14652

GEOLOGICAL ASSESSMENT REPORT

ON THE

CRESCENT 1,2,3 CLAIMS

NIOBIUM - TANTALUM PROSPECT

NELSON MINING DIVISION
SOUTHEASTERN BRITISH COLUMBIA

NTS 82F/5E

LATITUDE: 49°28'N
LONGITUDE: 117°36' W

BY

C. GRAF
November 1985

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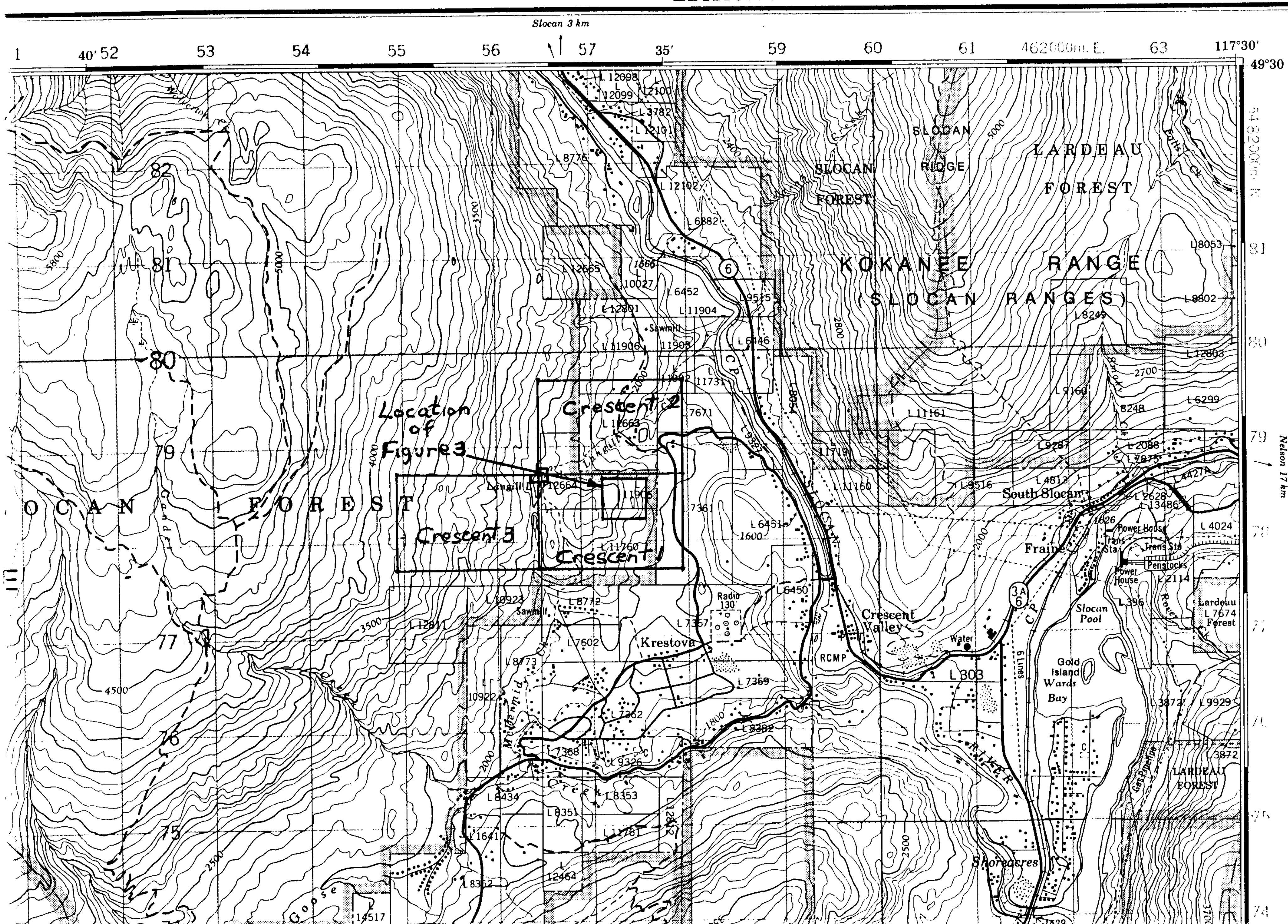
SUMMARY

