MAP NO.: **PLACER ASSESSMENT REPORT**	X	**DOCUMENT NO:** 120046	
PROSPECTUS		**MINING DISTRICT:** Whitehorse	
115 N 15 **CONFIDENTIAL**	X	**TYPE OF WORK:** (see remarks)	
OPEN FILE			

REPORT FILED UNDER: Tammi Resources Limited

DATE PERFORMED: Feb. 1982 | **DATE FILED:** Spring 1982

LOCATION: **LAT.:** 63° 57'N | **AREA:** Mosquito Creek

LONG.: 140° 50'W | **VALUE $:** n/a

CLAIM NAME & NO.: 30 claims: P13720 - P13749

WORK DONE BY: G.R. Hilchey (Gordon Hilchey and Associates Limited)

WORK DONE FOR: Ken McFarland

DATE TO GOOD STANDING:

REMARKS: There was no work done on the property by the author and his company. He studied it from other references and based his recommendations on previous personal knowledge of the area. MOSQUITO CREEK, GOLD RANGE AREA.

GORDON HILCHEY AND ASSOCIATES LTD.

4310 Quinton Place
North Vancouver, B. C.
V7R 4A7

1982 February 19

Tammi Resources Ltd.
1255 Kingsway
Vancouver, B. C.
V5V 3E2

Attention: Mr. Ken McFarland

Dear Mr. McFarland:

We are pleased to enclose herewith our REPORT ON McFARLAND PLACER PROPERTY, MOSQUITO CREEK, SIXTYMILE AREA, YUKON, CANADA.

This letter will also act as your authority to use this report in a prospectus or statement of material facts.

Our invoice is enclosed.

Yours truly,

G. R. Hilchey

Gordon R. Hilchey, P. Eng.

GRH:pam

Enclosure 2

120046

REPORT ON McFARLAND PLACER PROPERTY
MOSQUITO CREEK, SIXTYMILE AREA
YUKON, CANADA

1982 February 19

Gordon R. Hilchey, P. Eng.

INDEX

G.R.H.

CERTIFICATE

I, GORDON R. HILCHEY, of 4310 Quinton Place in the municipality of North Vancouver, in the Province of British Columbia, DO HEREBY CERTIFY THAT:

1. I am a consulting mining engineer,

2. I graduated from the University of British Columbia in 1942 with the degree of B.A.Sc. in Geological Engineering,

3. I graduated from the University of Alaska in 1947 with the degree of B.Min.E. in Mining Engineering,

4. I am a Registered Professional Engineer in the Association of Professional Engineers in the Province of British Columbia,

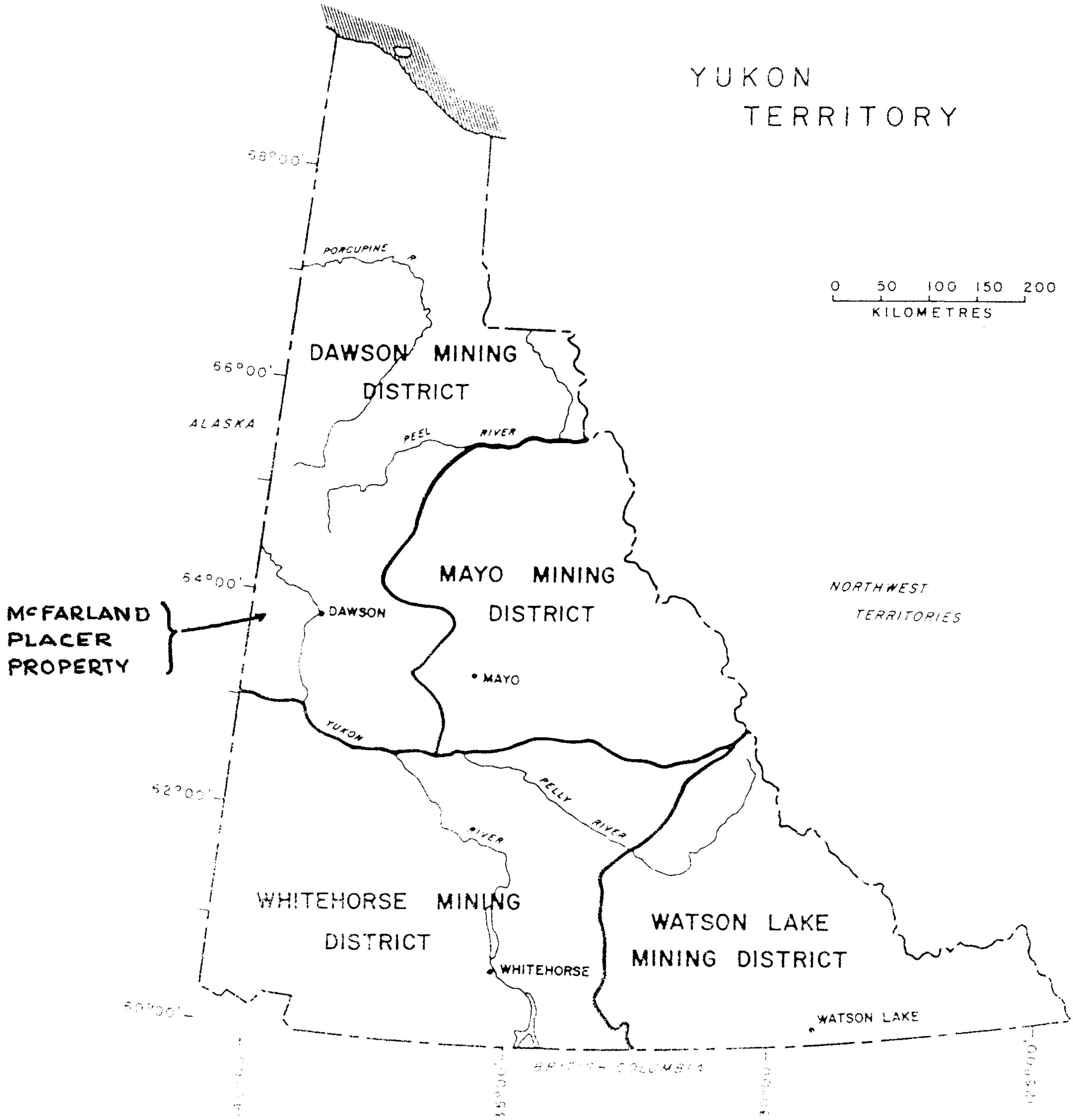
5. I am a Registered Professional Engineer in the Association of Professional Engineers of Yukon Territory,

6. I have practiced my profession for more than twenty years,

7. I have no interest, direct or indirect in the placer claims on Mosquito creek, Yukon Territory, which are the subject of this report nor do I expect to receive any.

Dated at North Vancouver, British Columbia this 19th day of February, 1982

REGISTERED PROFESSIONAL ENGINEER
G. R. HILCHEY
YUKON TERRITORY



To accompany:

REPORT ON McFARLAND PLACER PROPERTY, SIXTYMILE AREA, YUKON by G.R. Hilchey, P. Eng.

