

KERR-ADDISON GOLD MINES LIMITED

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attach to
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- W.S.R.
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- B.C.B.
- P.M.K. ✓
- G.W.M.
- R.O.M.
- C.K.W.
- J.B.S.
- G.P.R.
- K.F.L.
- J.P.
- E.C.J.

To P.M. KAVANAGH. From W.M. SIROLA.
 Subject D. HAWKINS' SHAKES CREEK IRON PROPERTY. Date April 30th, 1965.

Thank you for sending the report by J.F. McIntyre on this property. Our reasons for not recording any claims on this group were that while we were fully aware of the 10 - 20% magnetite content in the pyroxenite, we had subjected samples of this mineralization both to thin section and spectrographic analysis, quite apart from having done geochemistry on the job site. Neither the thin section nor the spectrographic analysis revealed any element, except titaniferous magnetite, which could be construed to have any value whatsoever. The spectrographic analysis showed a titanium content of .7%, but subsequent chemical analysis indicated a TiO_2 content of 4.5%. To the best of my knowledge, magnetite with a TiO_2 content of 4.5% has not been utilized anywhere in the world.

Apart from this very fundamental consideration is the location of the deposit. The Stikine River, as you know, would only handle very shallow draft vessels, and would not be suitable in its present state for hauling iron concentrates. It is, of course, true that if a large tonnage, valuable deposit had been found, the transportation problem could undoubtedly be resolved in some manner.

I do not pretend to know the calibre of the people who may be financing this project, but it would surprise me if any informed person would put money into this venture in this location.

It should be borne in mind too that if the TiO_2 content of the mineralization in place is $4\frac{1}{2}\%$, then the TiO_2 content of the concentrates would be approximately three times as great.

The allowable limit for titanium in iron ores being shipped to Japan is 0.25%.

W.M. Sirola
 William M. Sirola.

WMS/iw.

J. F. McIntyre, P.Eng.
Consulting Mining Engineer

11525 - 92A Avenue
North Surrey, B.C.

April 6, 1965.

Mr. J. A. Crossie,
2146 Ottawa,
West Vancouver, B.C.

Hawkins' Shakes Creek Iron Property,
Stikine Region, B.C.

Dear Mr. Crossie:

Attached are two copies of my report on the Shakes
Creek Iron Property. I have two more copies available for you
when required.

With regard to your recent request that I offer estimates
of exploration costs for the impending season I wish to state that
I have had no time as yet in which to make detailed estimates.
Also we are considering what really amounts to the start of a very
extensive evaluation program which will require at least two, and
possibly three seasons. Hence in estimating required funds for
this year an arbitrary cut-off is involved. In addition it is
possible that the rate of expenditure may be altered as results
come in.

Accordingly I would offer the following, very rough break-
down of direct expenditures for this season, say to the end of
September:

- | | |
|---|----------|
| 1) Access road | \$25,000 |
| 2) Camp - set up and operate | 25,000 |
| 3) Geological Mapping and Surface
Sampling | 5,000 |
| 4) Geochemical Survey | 5,000 |

*no action; we found
this in 1964 &
considered its
potential economic
negative
Hawkins was
one of our crew
members on our
1964 Stikine Project
MJK
Apr. 28/65*

5) Magnetometer Survey	15,000
6) Bulldozer trenching	40,000
7) Diamond drilling	80,000
8) Laboratory test and assays	<u>10,000</u>
Total	\$205,000

No estimate of professional services or company overhead is included.

I would stress that these estimates are of necessity preliminary in nature as such costs as trenching and drilling are difficult to estimate at this time. Accordingly individual items would be expected to vary. However, I do feel that the amounts listed above are realistic and, that these sums of money can be expended usefully without waste.

Yours very truly,

(signed)

J.F.McIntyre, P.Eng.

J. F. McINTYRE, P.ENG.

SHAKES CREEK IRON PROPERTY

Telegraph Creek, British Columbia.

By

J. F. McIntyre, P. Eng.

April 3, 1965.

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J. F. MCINTYRE, P.ENG.
CONSULTING MINING ENGINEER

11525 - 92A AVENUE
NORTH SURREY, B.C.

INTRODUCTION

The Shakes Creek Iron Property is located on the north fork of Shakes Creek, 21 miles air distance west of the settlement of Telegraph Creek, British Columbia.

The property was examined on behalf of Messrs. J. A. Crossie, D. H. Hawkins and M. Buller on February 27-28, 1965. At that time the ground was covered with 4-5 feet of accumulated snow hence a geological examination was impossible. However the main purposes of the examination were to investigate the reported existence of large magnetometer anomalies on the property and to report on other features of the property which would relate to mining possibilities.

Immediately prior to the writer's visit, Messrs. Hawkins and Buller had staked the claims and conducted a systematic ground magnetometer survey over the claim area. The writer examined as much of the property as was possible on snowshoes during which time a number of ground survey points were checked, followed by a helicopter-borne magnetometer survey to check the anomalies demonstrated by the ground survey.