The Crescent claims are located on NTS Map 82F/5E in the Slocan Valley of southeastern British Columbia. They cover niobium-tantalum bearing greisen and pegmatite zones in the cupola of a syenite body that has intruded an older gneiss unit. Black niobium-tantalum-titanium bearing oxide minerals are dispersed throughout the pegmatite-greisen zones, generally as minute grains in feldspar crystals. Occasionally larger niobium minerals up to 2 cm across occur interstitial to quartz, muscovite and feldspar. They are thought to have formed from the parent syenite magma during differentiation of the greisen-pegmatite phases.

A limited amount of rock sample assaying returned generally low (<.1%) niobium-tantalum values, the highest being 1.25% Nb_2O_5 and .14% Ta_2O_5. Electron microprobe analysis showed the black oxide minerals to contain high Ti and Nb content. These high values of Ti & Nb, as well as corresponding low values in most other elements such as the REE, Y, alkalis, etc., indicate the main black minerals to be ilmenorutile or niobian rutile.

Further rock, soil and stream silt sampling should be undertaken on the claims to search for other, possibly larger and higher grade, mineralized greisen-pegmatite zones. Cobra drllling may be necessary to properly sample the extremely hard, siliceous rock which hosts the mineralization.


Slocan 3 km
Location of Figure 3
Crescent 1
Crescent 2
Crescent 3
SLOCAN FOREST
SLOCAN RIDGE
LARDEAU FOREST
KOKANEE RANGE
(SLOCAN RANGES)
South Slocan
Fraine
Crescent Valley
Krestova
Langill
Sawmill
Radio 130'
RCMP
Water
Power House
Trans Sta
Penstocks
Slocan Pool
Gold Island
Wards Bay
Shoreacres
Lardeau Forest
Nelson 17 km
462000m. E.
117°30'
49°30
40'
35'

CLAIMS INFORMATION

The property is in the Nelson Mining District and consists of three mineral claims; Crescent 1 (6 units), Crescent 2 (6 units), and Crescent 3 (6 units). They are located 4 kilometers northwest of the town of Crescent Valley at Latitude 49° 28', Longitude 117° 36' on NTS Map 82F/5E. The anniversary date of all 3 claims is March 5, 1985.

	Record Number	Size	Date Recorded
Crescent 1	4021	2S3E	5 March 1985
Crescent 2	4022	2N3E	5 March 1985
Crescent 3	4023	2S3W	5 March 1985

LOCATION AND ACCESS

The property lies on the west side of Slocan River, 7 km northwest of the Slocan River - Kootenay River junction and four kilometers northwest of the town of Crescent Valley in southeastern B.C.. A paved road crosses the eastern boundaries of the Crescent 1 and 2 claims and numerous old logging trails occur on the claim group.

The topography is gentle with elevations ranging from 1800 to 3000 feet above sea level. Second growth fir and pine trees cover most of the claims, but outcrop is extensive. An adequate supply of running water for diamond drilling occurs on the claims near the main showings.

Both the Canadian Pacific Railroad and #3 Trans Canada Highway cross the Slocan River at its junction with the Kootenay River, 8 km from the claims. Cominco's Trail smelter lies 45 kilometers south in the Kootenay-Columbia Valley.

REGIONAL GEOLOGY

The area underlain by the Crescent claims has been mapped by the Geological Survey of Canada (Map 1090A) and published in G.S.C. Memoir 308. On the 1:250,000 Scale Map (1090A) which accompanies the memoir, the entire claims are shown to be underlain by porphyritic granite of the Nelson Batholith. Other rock types in the adjacent area, off the claims, are shown as early Mesozoic augen gneiss and hornblende-biotite-feldspar-gneiss, as well as bodies of Valhalla granite and pegmatites. In general, Nelson plutonic rocks predominate east of the Slocan River, Valhalla plutonic rocks are to the west and gneiss outcrops in a belt 6 to 10 km wide north of the claims along the Slocan Valley.

