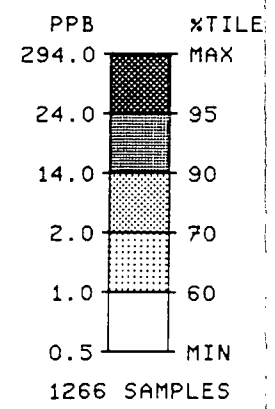
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GOLD
 IN
 STREAM SEDIMENTS

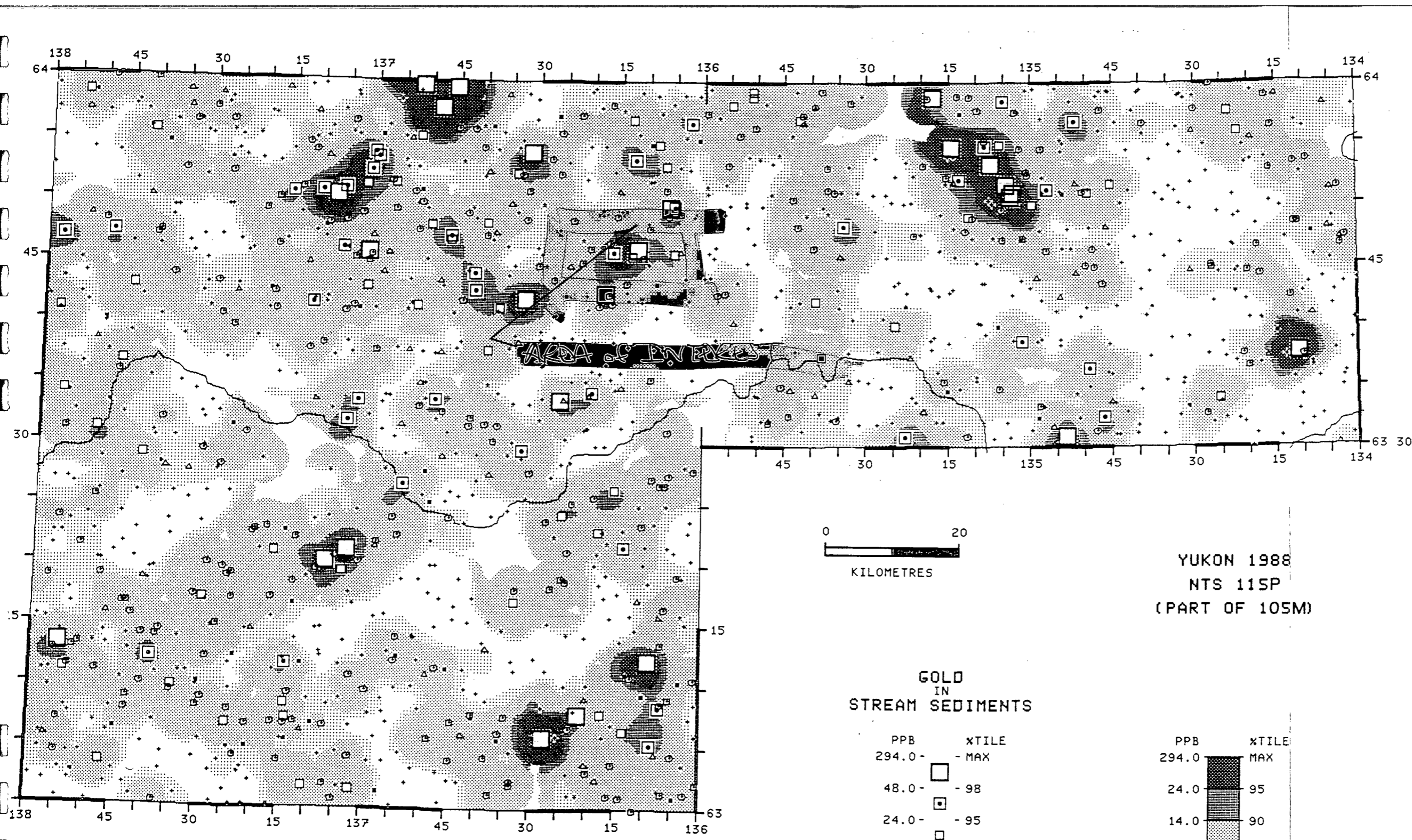
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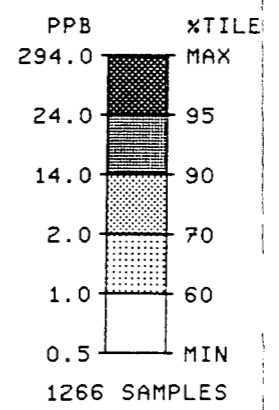
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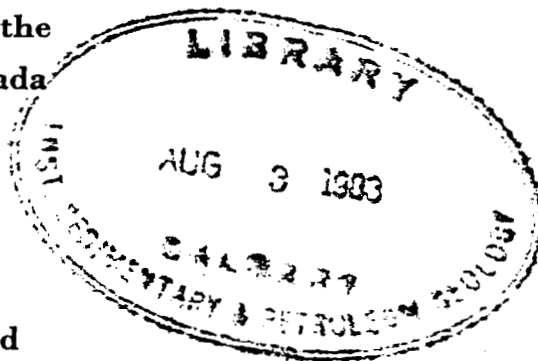
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GEOLOGICAL SURVEY OF CANADA

MEMOIR 284

YUKON TERRITORY

Selected Field Reports of the
Geological Survey of Canada
1898 to 1933



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resembling in general appearance andesites and diabases, also occur in a few places.

Mineral Resources

The mineral resources of Mayo area include mainly, so far as is known, gold-bearing gravels, and lode deposits, of which the gravels have, up to the present, proved to be of much greater importance. Coarse gold was found on Haggart creek in 1895, and since that time there has been more or less continuous prospecting for placer deposits within the area; and since 1898 or 1899 the district has each year yielded an important production of gold. As to the lode deposits, ore has actually been shipped from only one vein, shipments aggregating between 1,200 and 1,300 tons. This ore was high grade, and its discovery has given a great impetus to the lode mining industry of the district. The lode deposits of Mayo area, therefore, although they are not of the same immediate importance as the gold gravels, owing to the present high transportation costs and other causes, nevertheless constitute a very valuable future asset to the district.

Gold-Bearing Gravels

The Stewart was one of the first rivers in Yukon Territory to attract the attention of miners. In the year 1883, and for several years following, gold was found in paying quantities on the bars along this stream, and it is estimated that during 1885 and the two succeeding years, the yield amounted to about \$100,000. Since then the production has been small, but a certain amount of bar mining is performed each year. Bars have, in the past, been worked from the mouth of Mayo river down almost to the mouth of the Stewart. Steamboat bar, which is situated about 4 miles below the Mc-Queenen, and is the richest ever discovered on the Stewart, is reported to have yielded for some time at the rate of \$140 per day per man, as worked with a rocker. The gold-bearing gravels are rarely over 2 feet in thickness, and are generally less than one foot. This extreme shallowness of the auriferous deposits, combined with the fact that in most places they were confined to small areas near the head of each bar, accounts for the rapid exhaustion of the Stewart River diggings.

Two dredges were installed on Stewart river to more rapidly work these bar deposits, and, it is believed, with the hope of obtaining coarser gold nearer bedrock. One of these dredges worked for only a few months in 1910 and 1911, and the other for only about four months altogether, during 1911 and 1912. The dredging operations proved for various reasons to be a decided financial failure.

Even yet, however, a few men engage each summer in bar mining along the Stewart between Mayo river and Lake creek; and the miner experienced in this class of work can make from \$3 to \$5 per day or occasionally even more, when the water is low, which is generally from about the first week in August until the freeze-up. During the past autumn (1915) about twelve men were so engaged.

In 1895 coarse gold was first discovered on the streams tributary to the Stewart, and from that time until the present, new discoveries of importance have been made from year to year, with the result that for a number of years past, the placer mining industry in the district has been one of considerable importance. Mr. George P. Mackenzie, Gold Commissioner of Yukon Territory, has estimated that to the close of 1914 the Duncan Creek

mining district produced about \$658,000*. Practically all of this yield came from Mayo area, except that obtained from the Stewart River bars. This estimate is thought to be very conservative, since considerable amounts of gold were mined in the early days of which there is now no official record. The main streams within Mayo area from which placer gold has been produced are Hight creek, Duncan creek, Haggart creek, Minto creek near Minto lake, and Johnson creek. These will be briefly described in order commencing with Duncan creek on the east, and proceeding toward the west.