February 1[illegible], 1982

INDEX MAP

G. R. Hilchey

REPORT ON McFARLAND PLACER PROPERTY
MOSQUITO CREEK, SIXTYMILE AREA
YUKON, CANADA

INTRODUCTION

This report is prepared at the request of Mr. Ken McFarland of Vancouver, B. C., who is the registered owner of the 30 claims on Mosquito Creek which are the subject of this report. The report deals with the potential for economic gold placer deposits within these placer claims. The author did not visit the claims because of deep snow cover and low temperatures which would have prevented any meaningful observations.

LOCATION AND ACCESS

The property is located in the west central part of the Yukon Territory, Canada, at latitude 63° 57' N, and longitude 140° 50' W. It lies about eight kilometres (5 miles) east of the Alaskan boundary and about sixty-four kilometres west of Dawson (Dawson City), Yukon. The property lies in the valley of Mosquito Creek which flows westerly and enters the Sixtymile river opposite the mouth of Bedrock creek some nine kilometres upstream (southwest) from the mouth of Big Gold creek.

The usual means of access is by about one hundred and ten km (66 miles) of gravel road from Dawson. Dawson is served by the Klondike highway which joins the Alaska highway near Whitehorse. The Sixtymile area is also accessible from Alaska via the Taylor highway which joins the Alaska highway at Tetlin Junction. The Taylor highway and the road to Dawson are both normally closed during the winter months.

GRN

The western end of the property is accessible by road but there are no roads elsewhere on the claims. There is a small gravel airstrip that is suitable for light aircraft about eight kilometres northeast of the property.

PROPERTY

The property lies in the Dawson Mining District and consists of the 30 placer mining claims listed in APPENDIX I. The claims extend from the valley of the Sixtymile river up Mosquito creek for a distance of about five kilometres (3 miles). They were staked by Ken McFarland, the recorded owner, on July 24, 1981. The property was formerly held by McFarland under placer Prospecting Lease No. 4257 and was converted to claims under provisions of the Yukon Placer Mining Act.

The claims are all in good standing until July 24, 1982. In order to maintain the claims in good standing beyond that date, approved work must be done on the property in the amount of at least $200.00 per claim. The claims may be grouped before the work is done and all the work may then be done on one or more claims. Payment in lieu of work is not acceptable. The author does not warrent the ownership of the claims or the rights which they convey.

GEOLOGY

According to Cockfield (1931) the property is underlain by sericite and chlorite schists which he correlates with the Klondike schists in the Dawson area. The Klondike schists underlie most of the productive placer area in the Klondike. Cockfield's lengthy description of these rocks is included in this report as APPENDIX II. h.R.H.

Early Tertiary volcanic rocks of probable Eocene age occur along the valley of the Sixtymile river opposite the mouth of Mosquito creek and both upstream and downstream on the southeast side of the river. Cockfield referred to these rocks as "Younger Volcanics" - his description of these rocks is also included in APPENDIX II.

From the author's observations in various parts of the Yukon plateau, the primary gold deposits, which are the source of the placers, are closely related in time and space to early Tertiary subvolcanic rocks.

In common with most of the west central Yukon, the Sixtymile area has not been glaciated. This means that the original paystreaks would still be intact except where they have been mined out.

Although the author has not been on the property, some reasonable predictions can be made about the surficial geology. These are based on a study of photographs taken on the property and extensive personal knowledge of the west central Yukon and the Sixtymile area in particular.

The surficial materials (sand, gravel, etc.) will be perennially frozen in most places to considerable depth (permafrost). The north facing slope of the valley will be underlain by almost continuous permafrost but there will be only patchy permafrost on the south-facing slope.

There will be a layer of black muck overlying the gravels in the valley bottom. The minimum expected depth will be about two feet but, in places, it may exceed twenty feet. The muck is a mixture of loess, organic material and highly variable amounts of silt, gravel, and rock fragments. It contains negligible amounts of gold if any.

Considering the gentler north-facing slope of the valley, the bedrock rim will extend farther under the slope on the south side than the north. There is a possibility of a low bedrock bench on the south side. It is not possible to predict the depth to bedrock.

HISTORY

The first recorded placer mining in the Sixtymile area was on Miller creek in 1892. Miller creek empties into the Sixtymile river about four kilometres (2½ miles) northeast of the mouth of Mosquito creek.

In the same year gold was discovered on Glacier creek and on Big Gold creek. Production increased from $6,000 (about 400 crude ounces) in 1892 to $225,000 (about 15,000 crude ounces) in 1895. After the discovery of gold in the Klondike in 1896, the production slowly declined over the next two decades to about 2000 ounces. (Cockfield, 1921)

Production increased to about 15,000 ounces in 1915 when dredging commenced on Miller creek but has varied widely since then. The production from the Sixtymile camp has been summarized by Green (Green, L.H., 1966) up until the end of 1965:

> Recorded production for the goldfield since discovery is about 213,600 ounces of fine gold including 123,000 ounces up to 1917....about 12,700 for the Holbrook Dredging Company for 1934, 1935, 1939, and 1940.... 72,984 ounces for Yukon Explorations Limited, 1948 to 1961 inclusive....4,630 for other operators between 1948 and 1962....and about 290 ounces for later operations.... Total production for the goldfield is probably only slightly larger than recorded production.

G.R.H.

Some data is available regarding dredging operations on the lower part of Big Gold creek (Franklin, pers. communication). The average value of the gravel dredged was about 50¢ per cu. yd. when gold was selling at $35.00 per ounce. This translates to about $5.70 per cubic yard when gold is selling at $400.00 per ounce.

There is no record of any previous mining on Mosquito creek. The fact that the creek is named in an area where many smaller creeks are not, suggests however, that there was some prospecting in the past. More recently Mr. McFarland did some prospecting with a bulldozer prior to staking the Prospecting Lease into claims. The prospecting did not reach bedrock, however, and no systematic sampling was carried out. Some gold was reported.

CONCLUSIONS

The Mosquito creek property lies in an area of gold-bearing creeks that have been mined and are being mined successfully. The bedrock geology is similar to that of other productive placer areas in the west central Yukon. While the creek may have been prospected in the past, no records are available. In any case, gravels that would have been too low grade to mine some decades ago could possibly be made to pay with recent improvements in access, mining equipment, and the price of gold. It is therefore concluded that an exploration program is justified to determine if pay gravels exist on the property.

G.R.H.

RECOMMENDATIONS

It is recommended that:

1. three trenches be excavated completely across the valley bottom and extending downward into bedrock. The trenches should be approximately one mile apart

2. measured column samples of about one square foot in cross section be taken at regular intervals of not less than 8 metres (26 feet) or more than 15 metres (50 feet) across the valley bottom. The depth of each sample should not be more than 1.3 metres (4 feet) in gravel and 0.3 metres (one foot) in the bedrock. The sampling extends from the top of the gravel to bedrock and at least two feet into bedrock.