Property Geology

Although GSC Map 1090A shows the Crescent claims to be entirely underlain by Nelson plutonic rocks (granite), the predominant rock type on the property is gneiss and augen gneiss. On the north slope of the bare topped hill, in the center of the Crescent 1 claim, the gneiss has been intruded by pegmatitic syenite, pegmatites and small greisen-like zones. Two of the larger quartzose pegmatite-greisen bodies outcrop on the north slope of the hill and measure 20 m by 30 m and 8 m by 30 m, respectively.

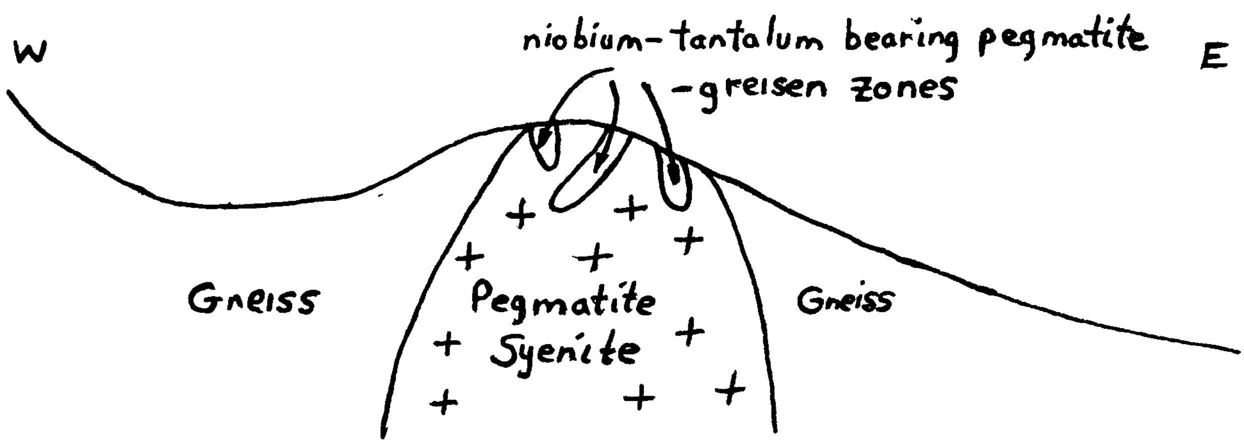


FIGURE 2

IDEALIZED GEOLOGIC CROSS SECTION OF CRESCENT 1 CLAIM

The pegmatitic syenite consists predominantly of coarse-grained feldspar with minor quartz and muscovite and contains blocks of gneiss. A large part of this syenite has been sheared and is reddish colored. Some quartz pods are isolated in the syenite, but others occur together in areas tens of meters across. The two largest such areas, previously decribed, contain niobium-tantalum oxide minerals and are of economic interest.

These quartzose pegmatite or greisen zones contain black niobium- bearing oxide minerals and large blocks of muscovite and potassium feldspar. The largest zone (8 m by 30 m) has a trench blasted across it, but the rock is extremely hard and difficult to chip-sample properly. The black niobium minerals generally are randomly disseminated as minute grains in feldspar; however, several solid chunks 5 cm across also occur. The black minerals are very fine-grained and difficult to see with a hand lens, but are indicated by red colored patches in feldspar and by gamma radiation detectable by spectrometer. Buff feldspar changes to brick red and reddish brown color in areas containing black niobium minerals. Only minor amounts of these minerals occur in quartz or muscovite; however, it appears that all minerals were deposited together in the cupola of the syenite body from differentiated magmatic fluids enriched in niobium-tantalum minerals. (Figure 2.) The niobium-tantalum-bearing minerals are tentatively identified as ilmenorutile or niobian rutile. (Appendix II.) The syenite body probably belongs to the younger Valhalla intrusions.