Stream Gravels

For a clear understanding of the gold-bearing gravels of Mayo area, a general knowledge of the geological history from late Tertiary times until the present, is necessary. Before proceeding with the description of the gravels along the individual creeks, therefore, the succession of geological events within the district will be briefly reviewed as far as they have a direct bearing on the placer mining industry.

In late Tertiary times, as a result of the general uplift of the Yukon plateau, including Mayo area, a new erosion cycle was initiated, and deep V-shaped valleys were rapidly eroded, and well-defined drainage ways became again established throughout the district. This erosion period was of long duration, and continued until the streams had gradually acquired more and more gentle gradients, much more gentle, owing to their greater degree of maturity, than those traversing Mayo area at present. Consequently the gravels deposited along the stream courses of this period were very well worn and sorted, and as the softer more destructible materials were removed, they became limited dominantly to quartz and other resistant materials. The accumulations of this time are represented in the Klondike by the famous White Channel gravels, and in Mayo area by remnants of higher channels along the benches of certain streams.

This long erosion interval was terminated by the initiation of a period of deep-channel cutting which has been generally attributed to a somewhat extensive and gradual upwarp or uptilt of the land surface. This uplift apparently amounted to several hundred feet in places, and gave the streams renewed head and vigour enabling them to quickly sink deep channels in the former valley floors. The bottom of the deep channel on Duncan creek produced at this time is over 100 feet below the level of the present stream; also Minto lake is reported to be over 300 feet deep, and Mayo lake is said to be still deeper.

This period of rapid valley deepening was brought to a close by an epoch of glaciation and aggradation which followed; but it is somewhat uncertain whether or not all the aggradation is attributable to the ice invasion, as the deposits still filling the deep channels have not been carefully investigated. All of these accumulations that are exposed, including the uppermost deposits, are, however, either directly or indirectly of glacial origin. During the Glacial period, ice accumulated until all, except possibly the higher summits, became enveloped. The ice also scoured and planated the valley walls, and in places, the floors as well, and must have destroyed, to a great extent at least, the various remnants of the old stream deposits left clinging to the valley sides. Thus the pre-Glacial gravels with their

* Personal communication.

gold content were, to a great extent, transported to form erratic, unsorted, morainal accumulations. During the time of the actual occupation by the ice, vast quantities of glacial debris were irregularly deposited over the valley floors, and to some extent along the walls of the various depressions; also, great quantities of glaciofluvial sediments were rapidly deposited within the valleys, in a bedded condition. Gradually, however, with the complete disappearance of the ice, the sedimentation became less, the streams resumed more normal proportions, and instead of aggrading their courses, commenced to re-excavate channels through the accumulations deposited in the valleys. In so doing they became in many places diverted from their original channels and, in some cases, were deflected from their former valleys completely. Occasionally, they became superimposed over rock spurs, and the work of cutting down through these was of necessity very rapid in order to keep pace with erosion through the softer materials below the spurs. Thus the numerous, deep, narrow, rock canyons which characterize most of the streams of Mayo area became incised. Both pre-Glacial and post-Glacial gravels occur in places at various elevations along the walls of the drainage ways of the district, and they mark former positions occupied by the streams in the process of sinking their channels either to the deep-channel or present-channel levels.

In Mayo area, there are thus six main types of stream gravels*.

- High-level gravels.
- Terrace gravels—pre-Glacial.
- Deep gravels.
- Glaciofluvial deposits.
- Terrace gravels—post-Glacial.
- Present gravels.

The high-level gravels correspond to the White Channel gravels of the Klondike, and are of pre-Glacial age. In Mayo area they have been to a great extent carried away by subsequent stream action, as well as by glacial erosion, but remnants undoubtedly still remain. These gravels must have originally contained placer gold in very considerable amounts, and wherever the old channels containing them are preserved, the gold must still remain.

Deep gravels, which are also pre-Glacial, are known to occur along Duncan, Haggart, and Hight creeks, and elsewhere, but, excepting those on Hight creek, have been very slightly prospected. Where bedrock was reached on Duncan creek on No. 53 below Discovery, the gravels on bedrock are reported to have been quite rich. Gold was undoubtedly originally concentrated in the deep gravels, and it must still remain in them, except where they have been disturbed by glaciation. The deep channels on all the gold-bearing creeks will doubtless eventually be prospected and in all probability the contained gravels will be mined in many places; but up to the present it has been found impracticable to prospect these deep channels along most of the streams owing to the fact that near bedrock the gravels are not frozen, and when these thawed deposits are pierced, water comes into the shafts so rapidly that further work is impossible. No doubt this difficulty will, however, some day be overcome.

The glaciofluvial deposits include the gravels, sands, and silts deposited by streams, during the Glacial period. These deposits accumulated very

* The term 'gravels' is here used in a general placer mining sense, to include all gravels and sands occurring in the various stream channels.

rapidly; sufficiently so, at least, to aggrade the stream courses, and, therefore, it is not to be expected that any great amount of placer gold has been concentrated in them. Locally, however, on Duncan and Minto creeks and elsewhere, occasional beds of gravel having this origin, contain gold in workable quantities. These deposits are older than both the post-Glacial terrace, and the present gravels.

The terrace gravels of both pre-Glacial and post-Glacial age were deposited by the various streams in the process of sinking their channels to the levels of the deep-channels or present channels, respectively. They thus occur at various elevations along the walls of their respective valleys—the post-Glacial deposits being necessarily higher than the level of the present streams, but the pre-Glacial deposits being at any elevation above the bottoms of the deep channels. The positions of these terrace deposits are often indicated by more or less well defined terrace forms. Along Hight creek, especially opposite Rudolph pup, apparently pre-Glacial terrace gravels have proved to be very rich; and along Duncan creek, prospecting has revealed the fact that post-Glacial terrace gravels occur at various elevations above the present stream, and, in the places discovered, they contain important amounts of gold. The benches along the various creeks should thus be carefully prospected, not only for the pre-Glacial high-level channels, but also for these terrace gravels, as it seems altogether probable that a very considerable portion of the placer gold remaining in Mayo area, which can be economically mined at present, occurs in these bench deposits.

It is the gravels along the present stream bottoms, however, that have been mainly worked in this district, owing largely to the fact that they are shallow and can be relatively easily prospected. The gold in the present gravels has been for the greater part reconcentrated from higher gravels and other unconsolidated deposits, and is, therefore, liable to be somewhat unevenly distributed. These gravels are thus generally richest, just opposite or immediately below points where higher gold-bearing channels have been tapped, either by the main stream itself or by its tributaries, provided, of course, that in such places the underlying bedrock is of a nature to hold the gold.

*Duncan Creek**

Duncan creek is one of the larger streams of Mayo area. It is about 14 miles in length, and follows a general southwesterly course, joining Mayo river about 6 miles below Mayo lake. The present stream flows throughout a considerable portion of its course in a decidedly constricted channel, and in places is even confined within rock canyons with almost perpendicular walls. In many places where both banks are not so steep, one of the walls is an abrupt rock scarp, showing the channel to be quite recent. On either side of the channel, a well-defined, wide-topped terrace follows along Duncan creek throughout the greater portion of its course, being most pronounced on its left side (limit). The top of the terrace has much less grade than the creek bottom, and ranges in elevation from about 200 feet above Duncan creek, opposite the mouth of Lightning creek, to over 300 feet near Mayo river. About 12 miles from its mouth, Duncan creek forks, the larger branch, called Lightning creek, continuing in the same general course as the main

* Keele, Joseph, "The Duncan Creek Mining district": Geol. Surv., Canada, Sum. Rept. for 1904, pp. 25A-29A.

creek, while the tributary, known as Duncan or Upper Duncan creek, comes in from the southeast at about right angles to this course. Commencing about 500 yards above the forks, Upper Duncan creek flows through a rock canyon about three-fourths of a mile long, with walls over 100 feet in height. A deep channel, in most places about 100 feet below the level of the present creek, follows down Lightning creek to the forks, and thence down the main or Lower Duncan creek.