Outcrops are very few and widely spaced in the area of the magnetometer anomalies. Only one was seen by the writer at which point representative samples were taken.

This property is a recent discovery.

J. F. MCINTYRE, P.ENG.

ACCESS. TOPOGRAPHY. CLIMATE

Access to the Telegraph Creek area is gained by the Cassiar-Stewart gravelled highway from the Alaska Highway near Watson Lake, Yukon, to Dease Lake, British Columbia, and thence by branch road to Telegraph Creek. Both roads are maintained by the British Columbia Department of Highways and are usable year round except for short interruptions during heavy winter snowfalls.

From Telegraph Creek a narrow but useful road runs southwesterly for a distance of 11 miles to Glenora on Stikine River. No roads exist beyond this point which is approximately 16 miles distant from the property along a projected road route. No particular problems would be encountered in construction of such a road. Glenora can also be served by river boats during the open-water season and barges have reportedly been employed in the past from the Pacific coast as far upstream as this point.

Charter air services connect Telegraph Creek with Whitehorse and Watson Lake, Yukon and Terrace, British Columbia, flying time to each being approximately 2 hours. Helicopters are regularly based at Whitehorse and Watson Lake. Radio-telephone communication is available at Telegraph Creek through B. C. Telephone Company but reception is often poor.

Stikine River in this vicinity flows through a sharp canyon in a broad valley some 4-8 miles wide, flanked on either side by mountains which reach to elevations of 6,000-7,000 feet. The bench lands between the river and the mountains are fairly gentle at elevations of 1,000-1,500 feet.

Shakes Creek occupies a gentle, fairly broad valley

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and drops approximately 500 feet between Latimer Lake and the mouth of this valley in a distance of 6 miles. Above Latimer Lake the north fork of Shakes Creek rises rapidly to the property.

The claim area roughly straddles the north fork of Shakes Creek. The lower boundaries lie at about 2,500 feet while the higher are at about 4,000 feet. The magnetometer anomalies extend across the north fork of the creek and up the slopes on the north side of Mount Rowgeen and the southwest side of the unnamed mountain to the northeast. No steep or rough slopes are involved. Throughout the claims the surface has been extensively glaciated resulting in gentle, undulating slopes of the order of 10-15 degrees.

The lower, or southerly one-third to one-half of the claim area is loosely covered with fairly small spruce trees, parts of which have been burned out by forest fires. The upper portion is mainly burned out or devoid of trees. The lower valley of Shakes Creek supports a thick growth of fairly large spruce trees suitable for lumber. Ample water is available for exploration and milling and there is ample suitable land in the vicinity of Latimer Lake for extensive plant and townsite facilities.

The climate is moderate for this latitude due to the coastal influence. Winter temperatures are frequently sub-zero but are much less severe than in the areas east of Telegraph Creek. Winter snowfalls would appear moderate, judging from the amount observed this February, in a year of unusually high snowfall throughout the Province. It would appear to be entirely practical to conduct open-pit mining operations the year round.

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PROPERTY

The property consists of 56 full-size mineral claims, designated M. H. 1 to M. H. 56, held by Messrs. Crossie, Hawkins and Buller. The claims form a rectangular block approximately 12,000 feet east-west by 10,500 north-south. No Crown grants, mineral leases or fractional claims are involved.

GEOPHYSICS

Magnetometer Survey Methods

The magnetometer survey conducted by Messrs. Hawkins and Buller consisted of ground readings taken at approximate intervals of 200 feet along four of the north-south claim lines spaced 3,000 feet apart. Available time and walking conditions did not permit of closer spacing of the lines.

The instrument used was a Sharpes Model A-3, direct reading, self-levelling, self-orientating, hand-held magnetometer, employed as a vertical force magnetometer (null method) rather than as a dip needle. Hence the figures obtained are the vertical magnetic force expressed in gammas.

Temperatures were not recorded so temperature corrections have not been made. During the course of the survey the temperatures remained steady in the 0-20 degree Fahrenheit range and diurnal variations were observed to be slight. Figures shown on Figure 3 would all be in the order of 1,500 gammas higher than absolute values due to the effect of temperature, however the relative differences would remain unchanged as diurnal variations would not exceed an amount of 200 gammas, plus or minus, from the average. The writer is satisfied that the survey was conducted in an accurate and satisfactory manner for the purpose required. To this end the writer checked a number of the survey points and found the readings in satisfactory agreement.

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As it was impossible, in the time available, to check out a very large percentage of the readings taken, the writer employed the helicopter to run an airborne magnetometer check survey to check out the anomalies demonstrated by the ground survey. To this end 4 lines were flown approximately along the lines surveyed on the ground. The same instrument was used but of necessity it was employed as a dip needle (drum method). The results of this survey are in close agreement with those obtained on the ground. Hence the writer is satisfied that the ground survey is essentially correct and is worthy of the conclusions drawn from it in this report.