Mineralization and Geochemistry

Economic interest in the Crescent claims is for niobium-tantalum bearing minerals contained in the quartzose greisen pegmatite bodies. These mineralized zones formed in the cupola of a syenite body that was intruded into a gneiss country rock. (Figure 2.) The niobium-tantalum minerals are formed from magmatic fluid by a process of differentiation and concentration of metal rich volatile phases, in the roof of the intrusive body. This process is well understood regarding tin mineralized granites. However, in this case the minerals are niobium tantalum, and

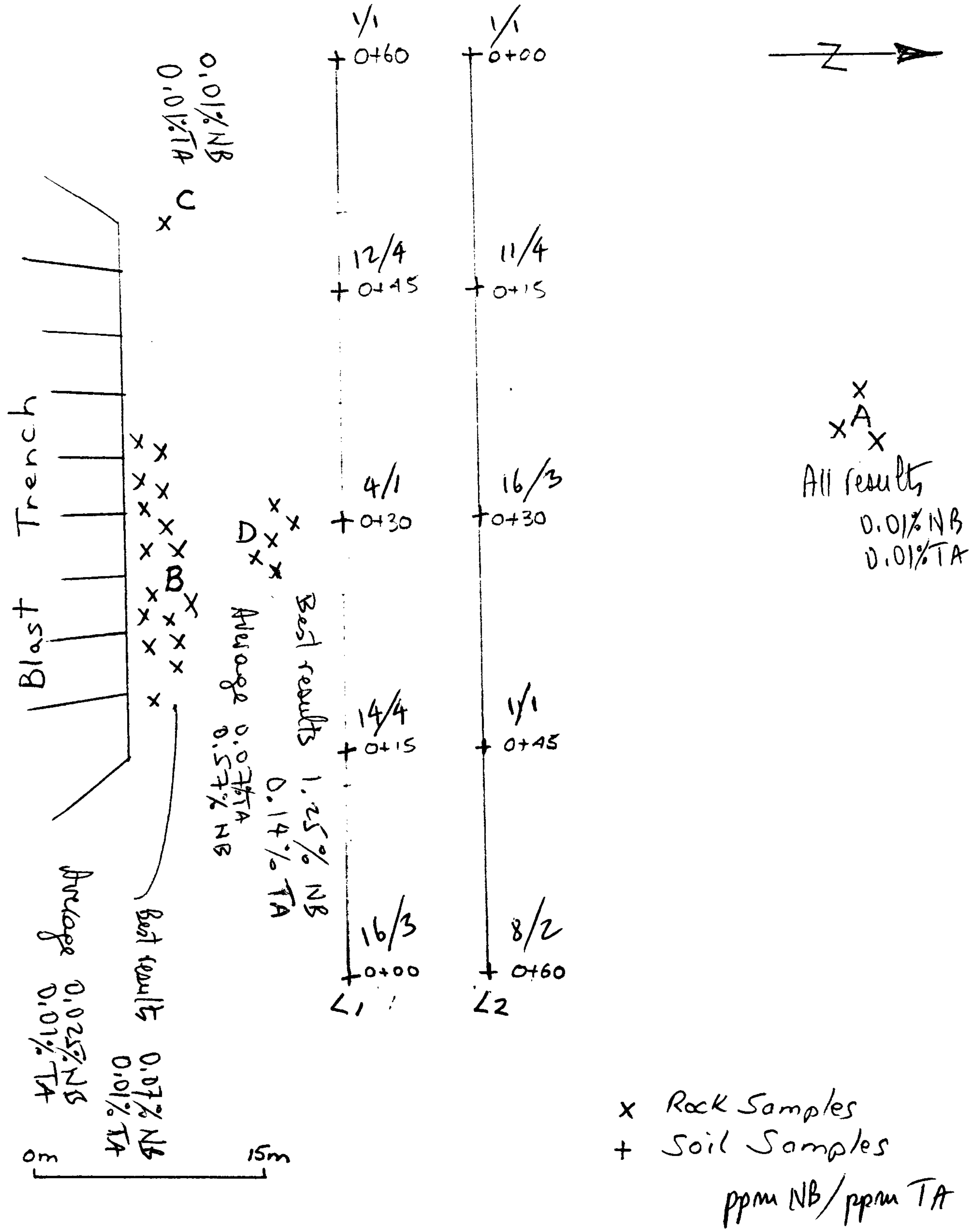


Figure 3 Rock and Soil Sample Locations

not tin bearing.