The bedrock top of the terrace along Duncan creek evidently represents a portion of the old floor of the pre-Glacial stream. Subsequent to the uplift of the district, the creek cut down through this former valley bottom, and eroded the deep channel along Lightning and Duncan creeks. Later, the entire Duncan-Lightning valley was filled, largely at least, with glacial and glaciofluvial deposits to above the level of the main terrace, after which the stream began to re-excavate its course and, following the direction of least resistance, only in places became superimposed over its former channel. Thus the present creek channel with its canyons, rock scarps, and other recent features, was produced. Remnants of the old, high-level, pre-Glacial gravels probably remain on top of the terrace, but at only one point—on Makela's property—have deposits resembling them been as yet found. The glaciofluvial deposits are very conspicuous both on the benches and along the valley bottoms. Along the lower portion of Duncan creek, in particular, the stream cuts through heavy deposits of glacial and glaciofluvial gravels, sands, and silts. Deposits of glaciofluvial origin are at present being hydraulicked along Upper Duncan creek, and terrace deposits containing important amounts of gold are known to occur in places along Lower Duncan creek. The deep gravels have also been somewhat prospected. It is mainly the present stream deposits, however, that have been worked along this stream.

Gold is believed to have been first discovered on Duncan creek in 1898, in the canyon just above the forks, the discovery being made by three Swedes, a father and two sons, named Gustavson. They were apparently very energetic prospectors, and it is claimed that, working their ground secretly and undisturbed for two or three years, they took out gold to the value of \$30,000 or more. Being in such a remote and secluded locality, however, they did not think it necessary to stake their claims or record their discovery. As a result, on September 12, 1901, during their absence, a discovery was staked in the canyon by four other prospectors, Duncan Patterson, Colin Hamilton, Allan McIntosh, and Jake Davidson—Duncan Patterson giving his name to the creek. This discovery and the other claims located covered the ground formerly worked by the Swedes. During 1902, Duncan creek was staked from its headwaters to Mayo river, cabins were built on many of the claims, and active preparations were made for developing the ground. A number of shafts were sunk along Lower Duncan to a depth of over 100 feet, and 130 feet was reached on No. 104 below Discovery*, without getting to bedrock. The depth alone would not have prevented the miners from sinking farther, but in every case they were forced to abandon their shafts on account of heavy water encountered when certain layers of unfrozen gravels were pierced. During the summer of 1903, a shaft sunk on No. 53 below Discovery, at some distance from the creek on the left limit, reached bedrock at a depth of 98 feet. During the winter, drifting

* Discovery claim was on Upper Duncan at the lower end of the canyon.

was continued toward the creek, the rock bottom yielding gold in small quantities. The water entering the drift during the progress of the work was pumped out, but the flow finally increased beyond the capacity of the pumps, and operations had to be abandoned just as good pay is reported to have been struck. The total clean-up from this working is variously reported at from \$800 to \$1,200. At a few other points, small amounts of gold have been obtained from Lower Duncan creek; but since 1904, very little mining has been done below the forks. Upper Duncan has, however, been worked continuously.

During last season (1915) three men were working on Lower Duncan, one man was prospecting on Parent creek, a tributary of Lower Duncan, one man was working on Lightning creek, one man was hydraulicking on the left bench of Duncan just below the forks, and five were working on Upper Duncan—a total of eleven men on Duncan creek and its tributaries.

The gravels along the creek bottom of Upper Duncan, from below the canyon upstream to No. 22 above Discovery, have been all worked over, and mining operations are at present limited to the deposits on the left bench of the creek. Last season when the creek was visited, two parties were hydraulicking on this bench. John Turner, an old-timer on Duncan creek, was working with one associate, Thomas Williamson, just below No. 8 above Discovery, and was intending to continue the working of this bench downstream. David Sparks was also hydraulicking on No. 8 immediately above Mr. Turner. Mr. Sparks has been practically continuously engaged on this creek since 1903, and holds the ground from No. 8 up to No. 17 above Discovery. He was working with two associates Sam. Rae and R. S. McLean. The gravels being worked by Turner and Sparks are mainly or entirely of glacial or glaciofluvial origin, and are coarse and composed mainly of the schistose rocks of the district. They are also fairly well bedded in places, and exhibit a certain amount of sorting, but they are also decidedly clayey in places, and include a great many foreign boulders of greenstone and pyroxenite, up to 4 feet or more in diameter. In fact, large boulders are so numerous there, that the handling of them is a serious item in the mining of the deposits. Where Mr. Turner was working, the gravel has a thickness of as much as 35 feet, and in places, on this bench, it is believed to approach more nearly 100 feet in thickness, and is nearly everywhere overlain by a considerable thickness of muck. The greater part of the gold appears to be within 10 feet or so of bedrock, but it is very erratically distributed, and is just about sufficient in amount to pay expenses with the present methods of working.

Elmer Makela was also engaged in hydraulicking on the left bench of Lower Duncan just below the forks, his property adjoining the claims of Sparks and Turner. Mr. Makela has been engaged in prospecting operations in this vicinity for about three years, and with his own labour has built a ditch for hydraulic purposes, and has installed 1,500 feet of 10-inch pipe, and a monitor, with which to explore and mine the gravels on this bench. At the point where he was working, gravels similar to those on the Sparks and Turner properties occur, but in addition a heavy bed of very different, much finer gravel was also encountered. In the top of the latter a well preserved portion of a mammoth tusk was found, this being the first mammoth or mastodon remain that is known to have been discovered on Duncan creek. This gravel deposit is as much as 100 feet thick in places and consists mainly of quartz pebbles with no large boulders. It is uniformly fine and

evenly textured, and exhibits well defined bedding. In fact, the deposit very much resembles the old White Channel gravels of other localities. Insufficient work had been done, however, to show whether the gravel overlies or underlies the glacial deposits. Very encouraging amounts of gold are reported to have been obtained from prospect shafts sunk in this deposit; in the hydraulic operations, however, bedrock has not yet been reached. If the gravel proves to be a remnant of the old pre-Glacial, high-level gravels, and the central portion of the channel is preserved, important amounts of gold are to be expected.

On Lower Duncan creek, three partners, J. A. Walsh, W. L. Bramley, and John Adair were engaged in mining the creek gravels. They hold the claims from No. 4 to No. 20 above Duncan Creek bridge, and were operating mainly on No. 10. During the latter part of 1913, and the spring of 1914, they prospected the gravels of the present stream channel with a Keystone drill, the depth to bedrock of ten holes sunk being from 10 to 16 feet. Encouraging results were obtained, and mining operations were commenced. A well constructed, covered bedrock drain was built, and an efficient plant for open-cut work was installed, consisting of a boiler, engine, and self-dumping, slip scraper. The gravels being worked show very imperfect sorting, and appear in general as a jumbled mass of large boulders filled in between with sand and other fine material, boulders 3 to 5 feet in diameter being quite common. These gravels contain a great amount of material, including greenstone boulders, and hematite and jaspilite pebbles, that are foreign to the Duncan Creek drainage area, and evidently have been transported by glacial ice. In fact the present gravels along Duncan creek are dominantly a concentrate or residual product from the glacial and glaciofluvial deposits that the stream has transported and re-sorted in post-Glacial times; and the gold they contain is mainly a result of this sorting and concentrating action. When last visited during the first week in September (1915) Mr. Walsh and partners had just completed the initial dead work necessary in mining operations of this description, and had only commenced to handle the pay gravel.

A certain amount of prospecting has also been done on the left bench of Duncan creek in the vicinity of the workings of Mr. Walsh and partners, and has shown that stream gravels occur at various elevations up the face of the terrace to the top, and that in places they contain gold in encouraging amounts. Certain terrace deposits in particular between 30 and 50 feet above the present creek have been found to contain important amounts of gold. It is thus evident that these bench deposits should be more carefully prospected.

During the past summer John Salin was prospecting on Parent creek about one mile from its mouth. Parent creek is a tributary of Duncan creek, joining it from the east about 6 miles above Mayo river.

On Lightning creek a shaft was at one time sunk in the valley bottom just above the forks, and reached bedrock at a depth of 105 feet. From the bottom of this shaft, drifts were run to crosscut the deep channel at that point, but no important amounts of gold were found. This is about the only work that has been performed on Lightning creek itself, but one man, Martin Malesich, has mined for the past 6 or 7 seasons on Thunder gulch, which joins Lightning creek about 5 miles above its point of confluence with

Duncan creek. Mr. Malesich is engaged mainly in ground-sluicing, using pipe and nozzle.

