Combined Geophysical and Geochemical Report

Placer Leases #311-314 & 354-357
20 miles west of Radium, 50°40', 116°25' S.E.

John R. Kerr, P. Eng.
Canadian Johns-Manville Co. Ltd.

July 14 to August 29, 1969

82K09W

2006

I, John Reynolds Kerr, of the City of Kamloops, in the Province of British Columbia, HEREBY CERTIFY THAT:

1. I am a registered Professional Engineer in the Province of British Columbia.

2. I am a graduate of the University of British Columbia, with a degree of Bachelor of Applied Science in Geological Engineering (1964).

3. I am employed by Canadian Johns-Manville Co. Ltd., P.O. Box 1500, Asbestos, Quebec, as Senior Geologist. My residential address is 295 Greenstone Drive, Kamloops, B.C., and my office is located at #6 - 219 Victoria Street, Kamloops, B.C.

4. I have practised as a Geological Engineer for Canadian Johns-Manville Co. Ltd., for five years.

5. I have visited the property discussed in this report, and I have personally supervised all completed work included in the report.

6. I have personally checked the location of some of the lease posts listed in this report, and have found the posts, tags, and location lines to be in good order, and lease boundaries correctly positioned on accompanying maps.

7. The line-cutting, sampling and radioactive surveying was completed in 40 days, during the period July 14th to August 29th, 1969.

8. The costs of the survey discussed in this report are analyzed in Appendix A, and to the best of my knowledge, are correct.

Dated this 1st day of October, 1969, at Kamloops, B.C.

John R. Kerr

John R. Kerr, P. Eng.

BUGABOO PLACER DEPOSITS

FORSTER CREEK

GOLDEN MINING DIVISION, B.C.

SAMPLING AND RADIOACTIVE SURVEY

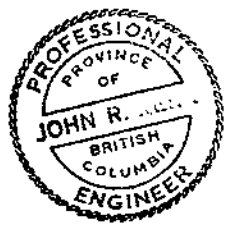
A combined geochemical and geophysical report submitted by Canadian Johns-Manville Co. Ltd. in compliance with regulations of the Placer Mining Act of British Columbia in reporting assessment work for placer mining leases.

Submitted by:

John R. Kerr

John R. Kerr, P. Eng.

SEPTEMBER, 1969



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SUMMARY AND CONCLUSIONS

Sampling of placers and a radioactive survey was completed over placer leases of Canadian Johns-Manville Co. Ltd. on Forster Creek during the summer of 1969. The purpose of the surveys was to outline zones of concentration of uranium and radioactivity as potential targets for future drilling.

Results of the survey indicate four relatively large zones of uranium concentration and radioactivity. As previous results of exploration from a limited drilling programme have indicated small zones of economic placer deposits, it is recommended that all zones found anomalous in the aforementioned survey be considered potential targets. A churn drilling programme is recommended as the next phase of exploration.

INTRODUCTION

The radioactive placer deposits and nine placer mining leases of Canadian Johns-Manville Co. Ltd. are located on Forster Creek, 18 to 22 miles west of Radium, B.C. Access to the property is possible by a logging road from Radium. Radium is on provincial highway #95 in the East Kootenays, at the headwaters of the Columbia River, approximately 500 miles east of Vancouver and 160 miles west of Calgary, Alberta. A spur line of the Canadian Pacific Railway Co. extends from Golden to Cranbrooke, through the East Kootenay Valley passing through Radium.

The radioactive placer deposits are in the well developed U-shaped valley of Forster Creek, at elevations between 4000 and 5000 ft. above sea level. Forster Creek drains the Purcell Mountain Range, with elevations of mountain peaks from 9,000 to 10,000 ft. above sea level. The headwaters of two main tributaries are fed by glaciers. The material on top of the valley floor consists of glacial outwash and morraine, overlain by recent placer alluvium up to depths of 50 ft. Sixty to eighty percent of the material within the placer deposits is derived from the 56 sq. mi. quartz-monzonite Horsethief Batholith. Earlier investigations have indicated that the batholith is radioactive with uneconomic grades of uranium throughout. Erosion, deposition and concentration of the quartz-monzonite rock is believed to be the source of radioactivity and uranium values in the placer deposits.