3. the samples be concentrated by sluicing and panning. The gold content should be estimated in the field but all concentrates should be retained for clean-up with mercury and the gold weighed to obtain the exact value

4. complete notes and sketches be kept on the size and location of the samples and a description of the material sampled. Annotated color photographs should be taken of the sample sites.

Some modifications in trench layout and other details will probably be necessary to suit local conditions.

G.R.H.

The average value from the sample results should be computed and the lateral limits of any paystreaks defined. From the information obtained in the sampling program, decisions can be made on the next step in exploration and/or development.

The estimated cost of the program is:

Bulldozer 140 hrs. @ $150.00/hr.	$ 21,000.00
Transportation, camp, misc.	9,000.00
Engineering services	2,000.00
	$ 32,000.00
Contingencies @ 15%	4,800.00
TOTAL	$ 36,800.00

REGISTERED PROFESSIONAL ENGINEER
G. R. HILCHEY
YUKON TERRITORY

Gordon R. Hilchey, P. Eng.
Gordon Hilchey and Associates Ltd.

February 19, 1982

REFERENCES

COCKFIELD, W.E., 1921 — Sixtymile and Ladue Rivers Area, Yukon; Geol. Surv. Can., Memoir 123

FRANKLIN, G.D., — Former partner Yukon Placer Mining Company, Personal communications and unpublished internal reports.

GREEN, L.H., 1966 — The mineral industry of Yukon Territory and southwestern District of Mackenzie, 1965; Geol. Surv. Can., Paper 66-31

G.R.H.

APPENDIX I

CLAIMS

GRANT NUMBER	CLAIM NUMBER
P 13720	Frank
P 13721	Drew
P 13722	Art
P 13723	Bordan
P 13724	Christina
P 13725	Rob
P 13726	Michelle
P 13727	Poppy Loco
P 13728	Greg Peter
P 13729	Poco Gladys
P 13730	Barb
P 13731	Joanne
P 13732	Elaine
P 13733	Deb
P 13734	Margaret Ann
P 13735	Gram
P 13736	Lorie
P 13737	Maureen
P 13738	Bea
P 13739	Alice
P 13740	Archie
P 13741	Donna Lee
P 13742	Bob
P 13743	Ken
P 13744	Leo
P 13745	Sally
P 13746	Tammy
P 13747	Vici
P 13748	Fonni
P 13749	Nancy

Recorded Date: July 24, 1981
Expiry Date: July 24, 1982

Note: Names are as shown on the Grants

Recorded Owner: Ken McFarland
1721 Kingsway
Vancouver, B. C.

G.R.H.

APPENDIX II

CANADA

DEPARTMENT OF MINES

SIR JAMES LOUGHEED, MINISTER; CHARLES CAMSELL, ACTING DEPUTY MINISTER.

GEOLOGICAL SURVEY

WILLIAM McINNES, DIRECTOR.

MEMOIR 123

No. 105, GEOLOGICAL SERIES.

Sixtymile and Ladue Rivers Area, Yukon

BY

W. E. Cockfield

OTTAWA

THOMAS MULVEY

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1921

No. 1837

12570—1

The structure is further complicated by the injection of large amounts of igneous material. Innumerable dykes and sills, now reduced to lenticular masses, have been injected into the rocks of Nasina series and have been in part folded with them. The complicated structure of these rocks and the large amount of injected material make it rash to estimate their thickness. Further, both the lower and upper boundaries are transgressive igneous contacts, so that neither the bottom nor the top of the series is actually present in the Sixtymile region.

Age and Correlation.

These rocks are the oldest in Sixtymile district, for they are cut or overlain by all the other rocks.

If the Yukon group as a whole be Precambrian, the Nasina series, the earliest members of that group, must be of Precambrian age. Dawson[1] correlated them with the Grenville series, but such a correlation can be of little value.

Origin.

The strongest evidence that these rocks are of sedimentary origin is the rapid alternation of the quartzites, schists, and limestone; the abundance of graphite; and the occurrence of quartz conglomerates. Microscopic examination shows that they have largely recrystallized into fine-grained schists and gneisses. Although some specimens show granulation, recrystallization is the rule, and in many cases the cracking or straining at right angles to the planes of foliation may be taken as being due to movements which have occurred subsequent to the recrystallization of the rock.

The Nasina series represent siliceous and arenaceous sediments, with some calcareous deposits laid down on the bottom of an early Precambrian sea, but which, as a result of earth movements, have become recrystallized into schists and gneisses. Complete metamorphism, however, was not wholly due to regional movements. In many cases garnet, and in some cases tourmaline, is developed and both these minerals are found only in proximity to the granite gneiss. It is believed that contact metamorphism played its part in the great changes which these rocks have undergone, and that the intrusion of the vast batholiths of granite, with the consequent soaking of the invaded sediments with granitic juices helped in the alteration. But the effects of contact and of regional metamorphism are so similar on rocks of this type, as to make the distinction a problem that can be solved only by detailed work.

IGNEOUS SCHISTS.

The igneous schists are divided for the present into two main groups, sericitic and chloritic schists and amphibolite or hornblende schists, for both of which formational names have already been given.

Sericite and Chlorite Schists.

This group consists of light-coloured sericite schists with subordinate amounts of chlorite schists. McConnell[2] has reported in detail on these rocks, but many difficult problems still remain; amongst these are the age relationships

---

[1] Dawson, G. M., "The geological record in the Rocky Mountain region of Canada." Bull. Geol. Soc., Am., vol. 12, 1901, pp. 62-64.

[2] McConnell, R. G., "Report on the Klondike gold fields," Geol. Surv., Can., Ann. Rept., vol. XIV, 1901, pp. 15-22B.

of the various members of the two groups to one another and to the granite gneiss. The intimate association of these rocks with the other members of the Yukon group has caused them to be mapped as a complex in many of the surveys of Yukon and Alaska. The writer has endeavoured to effect a separation of the main groups, and though this separation is not complete, it affords information which compensates for the mapping inaccuracies involved.

Distribution. The schists outcrop in three main areas, the largest of which occupies part of the southern portion of the district, extending south along the Boundary from near Deep creek to Ladue river, a distance of 20 miles, and east from the Boundary to Matson creek and Rice creek, a distance of 15 miles. Nasina and later igneous rocks make up a considerable portion of this area.

Two other areas occur along the Boundary, both of them near the northern end of the district. The more northerly crosses the Boundary near Little Gold creek, and extends eastward to Hungry gulch, a distance of 6 miles, following fairly closely the divide between the Sixtymile and Fortymile drainage. Its width is not known as this divide forms the boundary of the present mapping sheet. The second of these two areas occurs on the Boundary in the vicinity of Bedrock creek, and crossing Sixtymile river near the mouth of that creek extends along the south side of the Sixtymile to the mouth of Miller creek, thus having a length of 10, and an average width of about 4 miles.