Additional reconnaissance surveys were conducted from the helicopter to investigate possible extensions of the anomalies (or additional anomalies) in the areas to the east and to the west of the claim block.

Interpretation

The ground survey is considered by the writer to constitute an accurate, useful reconnaissance survey of the claim block. The line spacing of 3,000 feet is too great to permit presentation of the results in the form of lines (similar to contour lines) of equal magnetic force as is customary with more closely spaced results. Rather than using this method, the values of absolute vertical magnetic force have been grouped into arbitrary categories designated in order of rising magnitude as: 1) close to background level, 2) low, 3) intermediate and 4) high vertical force.

On Figure 3 the zones of various intensities are correlated as appears reasonable. However detailed examination shows that the geological situation is far from simple, hence the correlations shown must be considered as only preliminary in nature and subject to considerable modification as further information is obtained.

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Certain facts are clearly evident. There are a series of roughly parallel zones of high magnetic force trending roughly N20°E and extending over thousands of feet of length with apparent widths of 200 to 2,000 feet. The background force is approximately 52,500 gammas while the zones designated as high are from 62,500 to 66,000 gammas. Hence the high zones exhibit vertical magnetic forces of 10,000-13,500 gammas above the normal level in the area. Intermediate zones are those of 7,500-10,000 gammas and low zones are 5,000-7,500 gammas above background.

The relative magnetic forces of the intermediate and high zones are far in excess of those attributable to sulphide zones and could scarcely result from any cause other than very significant accumulations of magnetite ($Fe_2 O_3$), a principal ore of iron.

GEOLOGY

The geology of the Stikine River area in the vicinity of Shakes Creek is reported in Geological Survey of Canada Memoir 246 (Map No. 309A). Mapping extended up Shakes Creek to within about one mile of the base of the claim group. Apparently the iron deposits were unknown. The heavy snow cover and time limitations at the time of the writer's examination precluded any attempt to examine the rocks in the vicinity of the claims, hence the immediate geologic setting is not yet known.

The rocks around Latimer Lake and extending a short distance up the south slope of Mount Rowgeen are mapped as volcanic and sedimentary rocks of Triassic age. In the general area the sedimentary rocks are described as mainly conglomerate and greywacke with minor amounts of argillite, quartzite, shale and limestone. The volcanic rocks are described as andesites,

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basalt, tuff, breccia and agglomerate of which the latter three are predominate. The series is reported to be intensely folded and sheared and intricately faulted.

Only one outcrop was seen on the claims; near the centre of claim M. H. 8. This rock is an ultrabasic intrusive rock, consisting chiefly of augite, part of which is replaced by magnetite, and minor amounts of olivine and biotite. This rock has been identified by Dr. R. M. Thompson as clinopyroxenite. No other such ultrabasic intrusions have been reported in Memoir 246. The relationship of the clinopyroxenite to the Triassic rocks is not known at this time. At this outcrop the clinopyroxenite is of medium-grained texture. Some grains of magnetite were seen up to 1/8 inch size but most are much finer. Representative chip samples were taken by the writer for a magnetic separation test and analyses. Vertical magnetic force, measured with the magnetometer at two points at this location, varied from 57,000 to 60,500 gammas.

Too little direct evidence is presently available to draw any definite conclusions regarding the geology of the deposits. However the appearance of the surface suggests that the claim area is covered by a mantle of overburden, resulting from glaciation, possibly of the order of 10-30 feet thick.

LABORATORY TESTS AND ANALYSES

The samples taken by the writer from claim M. H. 8 were subjected to magnetic separation tests at Britton Research Laboratories, Vancouver, B. C. to gain preliminary indications of magnetite content at this point, recovery and concentrate grade, at various grinds. Samples were ground to various finenesses and magnetic separations carried out, under standard conditions, in a Davis Tube magnetic separator. Concentrates were assayed for iron, sulphur and phosphorus and subjected to

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a semi-quantitative, spectrographic analysis to determine contents of deleterious or other substances.

Results of the magnetic separation tests are shown in the following table.

<u>Grind</u>	<u>Concentrate Recovery</u>	<u>Concentrate Grade</u>
100% passing (Tyler mesh)	Wt. %	% Fe
8	44.6	34.5
28	31.6	47.0
65	24.0	60.0 (by interpolation)
100	20.6	66.7

Analyses of the 100 mesh magnetic concentrate are as follows:

By assay:

Iron	66.7%
Sulphur	.005%
Phosphorus	.008%

By semi-quantitative spectrographic analysis:

(Trace quantities not shown)

Alumium	2.0%	Molybdenum	.003%
Calcium	.4%	Nickel	.2%
Chromium	.003%	Silicon	2.0%
Copper	.015%	Titanium	1.0%
Magnesium	3.0%	Vanadium	.1%
Manganese	.5%		

No conclusions can be drawn from the results of a single sample however the above results indicate very good recovery by magnetic separation. Sulphur and phosphorus contents are very low and it would appear that no very large amount of any deleterious substance is present in the rock at that location. Results of the spectrographic analysis are to be considered as semi-quantitative only and therefore only approximations. It is worth noting that the contents of titanium, nickel and

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vanadium appear a little higher than in many magnetite ores, but this should cause no worry whatever at this time.