The climatic conditions are moderate in the area of the leases. Invermere, 30 miles to the southeast, has a mean annual precipitation of 11.76 inches. The total precipitation is considerably more in the mountains. Snow is permanent on some of the mountain peaks. At the elevations of the placer leases, snowfall commences in October, and snow is generally gone by late May. During the winter months, December to April, a ground cover of 3 to 4 ft. of snow can be expected during most years.

It is not known when radioactivity was first discovered in the placer deposits on Forster Creek. The Canada Research Council did some investigations in 1948-1949 on Forster Creek, Bugaboo Creek and Vowell Creek. Reports of sand

on Bugaboo Creek indicated a content of 0.21% U_3O_8. Quebec Metallurgical Industries and St. Eugene Mining Corporation located several placer leases on all three creeks in the period from 1953 to 1955. St. Eugene Mining Corp. sold their interest to Quebec Metallurgical Industries in 1954. On Forster Creek, Quebec Metallurgical Industries undertook a small churn drilling programme, and outlined a small economic deposit. The leases were permitted to lapse in the late 1950's and early 1960's.

The placer deposits lay idle until September, 1968, when a Canadian Johns-Manville crew, under supervision of the writer, located four leases on Forster Creek. Five additional leases were located in February, 1969. During July and August of 1969, a grid was established over the entire potential placer area. Samples of the placer material were obtained across an average width of 300 to 400 ft., maximum of 1000 ft., and analyzed geochemically for uranium. Scintillometer readings were obtained at all sample points. As it will be indicated through the text of the report, the geochemical and radioactive interpretations serve as very useful guides in outlining zones of concentration of uranium on the surface of the placers.

The writer acknowledges the work of a capable three and four man party, headed by J. E. Binnie, senior field assistant for Canadian Johns-Manville Co. Ltd. Appreciation is extended to the Exploration Department of Canadian Johns-Manville Co. Ltd., headed by H. K. Conn, Exploration Manager, and E. L. Mann, Chief Geologist, for their advice and assistance whenever necessary. Special thanks is given to F. D. Forgeron, Bondar-Clegg and Co. Ltd., who assisted in early stages of sample collection, and who offered advice and assistance throughout the programme. Bondar-Clegg and Co. Ltd. analyzed all samples.

The total cost of the survey, including geochemical work, scintillometer survey and line-cutting is $4781, or $485 per line mile for 9.9 line miles of grid. A breakdown of costs is shown in Appendix A.

GENERAL GEOLOGY

Two quartz-monzonite batholiths (the Horsethief Batholith at the head of Forster Creek and the Bugaboo Batholith at the head of Bugaboo Creek) intrude late Precambrian rocks of the Horsethief Group and Purcell Formation.

Material from the quartz-monzonite batholiths comprises 60 to 80% of the placer deposits. The quartz-monzonite is a coarse-grained, pink and white granitic rock, with large crystals of orthoclase and plagioclase. The rock almost appears pegmatitic in part, with crystals of feldspar up to and exceeding $\frac{1}{2}$" in diameter.

The remaining 20 to 40% of the placer material is composed of rocks of the Horsethief Group and Purcell Formation.

Valleys in the area are large U-shaped valleys, scoured out by valley glaciers during the later glacial ages. Retreating glaciers left glacial tills on the valley floors, with morraines, mainly along the sides of the valley floors.

Recent erosion and deposition of the batholith material has given rise to placer deposits across valley floors up to 1000 ft. in width. On Forster Creek, within the lease area, at least four zones of placer material are considered to be of sufficient volume to be of economic significance.

The source rock of uranium and radioactivity is believed to be the quartz-monzonite batholiths. Very low, uneconomic grades of uranium have been analyzed within the rock. Uranium-bearing minerals collect and are deposited with the heavier minerals in the placers. Subsequent sorting and concentration give rise to potential economic grades of uranium. A high content of magnetite, niobium and rare earth minerals is also associated with placer zones.

GRID CONTROL

A 3.4 mile baseline was established by transit along the river bed. Lines were turned off by transit at 400 ft. intervals, and cut by picket and chain methods the full width of the valley floor. A total of 6.5 line miles of grid lines were cut. See Appendix A and Appendix B for grid layout.