Lithological Characters. These schists resemble in appearance the most completely recrystallized rocks of the Nasina on the one hand and the most sheared of the granite gneisses on the other. They may be differentiated from the Nasina by the transitions which occur in the latter between limestone, quartzite, and schist. The sericite schists have been derived largely from porphyritic igneous rocks. and in many cases the traces of the porphyritic texture have not been completely obliterated. Rounded blebs of quartz and feldspar, probably the original phenocrysts of the rock, may sometimes be distinguished macroscopically.

The separation of the crushed quartz porphyries and the crushed granite porphyries or augen gneisses, is more difficult, for by the failure of the quartz phenocrysts and the consequent increase in the feldspathic constituents an almost complete transition between the two types may be found. Biotite is, however, conspicuously absent from the sericite schists, and abundant in the granite gneisses, and this fact, coupled with the general appearance in the field, which is of some value, served in differentiating the two types.

The most important and abundant rocks in this series are white, light yellow, or light green sericite schists. These possess a marked foliation accentuated by the development of secondary minerals as a necessary accompaniment to the pronounced dynamic agencies to which they have been subjected. They are soft to the touch, friable, and with a pearly lustre on the cleavage planes, owing to the abundant development of secondary micaceous minerals. The white or yellow varieties are usually more compact than the greenish rocks and have cleavage planes $\frac{1}{16}$ of an inch or more apart, whereas the bands in the greenish varieties are almost paper-thin, and the secondary micas are bent around the white or reddish decomposed feldspar individuals. Rounded blebs of quartz and feldspar are sometimes found.

Under the microscope these rocks are seen to be of simple mineralogical composition, the bulk of the specimens being composed of quartz, feldspar, sericite, and chlorite. Of the feldspar, both orthoclase and plagioclases are present, the plagioclases being usually albite or oligoclase. Numerous minerals of secondary importance occur. These are magnetite, pyrite, hematite, zoisite, epidote, zircon, kaolin, and calcite. Biotite is usually absent. The quartz shows progressive granulation and recrystallization, passing through a stage in which the quartz grains interlock with a sutured texture, into varieties in which the quartz has been largely recrystallized into large, clear areas entirely free from strain shadows and containing inclusions of the granulated material. Sericite is abundant, and occurs in parallel bands sweeping in curves through the rock. The chlorite occurs in small leaves or aggregates.

Macroscopically the chlorite schists are fine-grained rocks showing abundant chlorite and epidote. They occur both as bands alternating with the sericite schists and as masses. The planes of schistosity are not governed by the character of the rock, but pass from one variety to the other at different angles to the planes of contact between them.

Under the microscope the chlorite schists are very similar to the sericite schists, save that the chlorite is relatively much more abundant, and with the chlorite, epidote, and zoisite also increases its importance, and quartz declines. A large amount of granitic material has been injected into these rocks, and so intimately are the two associated that it is frequently impossible to separate the material even in thin section. The zoisite, however, replaces feldspar to some extent, and it is possible that the feldspars are more basic.

Remnants of a porphyritic texture are visible in many of the sections. These appear as lenticular masses of material usually bounded by bands of mica, probably the original phenocrysts of the rock. The material in these lenticular areas is usually granulated, but in some cases recrystallization has taken place.

Structure. The rocks of this series are everywhere foliated, but they have suffered somewhat unequally in this respect. The strike of the schistosity is in a general northwest-southeast direction, but there are many exceptions. The dip is persistently towards the southwest and notwithstanding the high degree of metamorphism which these rocks have undergone, the angles of dip are usually low, very seldom exceeding 30 degrees. In some cases, notably in the area lying along Sixtymile river, high dips were noted.

Age and Correlations. These schists are similar to certain sericite and chlorite schists which make up the bulk of the Klondike series.[1] In mapping that series, however, McConnell included the granite gneisses and consequently these rocks can only be referred to portions of that series. Correlations might also be made with portions of the igneous schists of the Klotassin area[2] which exhibit the same relations to the rocks of the Nasina series as do the sericite and chlorite schists in Sixtymile district. They may also be the equivalents of

[1] McConnell, R. G., op. cit., pp. 15B-22B.

[2] Cairnes, D. D., Geol. Surv., Can., Sum. Rept. 1916, p. 28.

similar rocks in the Salmon River[1] gold field correlated with the Klondike rocks, and they may also be correlated with similar rocks in the Stewart[2] River valley.

The schists exhibit distinctly intrusive relations with the rocks of the Nasina series. Not only are the contacts between the two extremely irregular, with areas of the sericite schists penetrating into the quartzites, but numerous inclusions of quartzites, from a few inches to several hundred feet in diameter, are found in the sericite schists.

There is also evidence that these schists are earlier than the granite gneisses, for patches and small areas of granitic material are folded and sheared with the schists. These patches represent injections of granitic material from the Precambrian batholiths or from the stocks of Mesozoic age, probably from the batholiths.

The fact that there is transition between the sericitic and chloritic schists is no proof as to their relative ages. It may indicate intrusive contact or contemporary age. The alternating bands are strongly suggestive of dykes and sills of the chlorite schists cutting the sericite schists, and it is believed that the former are younger than the latter, but both have been sheared alike, and all signs of eruptive contacts have been obliterated.

Origin. These rocks owe their origin to the extrusion or intrusion of igneous material subsequently deformed. The intrusive contacts with those of the Nasina series, and the porphyritic texture, remnants of which can be readily detected, leave little doubt as to their igneous origin. Further, the mineral composition strongly suggests that many of the rocks were originally quartz porphyries, and that from these there is a gradation to more basic types represented by the chlorite schists.

The deformation has been due to movements in the rock mass, and the microscope shows a progressive granulation proceeding hand in hand with recrystallization, and this was accompanied by the development of secondary minerals, along well-defined planes of pressure. The phenocrysts of quartz have suffered more than the feldspars in the process of granulation but both are crushed to a certain degree.

The fact that the planes of schistosity cut across the planes of contact between the sericite and chlorite schists at varying angles can only lead to the inference that shearing took place subsequent to the consolidation of these rocks and that it was not due to movements while the rocks were still in a molten state. It is, of course, impossible to say whether the rocks possessed an original flow structure, which in certain cases might be emphasized by later movements. All trace of such earlier flow movements has been lost by the later shearing to which these rocks have been subjected.

It is, therefore, probable that the sericite schists are derived from quartz porphyries and allied types of rock, and the chlorite schists from rocks of a more basic composition, which may have represented later intrusion into the quartz porphyries, and that these schists owe their origin to the processes of mechanical deformation known as regional metamorphism.

---

[1] McConnell, R. G., "Salmon River gold field," Geol. Surv., Can., Ann. Rept., vol. XIV, 1901, p. 25A.