ECONOMIC FACTORS - IRON ORE

Some discussion is appropriate at this time of several factors which normally relate to iron ore mines and the importance of these with regard to a possible iron ore mine on the Shakes Creek property.

Iron concentrates, as opposed to most other metal concentrates, sell for a relatively low price. Hence it is obvious that such factors as location, transportation distances, availability of transportation facilities and electric power costs are important from an economic point of view.

Within the coastal belt of British Columbia there are presently operating (or preparing for operation) some six or seven iron mines. All are relatively small as iron mines go. Most of the production comes from open pits and all are producing magnetically-separated concentrates for shipment to Japan. The average grade of concentrate is about 58-60% iron. None of these mines contain sufficient reserves of ore on which to base an iron smelting operation. By the same measure, none are large enough to justify construction of extensive transportation facilities, development of cheap hydroelectric power or establishment of long range community facilities much beyond the "mining camp" scale. Hence all are burdened with particularly high unit costs as regards these factors. In addition the amount of production from any one mine is small compared with any buyer's requirements and the product produced must conform rigidly to the buyer's physical and chemical specifications, as the total tonnage involved is not sufficient to justify any special or different smelting equipment or process. No single one of these mines constitutes a long term source of

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supply of major consequence to the world's iron and steel industries. In considering an iron mine on the Pacific coast these factors normally are kept firmly in mind.

Within this framework an iron mine of similarly small size, say 500-2,000 tons daily concentrate production, at Shakes Creek, would seem, at this stage, a doubtful venture. The fairly remote location, somewhat longer transportation distances, high electric power cost (if a diesel plant were used) and the relatively high mining unit costs characteristic of a small operation would each "whittle away" significant amounts of net revenue, possibly to the point where no profit could be realized.

However the magnetic anomalies on this property are very, very large. A quick glance is all that is required for one to realize that the anomalous areas are of sufficient size to be capable of containing literally immense tonnages. Hence in considering the potential of this property it is wise to approach it in the context of a property capable, as regards size, of supporting a large enough mining operation to supply the requirements of a major smelter by itself. Accordingly such an operation could justify the major expenditures on transportation, power, etc. that result in minimal costs and could justify reduction facilities tailored to its own characteristics.

Present world production of iron ores, concentrates and pellets is sufficient to meet current demands. However the rate of increase in world consumption will doubtless necessitate the development of very large reserves of additional iron during even the next decade. In addition the relative demand for high grade concentrates and pellets, which can only be produced from magnetite ores, is accelerating rapidly.

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CONCLUSIONS

The magnetometer survey, as interpreted on Figure 3, has shown the existence of five zones of high magnetic intensity. Numbered from north to south, these have the following apparent dimensions: (rounded out to nearest 100 feet)

<u>Zone</u> <u>Number</u>	<u>Average</u> <u>Width</u>	<u>Length</u>
1	1,300 feet	10,000 feet
2	600 feet	7,000 feet
3	500 feet	3,500 feet
4	400 feet	4,000 feet
5	200 feet	7,000 feet

These are obviously huge anomalies. Their magnetic intensity above the background levels, is very high, 10,000 - 13,500 gammas. Anomalies of this intensity must be due to significant concentrations of magnetite. At the sample location on claim M. H. 8 the relative magnetic intensity was 4,500 - 8,000 gammas. At this location the rock was found to contain 24% by weight of recoverable magnetite concentrate of 60% iron grade. It is only logical to expect that the zones of high intensity would represent rock with a much higher magnetite content. A figure in the order of twice that amount is suggested by the test results. While caution is necessary in extrapolating the results of a single sample location, it would be illogical not to expect that the high zones would contain considerably in excess of 24% magnetite. Intermediate zones might be expected to contain something comparable to that found at the sample location. It is worthy of note that parts of zones of intermediate intensity might be found to be rock of high magnetite content occurring under abnormally thick depths of overburden. While not definitive in itself, it is also worthy of note that while conducting the helicopter survey

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magnetic dips of 60-70 degrees were observed over some parts of the anomalies and in one location the dip was nearly 90 degrees. This would suggest the existence of relatively smaller sub-zones of very high grade. The geological attitude or attitudes of the zones of high intensity are not yet known. It is possible that these attitudes may be fairly flat, however in some places intensities vary widely within short distances. This suggests steeper attitudes.

Regardless of geological attitudes the potential tonnages under these anomalies appear immense. Any calculations at present would be highly premature. At the same time it is obvious that the Number 1 zone alone covers an area of such size that a depth of rock of only 100 feet represents a tonnage well beyond 100 millions of tons. While grade has by no means been proven and is, at present, barely indicated, it is the writer's expectation that these claims will be found to contain literally huge tonnages of rock well in excess of the 24% grade seen at the sample location on claim M. H. 8.