PLACER SAMPLING

Samples of the gravels and sands were taken along all lines at 50 ft. intervals where possible. Along the river banks and bars, samples were collected by hand. Where the placers are overlain by overburden, organic material and vegetation, a gasoline driven power auger, 3½" in diameter, was used to collect the sands. Depths of 7 to 8 ft. were obtained with this unit. The unit is a combined auger - power saw, manufactured by Stihl Ltd. Drilling through the organic layers was very satisfactory to the depths required. It is believed that deeper penetration would not be possible.

The unit failed through material comprised largely of pebbles and rocks greater than 2" in diameter. Several attempts were made to drill through 2 to 5 ft. of valley wall talus to obtain a sample of the underlying placers. The auger would not penetrate more than 1 ft. through this material.

Approximately 300 to 400 ft. of the potential placer width is overlain by valley wall talus, and therefore was not sampled.

Samples were collected by J. Binnie, an experienced field assistant. He has been under the employ of Canadian Johns-Manville Co. Ltd., intermittently since 1962, and is fully versed in the field of sample collection. Samples were analyzed geochemically for uranium by Bondar-Clegg and Co. Ltd., Vancouver, B.C., bonded assayers and geochemical analysts. Results were reported in parts per million uranium.

It was felt that geochemical analysis was sufficient for the purposes of outlining concentrated zones of uranium. This was mainly an economic decision, as the cost of assays versus geochemical analysis for uranium is $10.00 for assay and $2.00 for geochemical analysis. It is believed that the high concentrations of uranium will be at the bottom of the placers, and the values on the surface will only give a reflection or relation to what lies beneath.

Samples collected in swamps were taken from depths of 5 to 8 ft. It was necessary to penetrate a deep organic layer. In all samples collected, the material was from the placers. However, because of the nature of the spiral type auger used, contamination of the organic layer was experienced in retrieving

the sample. The organic material was sorted as well as possible by hand, however, some organic material would be left in the sample. It is believed that organic material will contain biogenic concentrations of uranium, thus giving rise to high results. As samples collected from swamps give results of both high and low values, it is believed that the uranium content is still a reflection of the underlying values, and therefore sample results were included in the interpretation.

Sample results were plotted on a 1":200' scale plan of the grid, at the sample location (see Appendix C). An arbitrary isograd of 10 parts per million uranium was interpreted to illustrate zones of uranium concentration in the grid area.

It must be noted that geochemical analysis is not a quantitative analysis, since:

1. Only the -80 mesh fraction of the sample was analyzed.
2. Only a portion of the uranium was extracted from the -80 mesh fraction by nitric acid and analyzed by fluorimetric methods.

Therefore, results cannot be related to economic values.

SCINTILLOMETER SURVEY

Two radioactive readings were taken with a Scintrex scintillometer, Model BGS-2, at all sample points. Readings are expressed in counts per second:

1. Taken with the scintillometer at waist level.
2. Taken with material placed alongside the scintillometer intake. On bars and river banks, the scintillometer was placed on top of the sample point. Where drilling was accomplished, the scintillometer was held at the top of the hole.

It was hoped that the difference between the two readings may be related to the geochemical analysis. Correlation was not apparent, thus results are not used in interpretation.

Readings taken with the scintillometer at waist level were plotted on a 1":200' scale plan of the grid (see Appendix D). An arbitrary isograd of 100 c.p.s. was interpreted to illustrate zones of radioactive concentration.

It must be noted that two factors will give rise to spurious impressions of the interpretation:

1. Readings taken along or near the river banks are higher than normal, due to direct exposure of the placer material.
2. Readings taken over swamps are low due to the masking out of radioactivity by water.

DISCUSSIONS AND RECOMMENDATIONS

Four areas of interest have been derived from the results:

1. 10+00 to 18+00E
   A width of 100 ft. is indicated by geochemical interpretation and 300 ft. is indicated by radioactive interpretation.

2. L24+00E to L36+00E
   A width of 200 to 400 ft. is indicated by geochemical interpretation, and 700 ft. by radioactive interpretation. The radioactive interpretation may indicate one area from 10+00 to L36+00E, however, width of the valley floor on L12+00E and L16+00E is narrow.

3. 164+00E to L108+00E
   Geochemical interpretation indicates width of 500 to 800 ft. As swamps cover much of this area, the widths of radioactive zones are disregarded. Part of this zone was drilled by Quebec Metallurgical Industries in 1955.

4. L124+00E to L164+00E
   A width of 300 to 400 ft. is indicated by geochemical interpretation and 400 to 500 ft. by radioactive interpretation. Again, swamps interfere with the radioactive interpretation.