It is very difficult now to determine the total amount of gold that Duncan creek has yielded. Mr. George Mackenzie, Gold Commissioner of Yukon Territory, estimates that to the close of 1915, Duncan creek has produced \$55,000 and its tributary Lightning creek, an additional \$2,000. Figures obtained from various old timers in this vicinity would tend to indicate that the total production considerably exceeded this amount, their estimates reaching about \$75,000 for Duncan creek without including the gold obtained by the three original Swedes who are claimed to have obtained \$30,000 or more. The assay value of Duncan Creek gold is generally between \$16.50 and \$16.60 per ounce.

Haggart Creek

Haggart creek is one of the principal tributaries of the McQuesten, having a length of over 20 miles; it has a general southerly to southwesterly course, and joins the south fork of McQuesten river, about 13 miles above its confluence with the north fork. The general characteristics and geological history of Haggart creek are much the same as those of Duncan creek. The present stream follows a recent, somewhat constricted channel; and an older deep channel also has been encountered in shafts sunk both above Dublin gulch, and along the lower portions of Haggart creek. One shaft to bedrock above Dublin gulch is 90 feet deep, and another near the mouth of Lynx creek is 140 feet deep. Stream gravels are also known to occur on the benches along Haggart creek, but these have been very slightly prospected; however, gravels containing important amounts of gold have been found on the left bench, several hundred feet back from the stream, and only a few claims below Dublin gulch. Glacial and glaciofluvial deposits at one time filled the valley bottom to above the top of the present main terrace or bench, but have since been transported to a considerable extent by the present stream. Vast amounts of boulder-clay and related deposits still remain, however, and are to be seen wherever sections of the superficial, unconsolidated deposits are exposed.

The only gravels that have been actually mined along Haggart creek are those occurring along the present stream channel. They are shallow, in most places, being less than 10 feet thick along the creek bottom. They consist dominantly of the schistose rocks of the district, but include also boulders and pebbles of greenstone and granitic rocks. These gravels, however, nowhere contain such large boulders as are contained in the gravels along Duncan creek. The largest boulders are generally between 1 foot and 3 feet in diameter and those exceeding 1 foot are somewhat exceptional. Along both sides of the creek's present course the gravels are frozen throughout, but in the creek bed, they remain thawed near bedrock even during the winter. Drifting operations are, therefore, possible only along the sides of the stream, the creek bottom being worked in summer by open-cut methods. The gold occurs mostly close to or in the bedrock, and is mainly limited to 2 feet or less of gravel and the underlying 3 feet of bedrock, 2 to 3 feet of bedrock being taken up in places in the course of mining operations.

The gravels at present being worked along Haggart creek are in places overlain by a few feet of boulder-clay, but sufficient evidence has not yet been obtained to determine whether the boulder-clay was originally deposited over these gravels, or has since slid over them from the banks. If

which checks very closely with the figures obtained from various old-time miners familiar with this district from 1898 until the present. The gold from Haggart creek generally assays about \$18.45 per ounce, and that from Dublin gulch about \$17.80.

Minto Creek*

Prospecting and mining were carried on along Minto creek a number of years ago, and during the last few years Otto F. Kastner and James A. Scougale have done some work on the left bench of the creek a short distance below Minto lake.

During the period of deep-channel cutting in Mayo area, a deep, steep-walled depression was incised through the valley now occupied by Minto lake, and persisted along the upper part of the present valley of Minto creek; not far below Minto lake, however, this old channel apparently swung to the left of the present stream course. It is known that the channel must be very deep, in places 300 feet or more below the level of the present valley bottom, as Minto lake is over 300 feet deep, and shafts have been sunk in the valley of Minto creek to depths of from 70 to 130 feet without reaching bedrock. This deep channel cutting was followed by a period or periods of aggradation during which the deep depression was rapidly filled with various kinds of sediments to above the elevation of the terraces that extend along the side of the present Minto creek at heights of over 300 feet above the level of the stream. Following this aggradation interval which was related to and included the Glacial epoch, the present Minto creek began to trench its channel down through the deposits in its valley. This work of re-excavation was very rapid at first, but gradually the stream channel reached a somewhat graded or aggraded condition, and the creek has now become a small sluggish stream.

Previous to the purchase of the Kastner-Scougale property a few years ago, some prospecting had been carried on, but the greater part of the mining and development has been done during the past three years, while the property has been under the management of John A. Ross. The operations on the property have been limited to hydraulicking and to work connected with that class of mining. Three ditches, having an aggregate length of $8\frac{1}{2}$ miles, have been dug, which bring water for hydraulic purposes from McIntyre, McLagan, and Turnip creeks; and monitors, piping, sluice-boxes, and other equipment comprising an efficient hydraulic plant, have been installed.

The hydraulic operations have exposed a section which includes bedded sands, gravels, and clays, and also boulder-clay, having an aggregate thickness of more than 200 feet. The lowest of these unconsolidated deposits exposed, rests on a low rock rim about 40 feet in elevation above Minto lake, and the uppermost beds are some 210 feet higher. These beds are in places nearly flat-lying, but for the most part dip toward the creek at angles rarely exceeding 10 degrees. For about 150 feet above the lowest beds exposed in the hydraulic cuts, bedrock has been encountered, and is seen to rise abruptly behind them, forming a rock wall which constituted the valley side just previous to the period of aggradation during which they were deposited. Bedrock had not been encountered above this point when the property was visited in September last (1915). The bedrock formations

*Op. cit.

consist dominantly of very old, probably Pre-Cambrian, schistose rocks which are mainly quartzite schists, but embrace coarser textured members, including some sheared conglomerates. These rocks are very micaceous in places and grade into mica schists. This schistose group of rocks is cut and invaded by reddish granite porphyry which is somewhat extensively exposed in the hydraulic cuts, and is thought to be of Mesozoic or early Tertiary age.

A small amount of gold was found on the low, bedrock rim above mentioned, and occasional bunches or pockets of gold-bearing gravels have been found erratically distributed throughout the uppermost sands which are evidently lake deposits, and are extensively developed along the top of the main terrace bordering Minto creek in this vicinity. Apparently these bunches of gold-bearing gravels were not originally deposited where they now occur, but represent bodies of gravel that were transported *en masse* by glacial ice, possibly by icebergs. They are, therefore, not very extensive or important as a source of placer gold. The only gravel so far encountered on this property, which gives any promise of constituting a workable deposit of any considerable extent, is a bed about 20 feet in thickness which occurs near the top of the workings. This is overlain by about 20 feet of fine, partly consolidated, bedded sands which are in turn covered by the sands above referred to, which contain the irregular bunches of transported gravels. The boulders or pebbles of this 20-foot bed of gravel are well rounded, and the gravel generally resembles a typical bar deposit. This gravel deposit is claimed by Mr. Ross to contain gold in sufficient quantity to pay well for mining, and it is hoped that it will prove to be sufficiently extensive to yield gold enough to at least pay for the past installation, development, and mining operations.

Hight Creek*

Hight creek is one of the small tributary streams draining the portion of deeply dissected upland lying between Mayo and McQuesten valleys. It has a general easterly to southeasterly course, is about 8 miles in length, and joins Minto creek about $2\frac{1}{2}$ miles below Minto lake, or 7 miles above its point of confluence with Mayo river at Minto Bridge. The present mining operations on Hight creek are confined to about 3 miles of the creek, the uppermost workings being about opposite the mouth of Rodolph pup, which is 13 miles from Minto Bridge measured along the wagon road. The creek has been prospected in the past, both above and below this section, but little if any actual mining has been done.

Great amounts of boulder-clay and gravel, overlain by sands or silts, were deposited in Hight valley during the Glacial period; and since the disappearance of the ice, the present stream has been re-excavating its channel in these accumulations, but has not as yet succeeded in reaching its pre-Glacial level. Thus along the portion of the creek at present being worked, the stream is flowing in a somewhat constricted channel bordered on either side by banks and terraces of boulder-clay, gravel, slide material, sand, and silt, and remnants of these deposits are still clinging to the valley walls up to an elevation of 300 feet or more above the present creek bed.

The present mining operations are almost entirely concerned with the

*Op. cit.

gravels in the creek bottom, although terrace deposits along the right bank of the creek have been mined in the past and are still being worked to a limited extent. The gravels being mined in the creek bottom underlie boulder-clay and are evidently of pre-Glacial age; the portion of the present stream now being worked has thus quite fortuitously become superimposed almost directly over its pre-Glacial position. The gravels being mined are dominantly coarse and include numerous large boulders of schist and granite. In places, also, they are fairly regular and are quite well sorted, but nearly everywhere both the gravels and the underlying bedrock exhibit evidence of having been formerly buried under an enormous weight of glacial ice which moved down Highet valley. The ice in places cut its way down to bedrock as evidenced by glacial striæ and grooving, but at other points, apparently, it over-rode the gravels which in places have lost all definite arrangement, and even include masses of soft bedrock that have been pushed several feet up into them. In places, the gravels are quite compactly cemented with a clayey matrix and grade up into the overlying boulder-clay. The gold is, therefore, very erratically distributed, at some points occurring in the bedrock or within a few inches above it, and at others, in rearranged gravels lying several feet above bedrock.