[2] McConnell, R. G., Geol. Surv., Can., Ann. Rept., vol. XIV, 1901, p. 16B.

tinuous with McConnell's Kenai series in Klondike[1]; and equivalent to certain beds in the Fortymile district which, from fossil evidence, have been referred to that age.[2] Similar beds occur in Upper White River[3] and Kluane mining districts[4].

These correlations place the rocks as Kenai, which is probably upper Eocene. As the rocks have been apparently deposited in separate basins, it is not likely that sections taken at different points will correspond, nor that the characteristic lignite seams will always occur at the same horizon. No diagnostic fossils have been found in these beds, but their similarity to the beds in the Klondike, their structural relations, and their content of fossil wood and lignite render it likely that they should be assigned to the Kenai.

NEWER VOLCANICS.

This name was applied to Cairnes in Upper White River district[5] to cover a series of andesites, diabases, basalts, and allied rocks of Tertiary age. Several areas of similar rocks in Sixtymile district have been provisionally assigned to this group. The largest lies in the vicinity of the creeks producing placer gold along Sixtymile river between Bedrock and Fivemile creeks. It outcrops for less than 2 miles up Miller creek; for about the same distance up Glacier creek; up Big Gold creek to the divide between the Sixtymile and Fortymile drainage; and along this ridge to the head of California creek.

Another area of importance, not yet fully explored, extends from Swede Creek dome across Fish creek and beyond. This is believed to be continuous with another area on Sixtymile river near the mouth of Fiftymile creek. Another area, or possibly a portion of the same area, occurs near the forks of Matson creek as far downstream as explorations were carried. The exposures here are on the benches and exhibit excellent sections through a vertical range of at least 100 feet. Many smaller areas—on mount Hart, Bedrock mountain, and elsewhere—as well as numerous dykes and sills, particularly in the vicinity of the surface flows, apparently belong to one general period of igneous activity.

Lithological Characters.

The rocks, consisting of andesites and diabases, have a bright, fresh appearance, but when examined closely are seen to be deeply weathered, and alteration has made it almost impossible to obtain a fresh hand specimen. Black and various shades of green and grey predominate, but reds, ranging from a dull brick colour to bright vermilion or even lavender are by no means rare. The texture ranges from glassy through aphanitic or porphyritic to granular. The porphyritic facies are most abundant and contain large crystals of feldspar,

---

[1] McConnell, R. G., "Report on the Klondike gold fields," Geol. Surv., Can., Ann. Rept., 1901, pp. 23B-24B.

[2] Prindle, L. M., op. cit., pp. 23-26.

[3] Cairnes, D. D., "Upper White River district," Geol. Surv., Can., Mem. 50, 1915, pp. 95-97.

[4] McConnell, R. G., Geol. Surv., Can., Ann. Rept., vol XVI, 1904, p. 7A.
Cairnes, D. D., Geol. Surv., Can., Sum. Rept., 1914, pp. 15, 32-33.

[5] Cairnes, D. D., "Upper White River district," Mem. 50, 1915, pp. 97-101.

usually decomposed, and hornblende or pyroxene. Bedded tuffs, usually banded white and green, are intercalated with the flows, and are frequently pierced by dykes belonging to later flows. These have been folded and in some instances faulted.

Under the microscope, the andesites, which make up the greater part of these flows, are seen to consist of basaltic hornblende, augite, diopside or hypersthene, and more rarely biotite, and lime-soda feldspars of intermediate composition, ranging from oligoclase to labradorite. Amongst the accessory constituents iron ore is the most abundant, with some zircon and apatite. The most common secondary minerals are calcite, epidote, chlorite, and kaolin. The feldspars are frequently decomposed, and in some cases have disappeared leaving casts of the crystals with remnants of the original material lining the walls of the cavities. The fresh feldspars show a decided zonary banding and are frequently filled with inclusions oriented parallel to the sides of the crystals. The groundmass is rarely coarser than microcrystalline, and in some sections small amounts of a brownish glass are present. Pilotaxitic structures characterize the groundmass of many of the sections, but where glass is present, this is designated as hyalopilitic. The reddish varieties of these rocks owe their colour to an oxide or hydroxide of iron derived from the oxidation or hydration of the magnetite.

The diabases are dominantly holocrystalline rocks. The minerals developed are intermediate feldspars, most commonly labradorite, and augite olivine, hornblende, and biotite. Black iron ore is the most abundant and characteristic of the accessory minerals, and certain secondary minerals such as serpentine and chlorite are developed. Contrasted with the andesites these rocks are fresh, the feldspars being usually clear. The specimens are marked by the development of the ophitic structure, characteristic of diabases.

Age and Correlations.

Portions of these rocks cut the Eocene (Kenai) sediments and are, therefore, later than they in age, and there is evidence that portions of them were contemporaneous with the Kenai sedimentation, for tuffs were found interbedded with some of the sandstones. It is probable, therefore, that this period of vulcanism began in the Eocene. Evidence as to when these extrusions ended is less satisfactory. Most of the areas in the Sixtymile appear to have been eroded along with the rest of the plateau, for their surface is concordant with that of the remainder of the plateau surface. At one point—mount Hart—however, these volcanics are to be found 500-700 feet above the general level of the plateau surface, and now stand at an elevation of 4,900 feet. Here, however, Eocene sediments are present with the volcanics, occurring in a bed about 30 feet thick near the summit, and as these sediments were eroded during the reduction of the plateau surface to base level mount Hart must be a monadnock or residual, and not a mountain of accumulation. Since it is believed that the planation of the Yukon plateau was complete towards the close of the Miocene, these volcanics cannot be later than that period. This conclusion does not agree with that reached by Mendenhall for the Wrangell lavas[1] which are thought to belong to the same

---

[1] Mendenhall, W. C., "The geology of the Central Copper River region, Alaska," U.S. Geol. Surv., Prof. Paper No. 41, 1905, pp. 54-62

period of vulcanicity, and which Mendenhall assigns to a period of igneous activity extending from the Eocene to the Recent, and of certain of the flows his conclusions are, "These flows, therefore, instead of preceding the deformation of the early Tertiary plain, are later than the dissection which followed its uplift, and are to be regarded as very recent indeed." There is, however, no evidence in Sixtymile district to show that any of these flows are of Recent age, and if these rocks are to be correlated with the Wrangell lavas, the later flows of those rocks are wanting in Sixtymile area.

These rocks may also be correlated with the Newer Volcanics of Upper White River district[1] and with similar flows in the Nabesna-White Rivers district,[2] and also with some andesites in the Klondike district[3]. They may also be correlated with the Chieftain Hill volcanics of Wheaton district[4] and with certain volcanics occurring in Klotassin area[5]. These correlations are made in order to show that they are by no means a local feature but are widespread throughout Yukon plateau.

Origin.