Since small blocks of economic placers had been blocked out previously by a limited drilling programme, and at such a time when uranium, niobium, and rare earth values were lower than today's values, and since zones of concentrated uranium and radioactivity are definitely apparent, it is recommended that drilling be undertaken, initially to ascertain if economic grades could be realized in order to block out large volumes of economic gravels.

The initial programme would entail one or two drill holes on all sections within anomalous zones. This would involve 30 to 50 holes with an approxi-

mate average depth of 30 ft. Drilling should be undertaken with a machine capable of collecting 90 to 100% of the gravel materials, with devices to ensure exact footages of the samples collected, to prevent contamination from overlying material and surface debris, and to restrict the use of additives and mud that may possibly contaminate the sample.

APPENDIX A

COST ANALYSIS

Grid Layout

40 man days at $23.00/day	$920	
20 man days at $29.00/day	$580	
14 man days at $19.00/day	$266	
		$1766

Sampling and Scintillometer Survey

40 man days at $23.00/day	$920	
20 man days at $29.00/day	$580	
		$1500

Sample Analysis

617 samples at $2.00/sample	$1234

Interpretation of Results and Report Preparation

5 man days at $29.00/day	$145	
3 man days at $40.00/day	$120	
1 man day at $16.00/day	$ 16	
		$ 281

TOTAL	$4781

N

LEGEND

- 100 C.P.S. — Area of concentration of radioactivity greater than 100 c.p.s.
- Grid line, reading station, & reading of scintillometer cycles per second
- Access Road
- Location posts for leases
- Forster Creek
- Small pond, or swamp, with appreciable water
- Marshy ground

Radioactivity was measured at all sample points with a Scintrex Scintillometer, Model BGS-1. Readings were taken with the scintillometer held at waist level at all points.
Radioactivity is naturally high over the river, where gravels are exposed on surface. Readings are low over swamps & wet ground, where radioactivity is masked by water.

CANADIAN JOHNS - MANVILLE CO. LTD.
KAMLOOPS, B. C.

BUGABOO

PLACER DEPOSITS PROJ. 403

(FORSTER CREEK)

RADIOACTIVITY INTERPRETATION

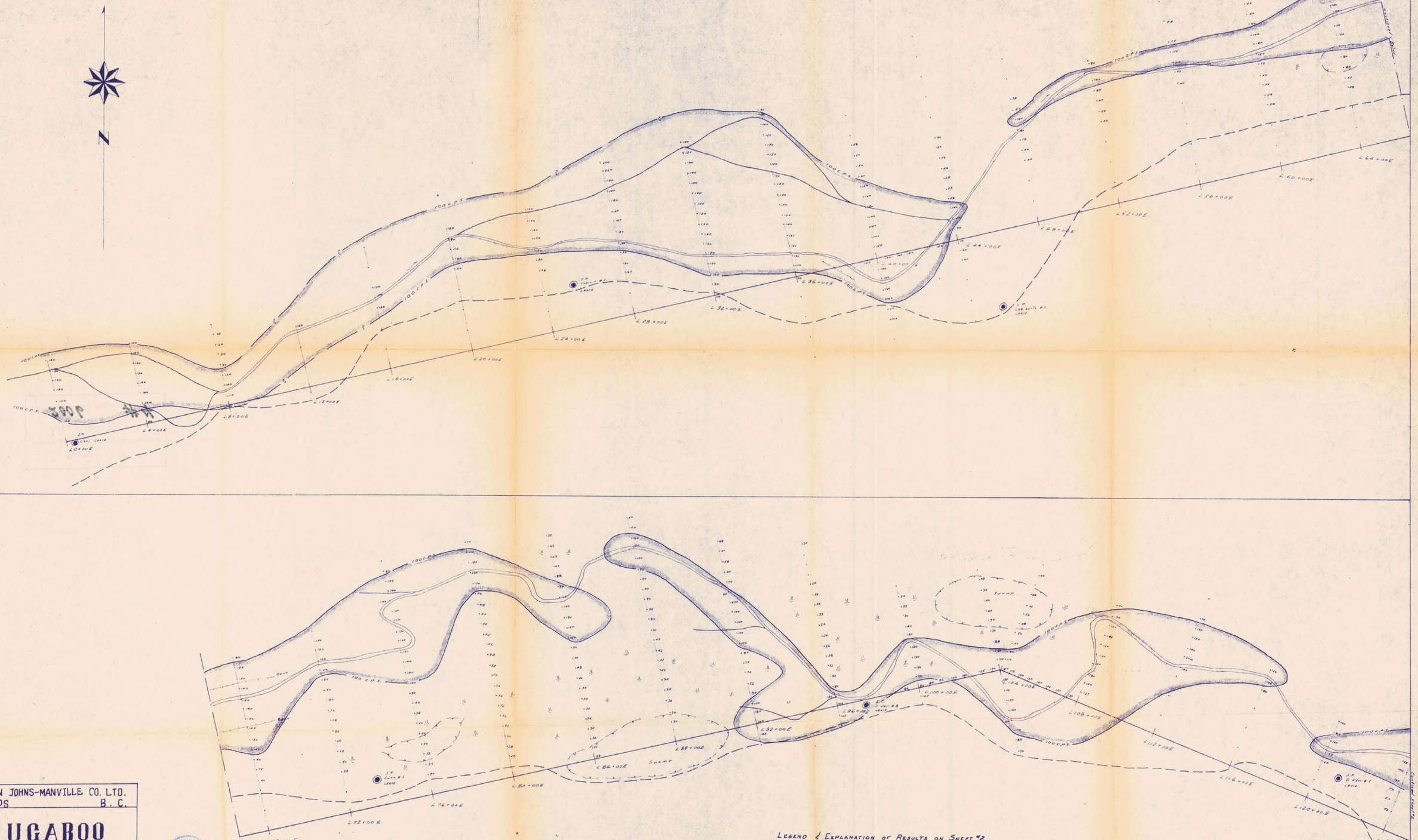
Drawn : C. Choi	Date : Sep./69	Scale : 1" : 200'