Terrace deposits opposite the mouth of Rodolph pup have also been mined and have proved to be quite rich. They also appear to be pre-Glacial in character, and to represent position, occupied by the pre-Glacial stream in the process of cutting its way to its lowermost position.

Along Highet creek there appears to be very little frozen ground adapted to drifting, which is practically the only method that can be employed for mining these gold-bearing gravels in winter. Consequently the mining on the creek is done almost entirely during the summer months.

Gold was first actually mined on Highet creek in 1903, but the creek is named after Mr. Warren Hiatt, who found gold on or in the vicinity of claim No. 105 several years before 1903—the present spelling of the name having been adopted through an error made by the original recorder. In June, 1903, Rodolph Rosmussen, Warren Hiatt, and J. D. McRay staked claims on the upper part of Highet creek. Soon after George Edwards, Fred Wade, and others located; and in a short time these early stakers commenced actual mining operations. Since that time Highet creek has had an important gold production each year, and has to date yielded more gold than all the rest of Mayo area. Previous to June, 1903, nothing was known concerning the placer deposits of Highet creek, except as a result of Hiatt's early discovery; the lower part of the creek had been stampeded and staked, but no gold had been found.

The highest point at which mining was being performed on the creek during the past summer was on claim No. 108, nearly opposite the mouth of Rodolph pup. There, Frank McKenna, who also owns claims Nos. 106, 114, and 116, was engaged in hydraulicking the terrace gravels along the right bank of the stream. At this point two well defined upper channels are exposed, which contain typical terrace gravels which are well exposed and have been worked from claims Nos. 100 to 109, inclusive. These terrace deposits appear to run out into the present creek valley above No. 109, and a short distance below No. 100. On No. 108, bedrock underlying the lower of the two upper channels is about 17 feet in elevation above the level of the present creek, opposite, or about 35 feet above the bottom of the deep channel below the present creek. The higher of the upper channels is 8 feet above

the lower. Important amounts of gold have been found on both of these terraces, but the upper one was much the richer. The total amount of gold that has been obtained from these terrace deposits is now difficult to correctly estimate, but from the best information available, it would appear to be between \$100,000 and \$140,000, and practically all of this came from claims Nos. 100 to 109 inclusive, the claims being 250 feet in length.

Mr. Elmer Middlecoff owns and mines about 2 miles of the creek next below. His operations have been and still are the largest in Mayo area. The mining equipment has been largely designed by Mr. Middlecoff to suit the peculiar conditions met with, and is both novel and efficient. One of the main considerations in connexion with any plant on this creek is to have it so designed as to make the best use of the limited amount of water available. On the Middlecoff property a large automatic dam has been constructed which is used for sluicing off the overburden during high water in spring. A specially designed self-dumping scraper has been installed, which is used largely for stacking the boulders encountered in sluicing the gravels. The gravels are conveyed into a line of sluice boxes by monitors. The sluice boxes are made of sheet steel and are lined along the sides with boards or slabs, the riffles in the bottom being of flat stones selected from the tailing piles. A clam-shell steam shovel disposes of the tailings, picking them up at the lower end of the sluice boxes and stacking them to one side. During the past summer, Mr. Middlecoff employed throughout the season an average of about eleven men, and mining operations were continued night and day. The average depth to bedrock was about 16 feet, and it was found that the gravels could be mined profitably for a width of 100 feet and in exceptional places to widths up to 200 feet. Mr. Middlecoff states that in his seven years mining in this vicinity, he has obtained gold to the value of nearly \$250,000.

Adjoining Mr. Middlecoff's property, downstream, is a group of claims owned by a partnership, locally known as the 'Little Gugs', made up of Geo. H. Miller, G. P. Godbout, M. P. Lindquist, Rodolph Rosmussen, and Charles Rockney. The 'Little Gugs' own all except three of the claims from No. 60 to No. 75, and have been working this property for the past five summers. No mining has been performed below No. 60. Until the past summer (1915) the partners worked their claims by means of an automatic dam and a self-dumping bucket equipment. The automatic dam, which is 12 feet high and has a gate 12 feet wide, was used to sluice off the overburden during high water in the spring, and later in the season the underlying pay gravels were conveyed to the sluice boxes by means of the self-dumping bucket which was operated by an 8-horsepower engine and boiler. Last summer a self-loading, self-dumping, one-yard bucket known as a drag-line, cable-way excavator was installed, which is operated by a 30-horsepower engine. As the new equipment was late in arriving no actual mining had been done with it when the claims were visited about the end of August. The owners of the property have worked 750 feet of the creek bottom, and state that in so doing, they recovered gold to the value of over \$80,000. The average depth of material worked was from 27 to 35 feet, and the width of the best pay was about 80 feet, to either side of which the gold becomes gradually less in amount.

The gold from Highet creek is heavy and well rounded, and that from the 'Little Gugs' property is about one-tenth composed of nuggets worth from \$1 to \$10 each. The gold generally assays from \$17.20 to \$17.28 in gold

and 7 to 8 cents in silver per ounce. It is difficult to form a close estimate of the total production of the creek. It would seem, however, from the information available, that it must amount to nearly \$500,000.

Johnson Creek

Johnson creek is a small stream about 6 miles long, which heads with Hight creek, but flows in an opposite or northwesterly direction into the McQuesten, joining that river about 4 miles below the forks, or approximately 40 miles above its confluence with the Stewart. The valley of Johnson creek is a typical U-shaped depression, with the valley bottom and walls verdure and forest clad to the summits on either side.

Johnson creek is at present a 'new creek', to use a term commonly applied in Yukon to a creek which has been recently stamped and staked after gold has been found in it, and a discovery claim located. The stream is named after F. Johnson who prospected it and staked a Discovery claim in the lower part of the valley in the autumn of 1898. As a result of this discovery thirty-eight men are reported to have been on the creek that autumn, most of whom wintered there. The attempts that were made to prospect the stream at that time were unsuccessful, owing to the fact that unthawed ground was encountered in the shafts before bedrock was reached, and water consequently came in so fast that the sinking had to be abandoned. Since that time practically no prospecting had been done on the creek until the autumn of 1914. The earliest discoveries on Johnson creek were, however, made even before 1898. Johnson had found gold there some time previous to the autumn when he staked his Discovery; also in 1894 two Garrison brothers found gold on this stream and returned to Dawson for an outfit; but they remained there and later located claims on Eldorado, and not long afterwards died in the Klondike from fever.

In the autumn of 1914, Ogden Pickett Thomson moved to McQuesten valley, and built a cabin at the mouth of Johnson creek, from which to prospect the surrounding neighbourhood. He commenced work on Johnson creek, on what is now his Discovery claim, in November, and on January 1 first found pay gold. The creek was stamped and staked during the latter part of January and in February. The discovery was thus due entirely to the untiring energies of Mr. Thomson, an old-timer who has been in Yukon continuously since 1898. When visited about September 1 (1915), he owned Discovery claim and No. 1 below Discovery.

Up to September, 1915, no actual mining had been done on the creek except on Discovery claim. Several holes or shafts had been started above Discovery, but in each case unfrozen ground was encountered, and sinking had to be abandoned. On Discovery claim the ground was frozen to bedrock along the edge of the creek where the mining was performed, but it is probably unfrozen under the creek channel. Mr. Thomson had leased portions of his ground, and about eight men were working on Discovery claim last summer. Three shafts, only a few feet apart, had been sunk on Discovery claim on the right side of the creek, in each of which bedrock was encountered at from 20 to 26 feet; and from the bottom of these shafts, the gravels on bedrock were drifted out, hoisted by wind-lass, and washed, the ground being thawed with steam points. The deposits exposed in these workings are largely of glacial origin, and consist mainly of coarse gravels containing numerous large boulders, and cemented by a clayey matrix. These deposits exhibit in most places very imperfect sorting, and many of

the boulders are on edge. In places, close to bedrock, finer, heavier, more regular gravels occur which are gold-bearing.