The near and long-range future outlooks for consumption of iron in the world are both good. Japan, in particular, has on a number of recent occasions expressed interest in purchasing quantities of iron concentrates from British Columbia of the order of 20 millions of tons annually.

The Shakes Creek Property is some 100 miles inland from salt water in Alaska. While this may seem a greater distance than tolerable for a small operation it would not represent a limiting obstacle to a large iron ore operation.

In summary, it is the writer's opinion that this property has apparently tremendous potential, is very valuable and is worthy of immediate expenditures of very large sums of money for exploration.

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The existing block of 56 claims covers the main extent of the potential iron deposits. However during the helicopter reconnaissance, less important extensions, or additional anomalies, of narrower widths were observed for some distances east and west of the claims now held. The additional claims shown in dashed outline on Figure 3 would appear to cover extensions observed by the writer. While this additional ground is of relatively low potential compared with the block now held, the additional claims nonetheless represent significant potential value well worth acquiring.

RECOMMENDATIONS

The writer recommends immediate staking, without delay, of the additional claims shown on Figure 3.

The writer recommends that a broadly based, extensive program of exploration be carried out on the property starting as soon as weather permits this year. Exploring a property of such large area and potential will obviously involve expenditures of major proportions. Individual recommendations and the aims behind each are as follows: (These are listed more in chronological order than order of relative importance.)

1.) Construction of an access road, approximately 16 miles long, from Glenora to the property roughly along the route shown on Figure 2. A rough road, passable to 4-wheel drive vehicles would be pushed-in before the ground thaws, followed by required improvements after the thaw. This would provide maximum ease and economy of access and avoid the extremely high costs of serving the program with helicopters.

2.) Establishment of a temporary "frame-and-tent" camp on the north fork of Shakes Creek, within the claim block. Should some work be decided upon for next winter,

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additional suitable camp facilities could be set up during the summer.

3.) A program of geological mapping and sampling of all rock exposures on the present claim block and additional claims, followed by geological mapping of the rocks immediately adjacent to the claims. This would provide some early information as to the grade and nature of the deposits.

4.) A fairly inexpensive geochemical survey, commencing early in the season before the patterns in the small streams become disturbed by bulldozer work, aimed at pinpointing possible concentrations of such elements as nickel, titanium, copper, vanadium, etc. within the deposits. This program might be increased if initial work yields valuable results.

5.) A closely controlled, detailed ground magnetometer survey, on 500 foot line spacings in the more interesting areas, commencing immediately after the snow is gone. This survey would provide detailed information delineating the anomalies and provide guidance for best employment of trenching and drilling.

6.) A program of bulldozer trenching on the high magnetic zones to make way for surface sampling and provide necessary understanding of the nature of the deposits which is more difficult to gain by drilling alone. The extent of this program would be somewhat dependent upon the thickness of overburden encountered.

7.) Diamond core drilling on the high zones to establish depths, grades and tonnages. Some comparison drilling using a dry rotary drilling rig would be carried out with the view of establishing the degree to which this less expensive and faster method could supplant diamond drilling. Dry drilling is also

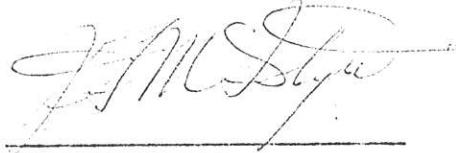
J. F. MCINTYRE, P. ENG.

practical under cold winter conditions and a program might be carried out, if desired, after diamond drilling becomes impractical.

8.) Laboratory testing of surface samples and cores to determine possible recoveries and the processing required to produce satisfactory concentrates.

9.) A preliminary survey of potential markets, possible railway access, hydroelectric power possibilities and other economic factors. This program would be deferred until early exploration results had been received.

Respectfully submitted,



J. F. McIntyre, P. Eng.

April 3, 1965.

J. F. MCINTYRE, P.ENG.
CONSULTING MINING ENGINEER

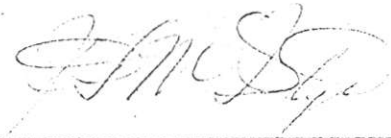
11525 - 92A AVENUE
NORTH SURREY, B.C.