These flows are believed to be local in origin, welling up through the fissures which are now found as dykes cutting the underlying formations, and even piercing older members of the flows. There is apparently no progressive change in character between the oldest and most recent members. The flows are apparently in part synchronous with the movements of the Yukon plateau preceding its planation, but it is impossible to say whether the igneous activity is to be connected genetically with the crustal disturbances which developed as the result of that uplift. The two, however, appear to be very closely associated. The rocks occur at intervals throughout the plateau, and the age appears to coincide closely with the date of uplift. The evidence in favour of genetic connexions between the two is strong, and it is believed that the volcanic activity began with and owed its origin to the crustal deformation which culminated in the uplift of Yukon plateau previous to its planation.

RHYOLITES, QUARTZ PORPHYRIES, AND RELATED ROCKS.

Rhyolites, quartz porphyries, and granite porphyries occur at many points within Sixtymile district, but are most common in the form of dykes, though several small areas with the characteristics of surface flows were mapped. The largest of these occurs along the Boundary, a short distance south of Deep creek, forming an area a few miles broad; and of unknown length, for it was traced into Alaska. Other areas occur on the ridges to the south of Matson creek and its tributaries, Marion creek and Thompson creek. In addition, small areas occur on the ridges leading from the upper part of Matson creek to Rice dome, on the ridge lying to the north of the East fork of Rice creek, and in the vicinity of Bedrock mountain, but most of these lie across the Boundary.

---

[1] Cairnes, D. D. "Upper White River district," Geol. Surv., Can., Mem. 50, 1915, pp. 97-101.

[2] Moffit, F. H., and Knopf, A., "Mineral resources of Nabesna-White Rivers district, Alaska," U.S. Geol. Surv., Bull. 417, 1910, pp. 32-36.

[3] McConnell, R. G., "Report on the Klondike gold fields," Geol. Surv., Can., Ann. Rept., vol. XIV, 1901, pp. 26B-27B.

[4] Cairnes, D. D., "Wheaton district," Geol. Surv., Can., Mem. 31, 1912, pp. 59-64.

[5] Cairnes, D. D., "Klotassin area," Geol. Surv., Can., Sum. Rept., 1916, p. 28.

Lithological Characters.

The most abundant of these rocks, namely the quartz porphyries, are yellow and compact rocks, having very much the appearance, on the fractured surface, of a brick. They range from white, light grey, or yellow to greenish grey in colour, and when struck with a hammer break with a clear, ringing sound. The phenocrysts of quartz are dull and smoky, and the feldspars are usually decomposed. Biotite is frequently absent. The groundmass is usually aphanitic.

In thin section the rocks show quartz, alkali feldspar, lime-alkali feldspar, and occasionally biotite as phenocrysts. The quartz is developed either in rounded, corroded forms, or in perfect dihexahedral crystals. The feldspars usually exhibit good crystallographic outlines. The groundmass is microgranitic or micropegmatitic, rims of micropegmatite frequently surrounding the feldspar crystals. The accessory constituents are apatite, zircon, and iron ore. Calcite and chlorite are developed as secondary minerals. These rocks include some granite porphyries, but quartz porphyries are the most abundant.

The rhyolites are typically sugar-grained rocks, the grain being developed largely as a result of the structure. They range from dark brown to light yellow, and frequently have a greasy lustre, resembling pitchstone. Microscopically they consist of quartz, alkali feldspar, and biotite as essential constituents. The quartz occurs in rounded or corroded forms and the feldspar usually exhibits good crystallographic outlines. Both quartz and feldspar individuals are shattered and the cracks filled with glass, the interiors as well as the exteriors of the crystals being corroded. Biotite occurs as large flakes and shreds. and iron ore and zircon as accessory constituents. The groundmass is glassy and marked by a well-defined perlitic cracking; but in a few cases it is cryptocrystalline.

Evidence of hot-spring action in connexion with the quartz porphyries is very marked, and in many places large masses of these rocks have been converted into chert, an alteration found in various stages of completion. The silica first replaces the groundmass, leaving the phenocrysts of quartz and feldspar; the feldspars are next attacked and in some places the rock consists of chert, in which are the original phenocrysts of smoky quartz, the obliteration of which completes the alteration.

Some mineral springs were noted on Bedrock and Little Gold creeks. The waters are strongly carbonated and effervesce on reaching the surface. No analyses have been made of these waters, but they contain abundant iron in solution, for a reddish deposit of limonite is deposited as the waters lose their carbon dioxide. These springs may be possibly connected with the extrusion of the volcanics, and represent the last stages of expiring vulcanism.

Age and Correlations.

These rocks cut all the other consolidated formations of the district and are, consequently, later than the early Miocene, and possibly extend from the Miocene to the Recent. Evidence in other regions that they are at least preglacial[1] is lacking in the non-glacial Sixtymile area.

---

[1] Cairnes, D. D., "Portion of Atlin mining district," Geol. Surv., Can., Mem. 37, 1913, p. 102.

Many other correlations might be made. In fact, throughout Yukon there are similar rocks, which are the latest of the consolidated formations. In southern Yukon[1] and nothern British Columbia[2], they were originally subdivided into the Wheaton River Volcanics and the Klusha Intrusives, but this subdivision was without value and was consequently abandoned.[3] These rocks are found also in the Lewes-Nordenskiöld,[4] Mayo[5], and Klotassin areas[6] and in the Klondike[7], but the original place names have been dropped from the later literature.

Origin.

These rocks are believed to be local in origin. They were extruded through fissures at or near the localities where they are found, and the magma from which they were formed being highly fluid, small dykes extend for great distances.

QUATERNARY.

Superficial Deposits.

The superficial deposits of Sixtymile district consist of gravels, sands, soil, silts, muck, volcanic ash, and ground-ice, covering to varying depths much of the valleys and upland. Though most of these deposits have been formed through rock disintegration and decay, some are due to volcanic activity. The volcanic ash is developed only locally, but the ground-ice is a prominent feature and generally remains throughout the year.

The colour representing these deposits on the map is confined to the thick accumulations in the wider portions of the valleys, and is not, as a rule, extended to the valley walls or upland. This colour scheme is not strictly accurate, but has certain advantages: it limits the colour to the areas of thick accumulations, but it does not cover those portions where outcrops disclose the nature of the underlying bedrock and it shows clearly the valley systems.

The gravels, sands, and silts deposited by the present and former creeks are derived by disintegration and decay from the various rocks within the district, disintegration proceeding with greater rapidity than decay. By sliding, land creep, or by the agency of the smaller gulches, this material reaches the valleys, and accumulates faster than it can be removed. In Sixtymile valley the depth of these sediments averages about 14 feet; in Ladue valley it frequently exceeds 90 feet.

---

[1] Cairnes, D. D., "Wheaton district," Geol. Surv., Can., Mem. 31, 1912, pp. 66-72. Sum. Rept., 1915, p. 42.

[2] Cairnes, D. D., "Portions of Atlin mining district," Geol. Surv., Can., Mem. 37, 1913, pp. 67-68.

[3] Cairnes, D. D., Geol. Surv., Can., Sum. Rept., 1915, p. 42.