The gold obtained from Discovery claim is massive, somewhat rough or angular, and fairly coarse, many single nuggets worth \$2 to \$3, and one valued at \$8 having been obtained. The first gold recovered assayed \$16.78 in gold and 5 cents in silver per ounce. Up to September 1 (1915), the total gold obtained from Johnson creek amounted to about \$800. The results so far obtained from the creek have been very encouraging and should give a stimulus to placer mining on other creeks in the neighbourhood.

Lode Deposits

Lode deposits of various types are known to occur at a number of points throughout Mayo area. Most of the prospectors in the past, however, have been in search of placer deposits, very few quartz prospectors having as yet visited the district. In addition, throughout the greater part of the area, there is a heavy mantle of superficial deposits, which obscures the underlying bedrock in most places, and renders prospecting for lode deposits very difficult and uncertain. The discoveries that have been made were mainly due to accident, or to the deposits being exposed along some stream cutting. This area cannot thus be considered to have been more than very slightly prospected, and many other valuable mineral deposits may yet be found within it.

The lode deposits that have been discovered within Mayo area, include mainly a rich silver-lead vein on Galena creek, and a number of gold-bearing veins on Dublin gulch. Other veins are known to occur carrying gold, silver, lead, and zinc minerals; but in most cases they have not been at all developed, and very little is known concerning them. Also on Hight creek and elsewhere, scheelite is frequently obtained in the concentrates in placer mining, indicating that deposits of this mineral occur in the vicinity. As scheelite and other tungsten ores have taken on increased value and importance since the outbreak of the war careful search should be prosecuted for deposits in which they occur.

Galena Creek

The silver-lead vein on Galena creek outcrops in the canyon about 3 miles from the mouth of the creek. Galena creek joins the south fork of the McQuesten approximately 25 miles above its confluence with the north fork. The Galena Creek property is reached by means of a wagon road constructed by the Yukon government, from Minto Bridge to the mine workings, a distance of about 20 miles.

The Galena Creek vein is believed to have been discovered and staked by H. W. McWhorter and partner about the year 1906, but the claim was afterwards allowed to lapse. The deposit was relocated in 1912 or 1913 by Mr. McWhorter who gave a lay [lease] on the ground to Jack Alverson and Grant Hoffman. These layees [lessees] did the first real development on the property, and proved it to be of importance. They shipped 59 tons of ore to the smelter at Trail, B.C., the smelter returns for which amounted to \$269 per ton, in gold, silver, and lead, the gold being very low, but the lead amounting to 45 per cent. In the spring of 1914 the property was acquired by Thomas P. Aitken and Henry Munroe, Mr. Aitken being the principal owner. During the winter of 1914-15 these owners shipped 1,180 tons of ore to San Francisco. The smelter returns for this shipment, according to a



GEOLOGICAL SURVEY
OF CANADA

MEMOIR 357

GEOLOGY OF MAYO LAKE,
SCOUGALE CREEK AND
McQUESTEN LAKE MAP-AREAS,
YUKON TERRITORY
(105M/15, 106D/2, 106D/3)

By
L. H. Green

DEPARTMENT OF

ECONOMIC GEOLOGY

Placer Deposits

No important gold placer deposits are known in the area although there is considerable evidence of test-pitting and other forms of prospecting on some of the creeks. Keele (1906a) referred to work on Edmonton Creek in one report, but there is no reference to this in his report for the following year (Keele, 1906b) and it is assumed that the workings were abandoned.

During the Pleistocene many of the larger valleys were enlarged and deepened by ice flowing along them and subsequently were partly filled with thick deposits of glaciofluvial material. In the author's opinion, any pre-existing placers along such valleys were destroyed.

In general, the only creeks that escaped scouring by the glaciers or burial by later glaciofluvial deposits were those at right angles to the main valleys followed by the ice.

Edmonton Creek heads in a number of cirques south of Mayo Lake map-area, and although the part of the creek valley within the map-area does not appear to have been scoured by ice flowing down it, it is partly filled with glaciofluvial deposits. These are believed to have originated both from the alpine glaciers at the head of the creek and from the ice sheet that filled the valley now occupied by Mayo Lake. The floor of Edmonton Creek lies far below the kame terraces formed on the margin of the latter ice sheet. Two relatively small creek valleys that are believed to be, at least in part, unglaciated are Contrast Creek and the creek that flows southwest to join Roop Creek west of the lake near the margin of Mayo Lake map-area. There appears to be little possibility of important gold placer deposits being discovered within the area.

Lode Deposits

Silver, Lead, and Zinc

Deposits of silver, lead, and zinc are known in both Mayo Lake and McQuesten Lake map-areas and there has been a limited production from the Cobalt Hill deposit in Mayo Lake map-area.

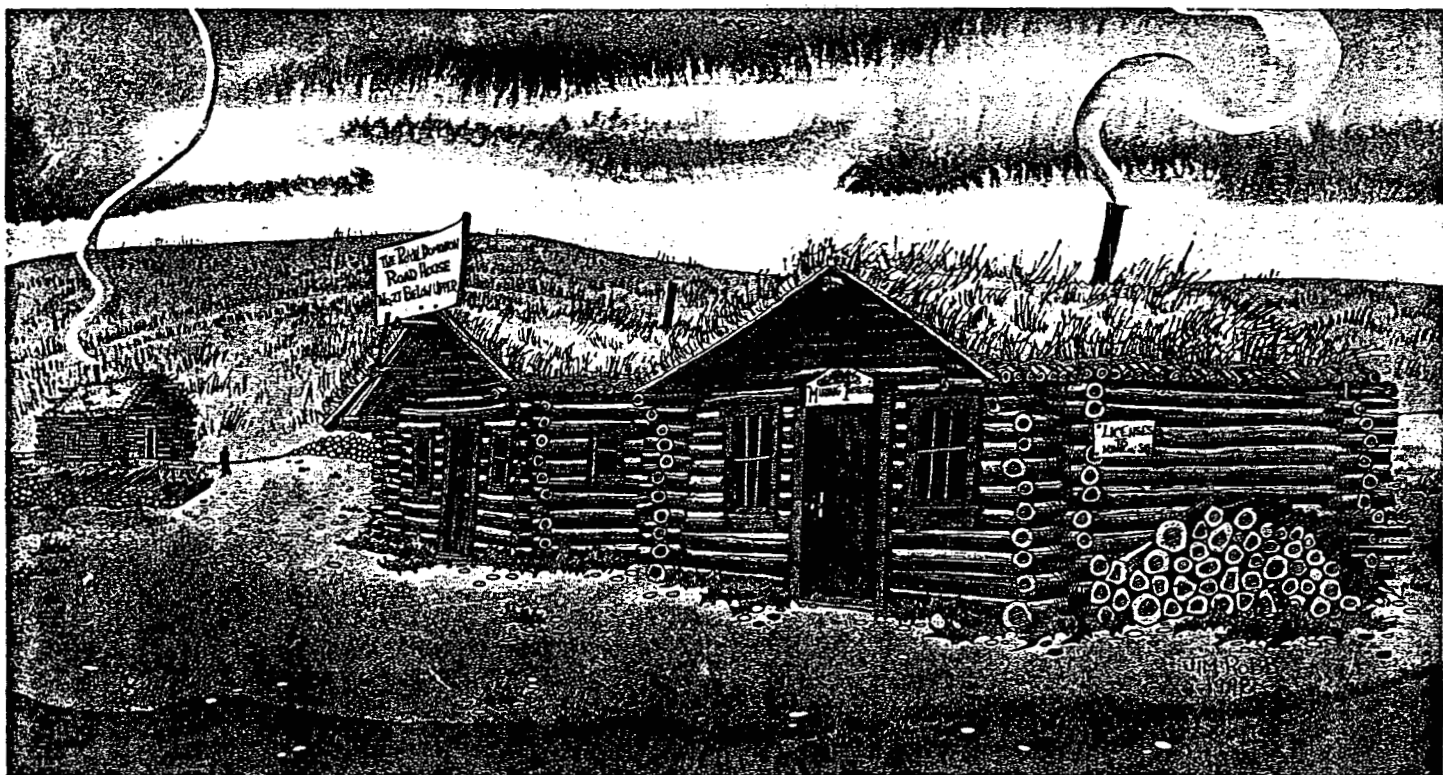
The deposits all occur as fracture fillings in steeply dipping fault zones. The common mineral assemblage includes galena, sphalerite, chalcopyrite, and pyrite in a gangue of quartz and siderite. The deposits occur in rocks of the Lower Schist division (unit 7); near the contact of the Lower Schist division with the Keno Hill Quartzite (unit 8); and the rocks of the Grit division (units 3 and 4). All the deposits discovered to date have a much lower silver to lead ratio than those of Keno and Galena Hills and, because of this and their relatively small size, little work has been done on them in recent years. The silver to lead ratio is commonly expressed as the number of ounces