CERTIFICATE

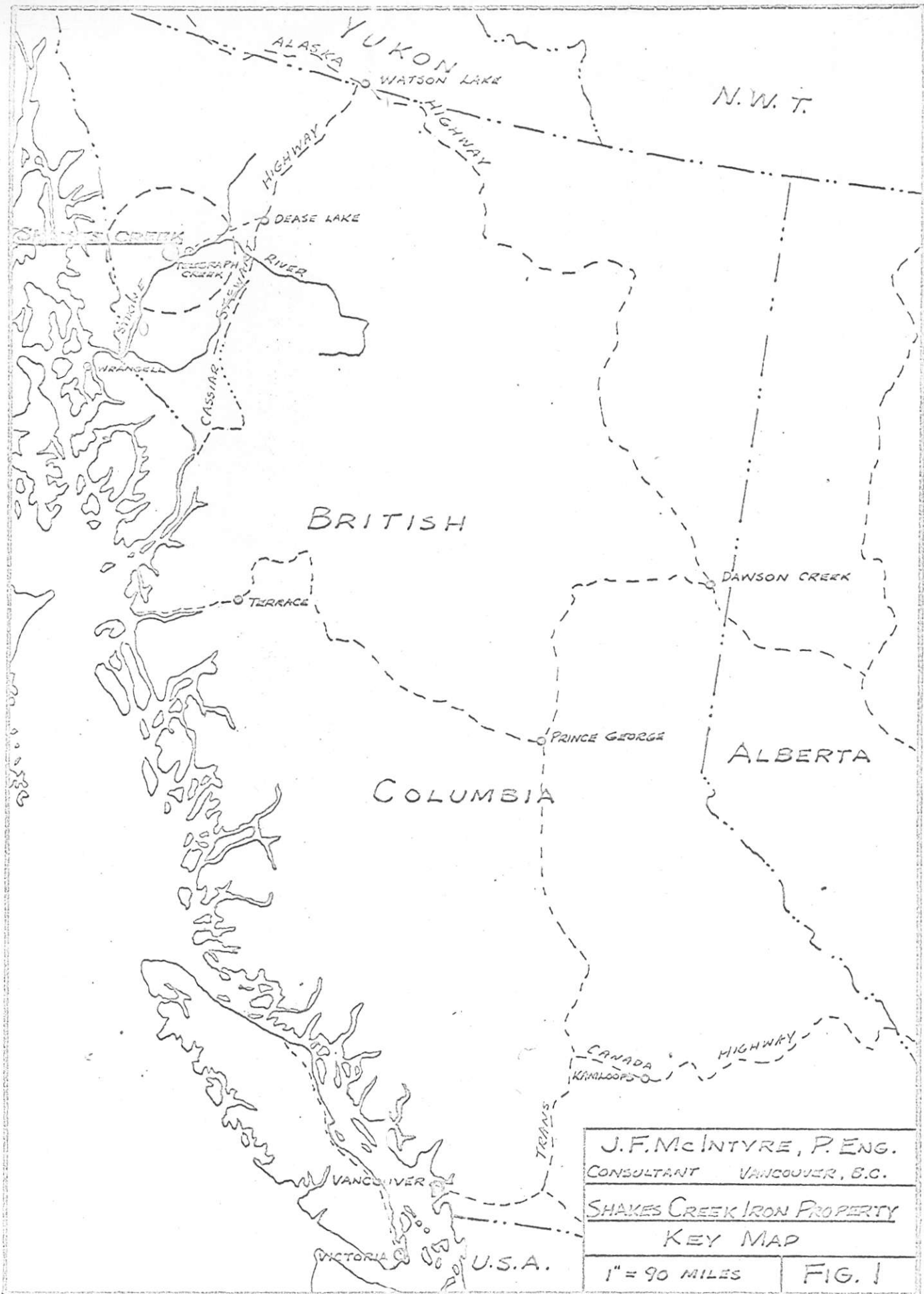
I, J. F. McIntyre, P. Eng., do hereby declare that:

- 1.) I am the holder of the degree of Bachelor of Science in Mining Engineering, and;
- 2.) I am a Registered Member, in good standing of The Association of Professional Engineers of British Columbia, and;
- 3.) I do not, nor have ever, owned any financial interest whatever, in the M. H. group of claims or in any other properties owned, singly or collectively, by Mr. J. A. Crossie, Mr. D. H. Hawkins or Mr. M. Buller and;
- 4.) I personally examined the M. H. group of claims on February 27-28, 1965 and checked, to my satisfaction, the magnetometer survey conducted by Mr. D. H. Hawkins and Mr. M. Buller, and;
- 5.) I have prepared this report from results of the above-mentioned survey, laboratory tests and my own observations, without influence by any person whomever.

Signed:



J. F. McIntyre, P. Eng.
April 3, 1965.



J.F. McINTYRE, P. ENG.
 CONSULTANT VANCOUVER, B.C.