[4] Cairnes, D. D., "The Lewes-Nordenskiöld coal area," Geol. Surv., Can., Mem. 5, 1910, pp. 43-44.

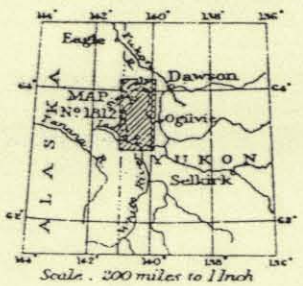
[5] Cairnes, D. D., Geol. Surv., Can., Sum. Rept., 1915, p. 13.

[6] Cairnes, D. D., Geol. Surv., Can., Sum Rept., 1916, p. 28.

[7] McConnell, R. G., "Report of the Klondike gold fields," Geol. Surv., Can., Ann. Rept. vol. XIV, 1901, pp. 27B-28B

LEGEND

QUATERNARY	RECENT AND PLEISTOCENE	Q	**Superficial deposits** *(Gravel, sand, silt, muck, volcanic ash, and ground ice)*
TERTIARY		T2	*Rhyolite, quartz porphyry, granite porphyry, with associated tuffs and breccias*
		T1	**Newer volcanics, with some sediments** *(Andesite and diabases, associated with sandstones, shales and conglomerates)*
MESOZOIC(?)	CRETACEOUS OR JURASSIC	K	**Granitic intrusives** *(Granites and allied plutonic rocks)*
	CRETACEOUS POSSIBLY IN PART OLDER		**Older volcanics** *(Andesite and diabase)*
PRECAMBRIAN (?)		A4	**Pelly gneisses(?)** *(Chiefly granite gneiss)*
		A3	**Amphibolite schists** *(Schistose amphibolites, greenstone schist and allied rocks)*
		A2	**Klondike schists(?)** *(Sericite and chlorite series)*
		A1	**Nasina series** *(Quartzite, quartz mica shists, mica schist, sheared conglomerate, graphite schist and crystalline limestone)*



GEOLOGY

SIXTYMILE AND LADUE RIVERS, YUKON TERRITORY.

Scale of Miles

5 4 3 2 1 0 5 10

Part of G.S.C. Publication No.1812, 1920

120046

To accompany: REPORT ON McFARLAND PLACER PROPERTY, SIXTYMILE AREA, YUKON by G.R.Hilchey P.Eng. February 19, 1982

REGISTERED PROFESSIONAL ENGINEER G.R. HILCHEY YUKON TERRITORY

G.R. Hilchey

PROVISIONAL MAP
115 N/15

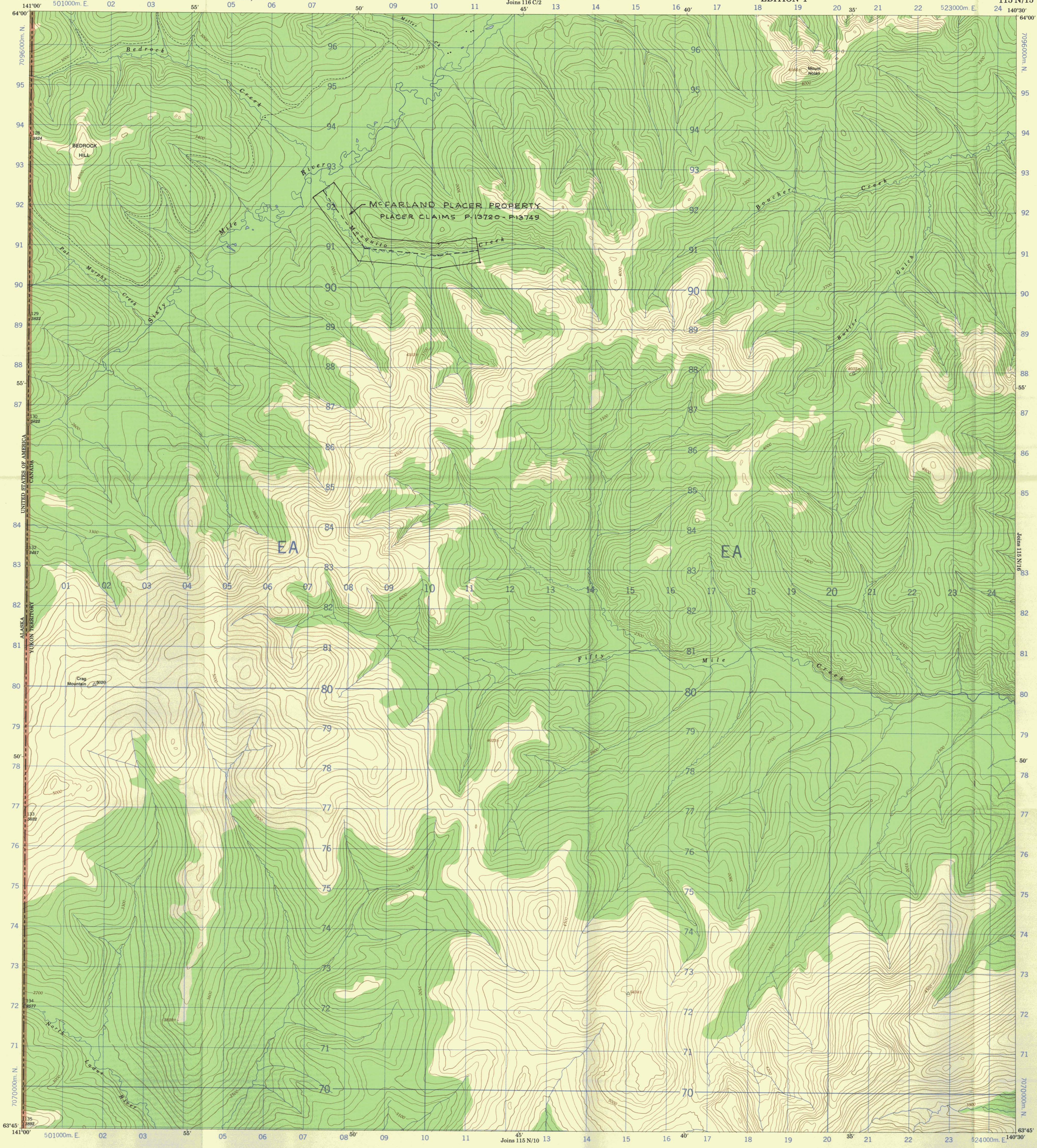
CANADA

1:50,000

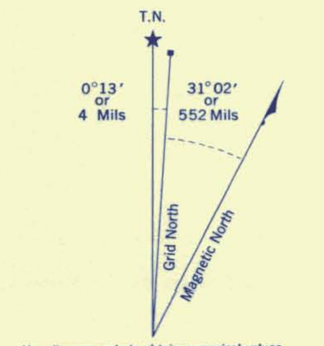
EDITION 1

CARTE PROVISOIRE
115 N/15

Refer to this map as:	115 N/15 EDITION 1 MCE SERIES A 722



CONVERSION SCALE FOR ELEVATIONS
Metres
Feet



Use diagram only to obtain numerical values.
APPROXIMATE MEAN DECLINATION 1968
FOR CENTRE OF MAP
Annual change decreasing 3.5′