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA JOHN R. KLOO

John R. Kloo

2006

SHEET #2



CANADIAN JOHNS-MANVILLE CO. LTD.
KAMLOOPS B. C.

BUGABOO

PLACER DEPOSIT PROJ. 403
(FORSTER CREEK)

RADIOACTIVITY INTERPRETATION

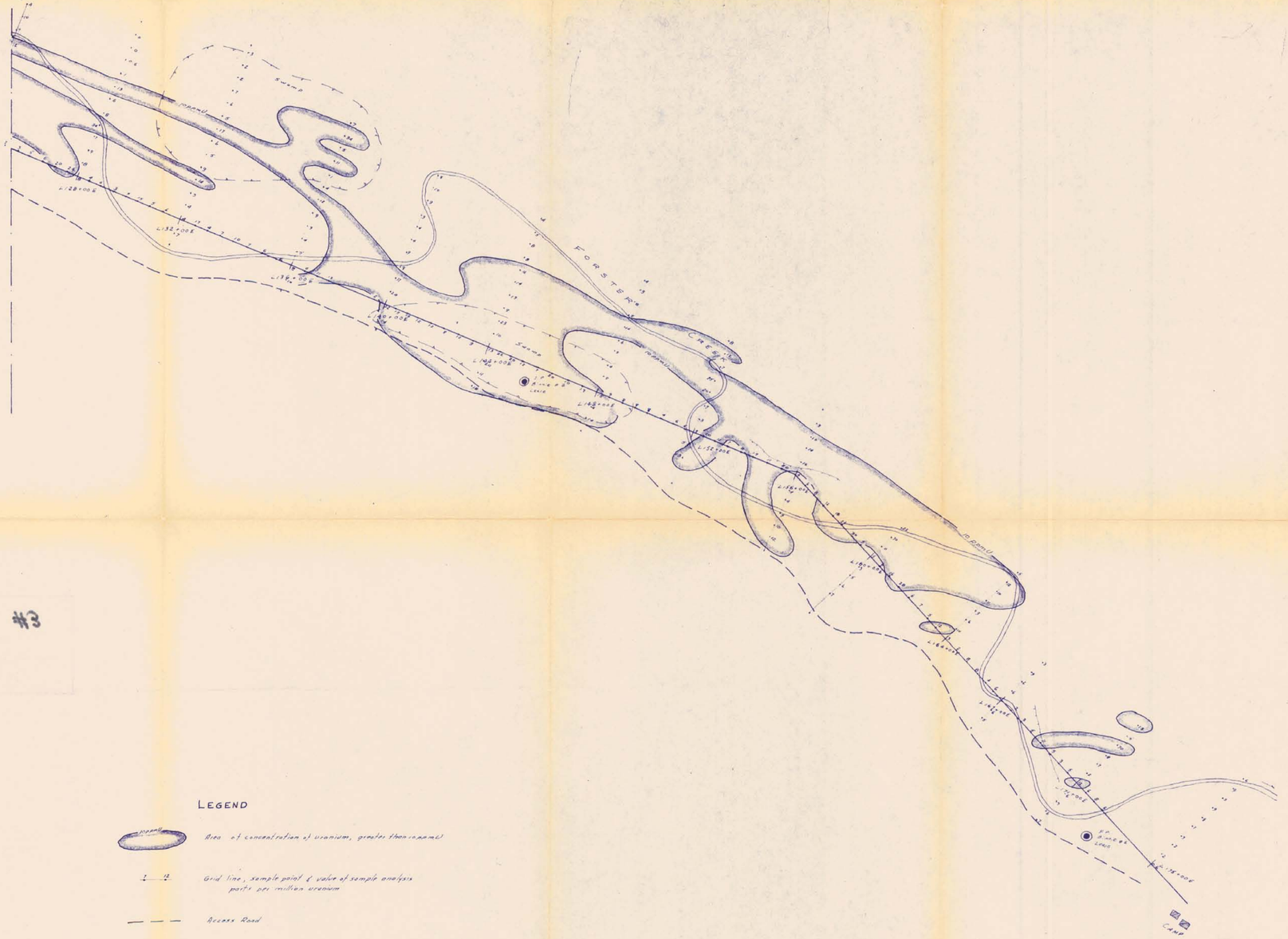
Drawn: C. Choi	Date: Sep/69	Scale 1" : 200'