In 1985, twenty-eight (28) rock samples and 10 soil samples were taken from the vicinity of the blast-trenched pegmatite zone and analyzed for niobium and tantalum. Twenty-three (23) of the rock samples assayed less than .1% Nb_2O_5, with the highest assay containing 1.25% NbO_2O_5. Twenty-four (24) of these rock samples contained only .01% Ta_2O_5, and the highest assay was .14% Ta_2O_5. The highest niobium and tantalum assays came from the same samples, which were grabs that had been blasted off the main trench face.

Of the ten soil samples, the highest values were 16 ppm Nb and 4 ppm Ta, which are not considered anomalous. The soil samples were taken at 15 m spacings from 2 parallel lines 10 m and 50 m downslope (north) of the main showing. A mattock was used to dig a hole 10 cm to 30 cm deep in order to retrieve a representative soil sample.

The rock samples were taken from four separate areas, all in the vicinity of the blast trenched pegmatite zone (Figure 3). As the rock is too hard to chip sample along the face exposed in the trench, it was not possible to get any evaluation of the overall grade of the zone.

The highest Nb-Ta bearing rock sample (D-1) was also analyzed by neutron activation for rare earth elements, but was found to contain only low values.

An electron microprobe and petrographic study was made on rock sample D-1 (Appendix II). By petrography it was found to be a granite pegmatite that contains ilmenorutile or (niobian rutile), muscovite, albite and quartz. By electron microprobe the opaque or black mineral phase was found to consist mainly of Ti, Nb and Fe oxides with minor Ta and a consistent minor S_1O_2 content. Of six separate energy dispersive electron microprobe analyses the mean TiO_2 content was 59.44% and the mean Nb_2O_5 content was 22.65%. The high Ti and Nb contents combined with low contents of other elements such as Y, alkalis and REE indicate the black oxide mineral phase to be ilmenorutile or niobian rutile.

CONCLUSIONS AND RECOMMENDATIONS

1. The Crescent claims are predominantly underlain by gneiss which has been intruded by a pegmatitic syenite body. This intrusion has been strongly sheared in places and contains two niobium-tantalum bearing pegmatite-greisen bodies about 300 m apart horizontally.

2. Most of the black niobium/tantalum minerals are finely disseminated in feldspar which indicates that they formed from the same differentiated magmatic fluid as the pegmatite bodies themselves.

3. Overall grade of the niobium/tantalum mineralization appears to be low; however, selected samples do contain economic values.

4. Other greisen/pegmatite zones may occur in the vicinity and at depth, which may be larger and of higher grade. The limited amount of soil sampling done to date has not indicated any new mineralized zones immediately downslope of the largest showing.

5. The rock face of the blast trench is too hard to chip-sample properly, and so far no overall assays across the zone have been taken. One way to take such samples would be to drill some short holes with a cobra drill.

6. Other mineralized zones may occur elsewhere on the claims and therefore a larger soil sample grid program should be carried out. Stream silt sampling of the entire claim group should also be done.

7. The type of mineralization is of economic interest, even if the deposits on the Crescent claims ultimately turn out to be too small or too low grade, as other magmatically differentiated niobium-tantalum deposits may occur regionally in other syenite-pegmatite bodies.

COST STATEMENT

Salaries

Field geologist - C. Graf, 1 day @ $250/day		$ 250.00
office	C. Graf, 2 days @ $250/day	500.00
Samplers	- G. Paulson, 2 days @ $150/day	300.00
	J. Paulson, 2 days @ $75/day	150.00
		$ 1,200.00
Airfare		218.15
Truck Rental, 1 day		40.00
Truck Rental, 4 days		160.00
Gas		120.00
Room and Food @ $50/man day		250.00
Typing, xeroxing		121.15
Petrographic & Microprobe (Turnstone Geological Services Ltd.)		371.00
Geochemical Analyses & Assaying		1,000.50
Neutron Activation Analysis		78.00
		$ 3,558.80

STATEMENT OF QUALIFICATIONS

I, Chris Graf, do hereby declare that:

(1) I graduated from the University of British Columbia, Vancouver, British Columbia in 1974 with a B.Ap.Sc. Degree in Geological Engineering.