ONE THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 7

GRID ZONE DESIGNATION	100,000 M. SQUARE IDENTIFICATION
7 V	EA

EXAMPLE OF METHOD USED
TO GIVE A REFERENCE TO NEAREST 100 METRES
THE FOLLOWING GRID REFERENCE IS A SAMPLE ONLY AND DOES NOT REFER TO A POINT ON THIS MAP

REFERENCE POINT	CHURCH (as above)
EASTING: Read number on grid line immediately to left of point	97
Estimate tenths of a square from this line eastward to point	5
	975
NORTHING: Read number on grid line immediately below point	98
Estimate tenths of a square from this line northward to point	4
	984

EXAMPLE MILITARY GRID REFERENCE 975984
Nearest similar grid reference 100,000 metres (about 63 miles)

Produced, 1968, by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES, from aerial photographs taken in 1961, 1965 and 1966. Field surveys 1965. Printed 1970.

Copies may be obtained from the Map Distribution Office, Department of Energy, Mines and Resources, Ottawa.

CRAG MOUNTAIN
YUKON TERRITORY

Roads: trail or portage ....
Routes: sentier ou portage ....

Scale 1:50,000 Échelle
Miles 1 — 0 — 1 — 2 — 3 Milles
Metres 1000 — 0 — 1000 — 2000 — 3000 — 4000 Mètres
Yards 1000 — 0 — 1000 — 2000 — 3000 — 4000 Verges

This Provisional Map is equivalent to a standard map in accuracy of content.

Some names on this map are not yet official. Corrections or additions are invited by the Surveys and Mapping Branch.

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

Cette carte provisoire équivaut une carte régulière au point de vue précision de l'information.

Certains noms inscrits sur cette carte ne sont pas encore officiels. La Direction des levés et de la cartographie saurait gré au public de lui signaler corrections et additions.

ÉQUIDISTANCE DES COURBES 100 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer
Système de référence géodésique nord-américain 1927
Projection transverse de Mercator

Établie en 1968, par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES, d'après des photographies aériennes prises en 1961, 1965 et 1966. Levés sur le terrain en 1965. Imprimée en 1970.

Ces cartes sont en vente au Bureau de distribution des cartes, ministère de l'Énergie, des Mines et des Ressources, Ottawa.

To accompany:

REPORT ON McFARLAND PLACER PROPERTY, SIXTYMILE AREA, YUKON by G.R. Hilchey, P. Eng.

February 19, 1982

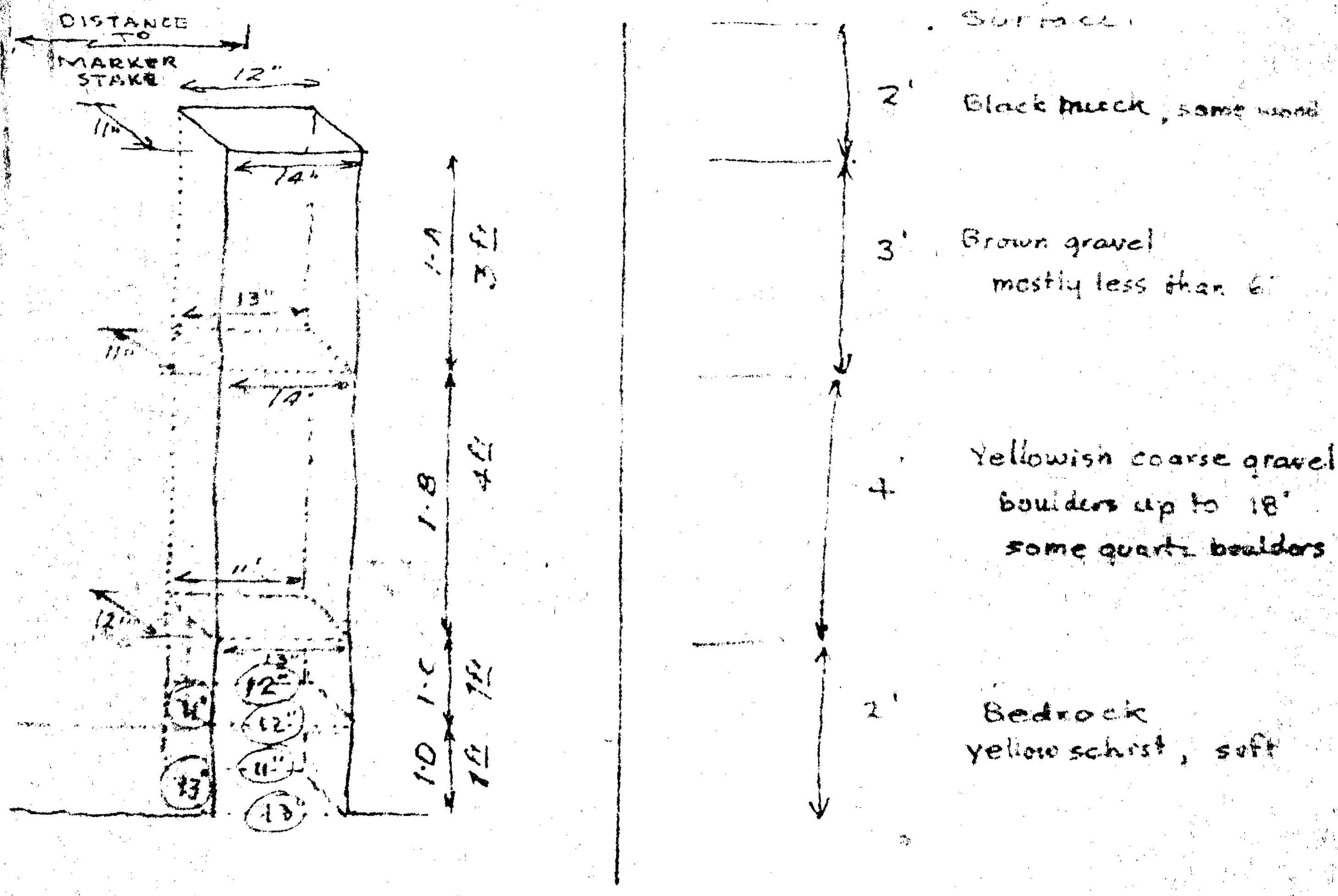
REGISTERED PROFESSIONAL ENGINEER
G. R. HILCHEY
YUKON TERRITORY

G.R. Hilchey

115 N/15
EDITION 1

120046

LINE 1 SAMPLE 1



TYPICAL SAMPLE LOG

Note: (1) All distances and measurements must be horizontal or vertical even if side of trench is sloped.

(2) Place a large piece of plywood as close to sample site as possible to catch material that falls down.