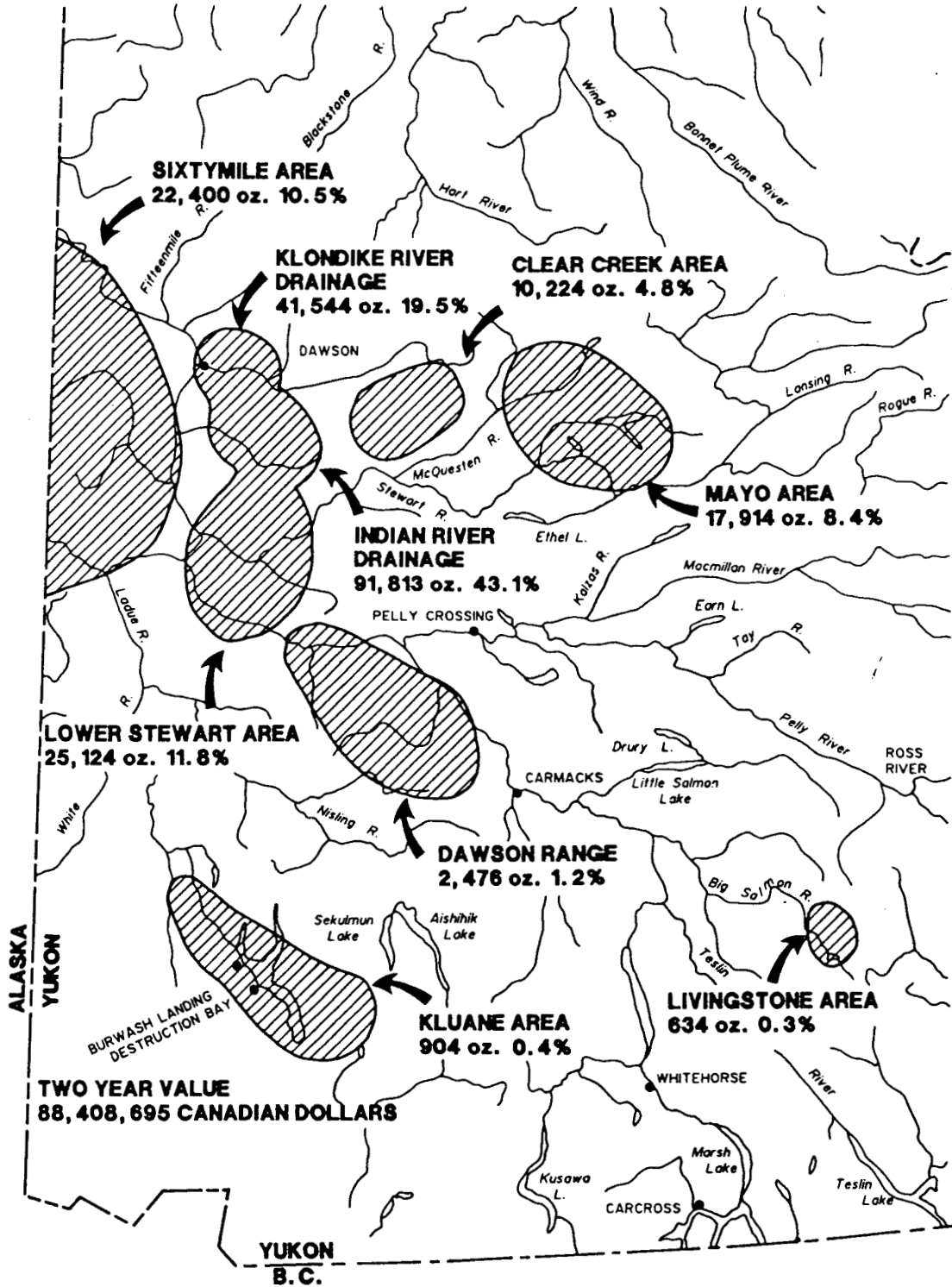
Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

YUKON PLACER MINING INDUSTRY 1991-1992



TWO YEAR YUKON PLACER PRODUCTION
1991 to 1992 Incl.
TOTAL 213,033 oz.



MAP SHEET/CREEK	OPERATOR	NTS	LAT. LONG.	Page
Hunker Creek	Erickson, John	115-O-15	63°56'N 138°53'W	105
<u>McQuesten 115-P</u>				
Bear Creek	Konservative Placers	115-P-9	63°39'N 136°22'W	107
Clear Creek	Jarvis, Raymond	115-P-12	63°44'N 137°37'W	107
Barlow Creek	Lizotte, R.	115-P-13	63°48'N 137°38'W	107
Clear Creek	West Coast Paving	115-P-13	63°46'N 137°28'W	108
Left Fork Clear Creek	Blackstone Mining Ltd.	115-P-14	63°50'N 137°07'W	109
Clear Creek	Sisters Resources	115-P-14	63°47'N 137°27'W	109
Clear Creek	4757 Yukon Ltd.	115-P-14	63°46'N 137°16'W	110
65 Pup	Scott, J.	115-P-14	63°49'N 137°19'W	110
Hight Creek	Bleiler Placers Ltd.	115-P-16	63°43'N 136°06'W	111
Bennett Creek	Lone, Howard & Elizabeth	115-P-16	63°44'N 136°04'W	111
Hight Creek	Erl Enterprises	115-P-16	63°43'N 136°12'W	112
Hight Creek	Sasha Mining Ltd.	115-P-16	63°44'N 136°08'W	112
Johnson Creek	C & I Construction Ltd.	115-P-16	63°46'N 136°21'W	113
Johnson Creek	Barchen, R.	115-P-16	63°47'N 136°22'W	113
<u>Dawson 116-B & C</u>				
Australian Hill	Eldorado Mining	116-B-3	64°03'N 139°09'W	115
Hattie Gulch	Gould, P.	116-B-3	64°01'N 139°07'W	115
Hunker Creek	J & C Holdings Ltd.	116-B-3	64°02'N 139°08'W	116
Unnamed Tributary of Last Change Creek	Wolreid Mining Ltd.	116-B-3	64°01'N 139°06'W	117
Bear Creek	Sunrise Placer	116-B-3	64°00'N 139°14'W	117
Klondike River	Hall, L.	116-B-3	64°02'N 139°25'W	118
Klondike River	Djukastein, T.	116-B-3	64°02'N 139°25'W	118
Klondike River	Olson, B.	116-B-3	64°03'N 139°22'W	119
Bonanza Creek	Brunet, A.	116-B-3	64°01'N 139°22'W	119
Bonanza Creek	Brunet, A.	116-B-3	64°01'N 139°22'W	120
Bonanza Creek	Nicholson, R.	116-B-3	64°01'N 139°22'W	120
Bonanza Creek	Algotsson, H.	116-B-3	64°01'N 139°22'W	121
Sixty Mile River	Aardvark Placer	116-C-2	64°02'N 140°45'W	122
Sixty Mile River	Coulee Resources Ltd.	116-C-2	64°01'N 140°42'W	122
Sixty Mile River	Eldorado Placers	116-C-2	64°01'N 140°43'W	122
Moose Creek	McMillan, R.	116-C-2	64°12'N 140°54'W	123
Moose Creek	Young, R.	116-C-2	64°11'N 140°54'W	124
Glacier Creek	Hanulik, B. & H.	116-C-2	64°02'N 140°49'W	124
Glacier Creek	Coulee Resources Ltd.	116-C-2	64°02'N 140°45'W	124
Little Gold Creek	Downs, G.	116-C-2	64°02'N 140°46'W	125
Glacier Creek	D & P Mining Expl. Ltd.	116-C-2	64°01'N 140°45'W	125
Big Gold Creek	Prohaszka, S.	116-C-2	64°02'N 140°45'W	126
Miller Creek	Sixty Mile Enterprises	116-C-2	64°02'N 140°55'W	126
Glacier Creek	D & H Placers	116-C-2	64°02'N 140°54'W	127
Bruin Creek	Gagnon, B.	116-C-2	64°15'N 140°40'W	127
Browns Creek	Neuser, C.	116-C-7	64°20'N 140°52'W	128
Forty Mile River	Forty Mile Placers	116-C-7	64°23'N 140°38'W	128
Forty Mile River	Forty Mile Placers	116-C-7	64°23'N 140°39'W	129

were sluiced in 1991 in preparation for 1992 and 50,000 cubic yards were stripped in 1992 in preparation for 1993. The average cut was 10 feet deep and had been stripped and thawed previous to mining.