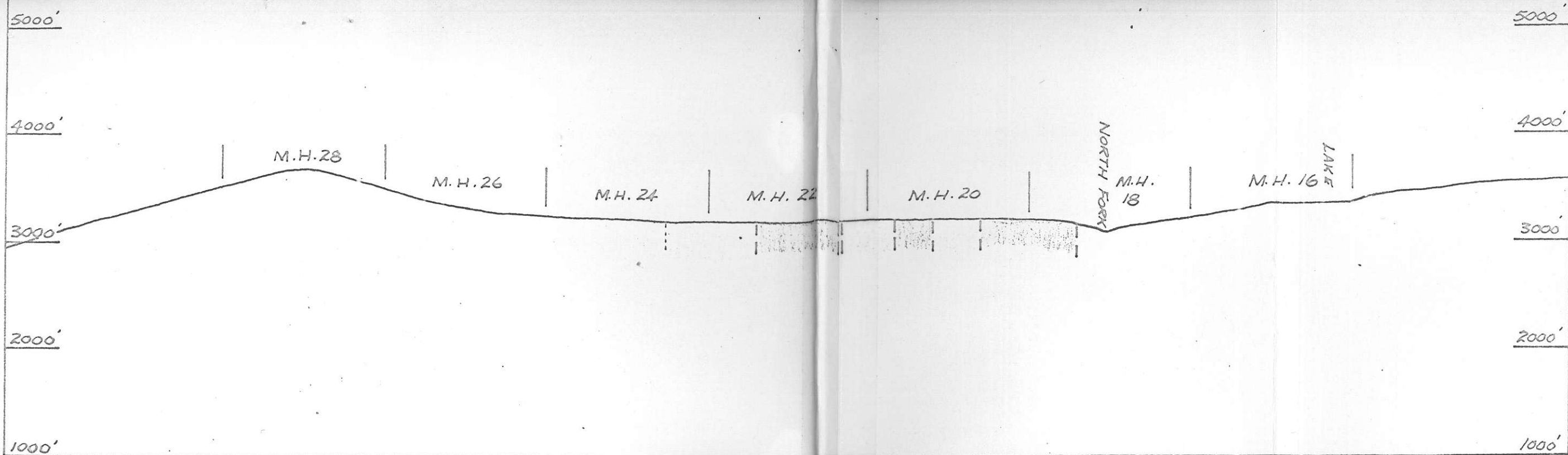
SHAKES CREEK IRON PROPERTY
 KEY MAP

1" = 90 MILES

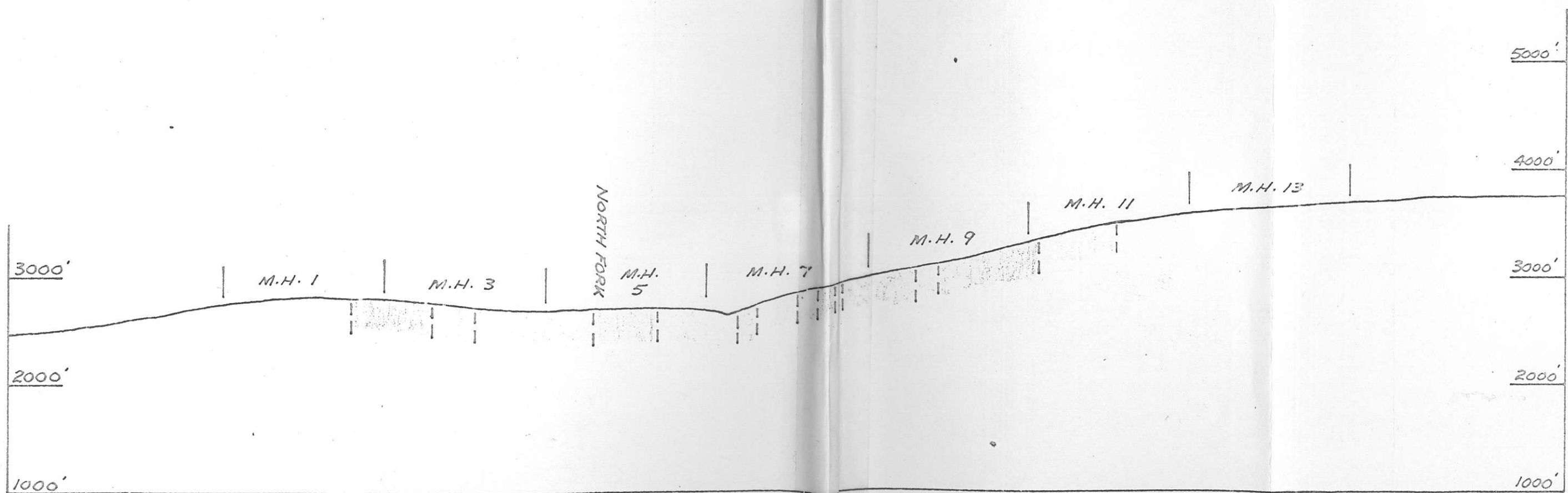
FIG. 1



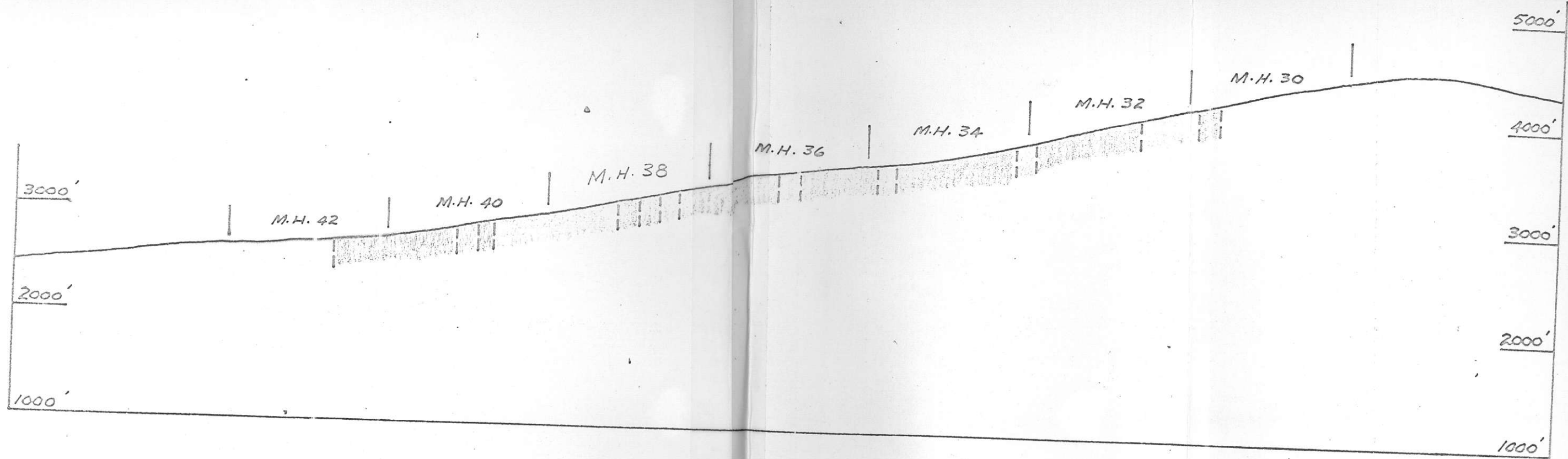
FIG. 2



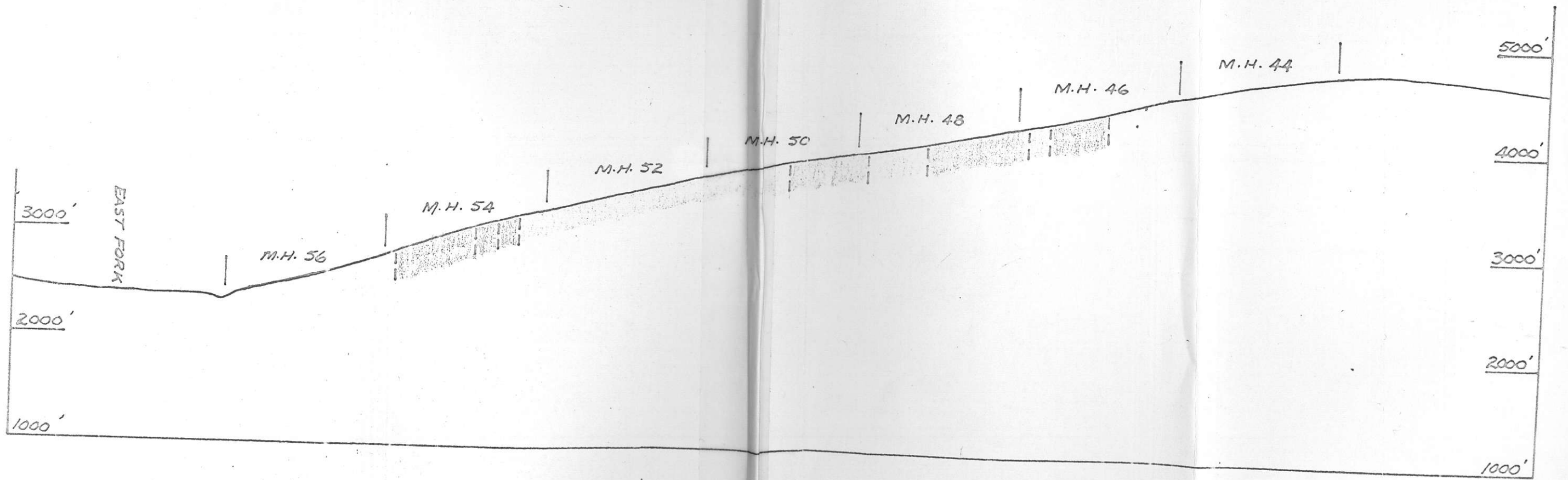
LINE 1



LINE 2



LINE 3



LINE 4

26 April 55

P.M.K.

Ralph Worlreath called re an iron deposit at
Shakes Creek (Stikine area) 21 air miles west of
Telegraph Creek. Samples of magnetite in ultrabasic
rocks 24% Fe conc. to 60% Fe with 100 mesh grind.

Largest anomaly 10000 feet long by 1300 feet wide. Owned
by ^{J.A.} Crossie, ^{D.H.} Hawkins, and ^{M.} Butler.

Archie Bell not interested because of distance from
Fidewater (about 100 miles). He thought that since Kerr
Addison might have people working in the Stikine area that
an examination might be feasible.

pm.