LEGEND & EXPLANATION OF RESULTS ON SHEET #2

2006

SHEET #1

5006 #3



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LEGEND

- Area of concentration of uranium, greater than 10 ppm U
- Grid line, sample point & value of sample analysis parts per million uranium
- Access Road
- Location posts for leases
- Forster Creek
- Small pond, or swamp with appreciable water
- Nearby ground

Samples of sand & gravel were taken from the top of uranium bearing placer deposits. Where sands were not readily available along bars and river banks, a power driven post hole auger was employed to obtain a sample (maximum of 8' in swamps). 200-400 feet of the placer width are covered by valley wall talus & debris. It was impossible to drill through this material.

Samples were geochemically analysed for uranium, results expressed in parts per million uranium (ppm U). It is important to note that this is not a quantitative analysis as:

1) Only a portion of the uranium is extracted from the sands for fluorometric analysis
2) Only the -80 mesh fraction of the sands are analysed

Interpretation indicates relative concentrations of uranium on the surface of the placers.

CANADIAN JOHNS - MANVILLE CO. LTD.
KAMLOOPS, B. C.

BUGABOO

PLACER DEPOSITS PROJ. 403

(FORSTER CREEK)

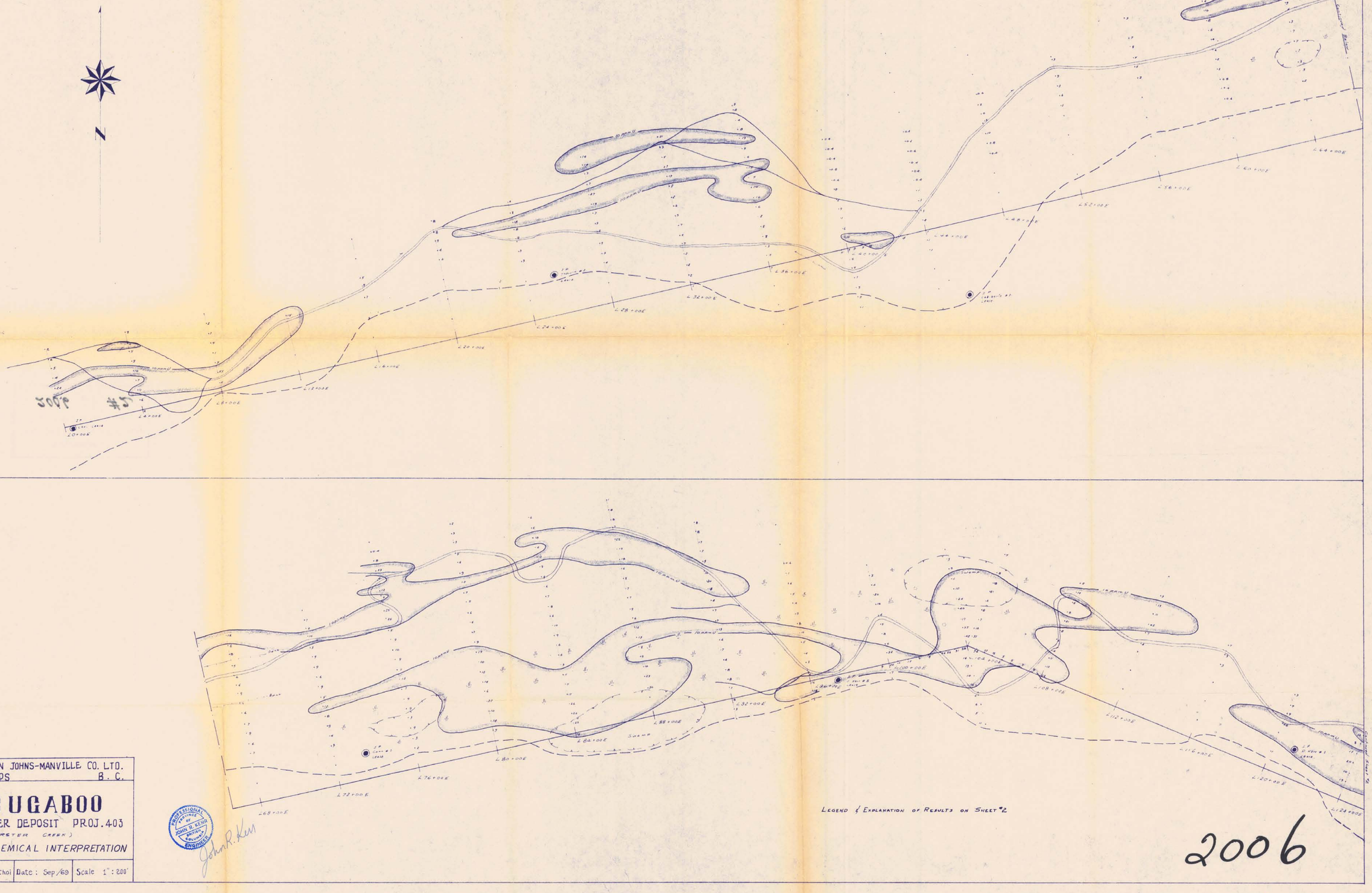
GEOCHEMICAL INTERPRETATION

Drawn : C. Choi	Date : Sep./69	Scale : 1" : 200'

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA JOHN R. KERR

John R. Kerr

2006



CANADIAN JOHNS-MANVILLE CO. LTD.
KAMLOOPS B. C.

BUGABOO

PLACER DEPOSIT PROJ. 403
(FORSTER CREEK)
GEOCHEMICAL INTERPRETATION

Drawn: C. Choi	Date: Sep/69	Scale 1" : 200'

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA JOHN R. KEAR

John R. Kerr

2006

SHEET #1

MALLOTS CRK.

VOWELL CRK.

BUGABOO CRK.

TEMPLETON CRK.

FRANCES CRK.

GEIGERICH CRK.

Bugaboo Batholith

EAST CRK.

FORSTER CRK.

Horsethief Batholith

RORY CRK.

HOWSER CRK.

STOCKDALE CRK.

HORSETHIEF CRK.

N

BC

Property

1: 400 mi.

John R. Kerr

LEGEND

Qtz Monzonite & Granodiorite Intrusions

Sample location - reference no.
Scintillometer rdg. (+RR/hr)
Heavymet analysis (ppm Cu)
Panned grain analysis (ppm Au)

Basalt

Placer Leases
Locators name
Scintillometer rdgs. at linear peak

CDN. JOHNS-MANVILLE CO. LTD.
KAMLOOPS, B.C.

BUGABOO PLACER DEPOSITS

Lease Location

Stream Sediment Survey

Scale 1" = 1 mile | Dr. J. Kerr | Date: Sept. 1968

2006