Water Supply and Treatment: A 6 inch Gorman Rupp pump recycled water to the wash plant from an instream reservoir below the trommel at a rate of 400 igpm. Effluent was treated in a 75 foot wide by 75 foot long by 20 foot deep instream pond at the bottom property boundary.

Gold: The angular gold was half coarse and half fine. Small amounts of magnetite occurred in the concentrate. The fineness of the gold was 960, and it was stained red and black.

HIGHET CREEK 115 P 16
Bleiler Placers Ltd. 63°43'N 136°06'W
Water Licence: PM89-015 1991, 1992

Operation/Location: Highet Creek is located in a narrow valley of moderate gradient. Mining in 1991 and 1992 took place approximately 2000 feet downstream of Dredge Creek. The crew consisted of 5 miners and one helper. Two 10 hour shifts were worked when sluicing.

Equipment/Function: A D9L Cat dozer and 637 Cat scraper with a 35 yard dump capacity were used for stripping. When sluicing, the dozer stockpiled the pay, which was fed to the box by a UH20 Hitachi tracked excavator with a 4 yard bucket. Tailings were removed and stacked in the old cuts by a 988B Cat loader with a 7 yard bucket.

Wash Plant: The wash plant was a modified Ross 200 with a hopper and wet grizzly. The bars in the grizzly were specially cast with a taper to prevent rocks from getting stuck. The sluice box was 40 feet long and 9 feet wide with three top runs and one bottom run. A section of hydraulic riffles were incorporated into the top centre run. The processing rate was 250 yards per hour.

Ground Description: The overburden was partially frozen and ranged from 40 feet deep on the left limit to 60 feet on the right limit. It consisted of interlayers of organic blue and grey mud, fluvial glacial gravels including quartzite boulders up to 3 feet in diameter, and weathered bedrock slide material. The bedrock was shattered quartzite and quartzite schist. The lower 10 feet of gravel and

boulders plus 2 feet to 3 feet of bedrock were sluiced.

Mining Cuts: Most of the 1991 season was spent stripping in preparation for sluicing in 1992. Approximately 433,333 cubic yards were stripped and 20,000 cubic yards sluiced in 1991. In 1992 106,000 cubic yards were sluiced from one cut measuring 730 feet long by 280 feet wide by 14 feet deep.

Water Supply and Treatment: Water was supplied directly out of the creek to the wash plant at a rate of 3000 igpm by a Morris 8 inch by 10 inch trash pump powered by a Cat 3208 engine. Total creek flow was treated in a 350 foot wide by 400 foot long by 20 foot deep two cell settling pond located 1 ½ miles downstream in a wide portion of the Highet Creek valley.

Gold: The gold was coarse with nuggets common. Fineness was 825.

BENNETT CREEK 115 P 16
Howard & Elizabeth Lone 63°44'N 136°04'W
Water Licence: PM92-020 1991, 1992

Operation/Location: This property was located on a right limit bench of Bennett Creek. Howard and Elizabeth Lone set up the operation in 1991 and began testing in 1992.

Equipment/Function: A D7 Cat dozer was used to strip overburden. A 55 Michigan loader moved the pay and tailings.

Wash Plant: A 7½ foot wide by 16 foot long dump box fed material into a wet grizzly. A 2 foot wide by 20 foot long single run sluice was lined with 1 inch angle iron and 20 feet of cocoa matting.

Ground Description: The ground consisted of 3 to 4 feet of sand, and 8 feet of hard packed gravel on top of hard packed sand. The ground was not frozen, and bedrock was not reached.

Mining Cuts: All the gravel was sluiced.

Water Supply and Treatment: A 6 inch by 4 inch pump powered by a Gardner Denver motor pumped water from Bennett Creek at a rate of 150 igpm. Effluent was treated in an out of stream pond located between the bench and the

Highet Creek road. The only discharge from the pond was by seepage.

Gold: A pan was used to clean up gold from the sluice box. A small amount of fine gold and hematite was recovered.

HIGHET CREEK 115 P 16
Erl Enterprises 63°43'N 136°12'W
Water Licence: PM89-078 1991, 1992

Operation/Location: This property was located along the upper reaches of Highet Creek, upstream from the mouth of Rudolph Gulch. The valley bottom is narrow and the gradient steep. The high elevation (3300 feet) results in a shorter than average mining season. Frank Erl worked an 11 hour shift and had two helpers for part of the 1991 season.

Equipment/Function: A 950 Cat loader with a 2 yard bucket fed the box and removed tailings. A D8K Cat dozer with angle blade was used for stripping, pushing up pay, and levelling tailings.

Wash Plant: The wash plant consisted of a wet grizzly 4 feet long by 5 feet wide and a single run sluice 20 feet long by 2 feet wide. The spacing of the pipes was 2½ inches at the top and 3 inches at the bottom. The box was lined with angle iron riffles 1¼ inches apart, expanded metal, and cocoa matting. The processing rate was 30 cubic yards per hour.

Ground Description: The bench deposit was frozen and consisted of 5 feet of gravel mixed with quartzite and granite boulders, overlain by 2 feet of gravel and yellow clay layers, and 2 feet of black muck. Bedrock stepped up the valley and consisted of fractured greenstone with quartz stringers.

Mining Cuts: Several cuts were made on the right limit bench deposits, and one cut was made in the creek channel on the left limit. The unfrozen creek deposit was mined when the water was low and could be bypassed around the cut. Five to 6 feet of gravel and 1 foot of bedrock were sluiced. A total of 2370 cubic yards were sluiced and 3273 cubic yards stripped in 1991. In 1992, 4348 cubic yards were sluiced and 2400 cubic yards stripped.

Water Supply and Treatment: Water was gravity fed to the sluice plant from a small reservoir in

Highet Creek at a rate of 600 igpm, using a 200 foot long aluminum and PVC pipeline 6 inches in diameter. Effluent was treated in a series of instream ponds.

Gold: The fineness was 810. Twenty five percent of the gold was larger than 3 mesh, 25% between 3 and 8 mesh, and 50% smaller than 8 mesh. Some scheelite was found in the concentrate.

HIGHET CREEK 115 P 9 & 115 P 16
Sasha Mining Ltd. 63°44'N 136°08'W
Water Licence: PM92-002 1991, 1992

Operation/Location: Merl Powers and family mined this property on Highet Creek with 4 helpers, working two 12 hour shifts. Two claims located 2000 feet downstream of McRae Gulch were mined.



Looking for a bit of the yellow stuff at Sasha Mining's operation on Highet Creek.

Equipment/Function: A D9 Cat dozer was used for stripping and pushing up pay. Two 275B Michigan loaders fed the wash plant and removed tailings. A UH30 Hitachi excavator was used for stripping, and hauling pay and tailings. A 769C Cat rock truck hauled overburden and pay.

Wash Plant: The wash plant consisted of a 14 foot wide by 4 foot long by 4 foot deep wet hopper feeding a 26 foot long trommel 9 feet in diameter. Two inch minus material passed through the trommel into the top sluice run, which measured 8 feet wide by 9 feet long, and was lined with hydraulic riffles over astroturf. The bottom run measured 8 feet wide by 24 feet long

To: **TS2 CONSULTING INC.**
 520, 734 - 7th Avenue S.W.
 Calgary, Alberta
 T2P 3P8
 ATTN: Tony Speed



File No : **39470**
 Date : September 11, 1997
 Samples :
 Project :
 P.O.#

Certificate of Assay
Loring Laboratories Ltd.

629 Beaverdam Road, NE Calgary Alberta
 Tel: (403)274-2777 Fax: (403)275-0541

Sample No.	Au ppb	Ag ppm
"Geochemical Analysis"		
111176	38	0.5
111177	14	0.4
111178	< 5	0.4
111179	14	0.4

I HEREBY CERTIFY that the above results are those assays made by me upon the herein described samples :


 Assayer

Rejects and pulps are retained for one month unless specific arrangements are made in advance.