(2) That I am a registered Professional Engineer in the Province of British Columbia.

(3) That I have practised my profession for ten years with numerous mining companies in British Columbia.

Chris Graf
1010 - 837 West Hastings Street
Vancouver, B.C.
V6C 1C4

November 1985

APPENDIX I

GEOCHEMICAL ANALYSES AND ASSAYS

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

:(604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY: ACTIVE MINERALS
PROJECT:
ATTENTION: CHRIS GRAF

FILE: 5-265
DATE: JUNE 27/85.
TYPE: ROCK ASSAY

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	NB205 %	TA205 %
A-1	.01	.01
A-2	.01	.01
AA	.01	.01
B-1	.04	.01
B-2	.04	.01
B-3	.03	.01
B-4	.02	.01
B-5	.02	.01
B-6	.02	.01
B-7	.01	.01
B-11	.01	.01
B-14	.01	.01
B-15	.07	.01
B-18	.01	.01
B-19	.02	.01
B-20	.04	.01
B-21	.01	.01
B-22	.02	.01
B-23	.03	.01
C-2	.01	.01
D-1	1.25	.14
D-2	.87	.12
D-5	.13	.02
D-6	.38	.04
D-11	.01	.01
E	.03	.01
CHIP-1	.09	.01
CHIP-2	.10	.01

Certified by [signature]

MIN-EN LABORATORIES LTD.

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

GEOCHEMICAL ANALYSIS CERTIFICATE

COMPANY: ACTIVE MINERALS
PROJECT:
ATTENTION: CHRIS GRAF

FILE: 5-265
DATE: JUNE 27/85.
TYPE: SOIL GEOCHEM

We hereby certify that the following are the results of the geochemical analysis made on 10 samples submitted.

SAMPLE NUMBER	NB PPM	TA PPM
L1-0+00NW	16	3
0+15NW	14	4
0+30NW	4	1
0+45NW	12	4
L1-0+60NW	1	1
L2-0+00SE	1	1
0+15SE	11	4
0+30SE	16	3
0+45SE	1	1
L2-0+60SE	8	2

Certified by [signature]

NUCLEAR ACTIVATION SERVICES LIMITED

1280 MAIN STREET WEST, HAMILTON, ONTARIO, L8S 4K1

PHONE (416) 522-5666 TELEX 06-986947

CERTIFICATE OF ANALYSIS

TO: MIN EN LATORATORIES LTD
ATTN: J.J. BARAKSO
705 WEST 15TH STREET
NORTH VANCOUVER, B.C.
CANADA V7M 1T2

CUSTOMER NO. 4/01/01

DATE SUBMITTED
18-JUL-85

REPORT: 4380 FILE NUMBER: 6061

1 UNPREPARED SAMPLE

WAS ANALYZED AS FOLLOWS:

ELEMENTS	DETECTION LIMIT	UNITS	METHOD	ELEMENTS	DETECTION LIMIT	UNITS	METHOD
SC	0.0100	PPM	INAA	TH	0.2000	PPM	INAA
U	0.1000	PPM	INAA	LA	0.1000	PPM	INAA
CE	1.0000	PPM	INAA	ND	3.0000	PPM	INAA
SM	0.0100	PPM	INAA	EU	0.0500	PPM	INAA
TB	0.1000	PPM	INAA	YB	0.0500	PPM	INAA
LU	0.0100	PPM	INAA				

DATE 07-AUG-85

NUCLEAR ACTIVATION SERVICES LIMITED

CERTIFIED BY ....

*** UNLESS INSTRUCTED OTHERWISE WE WILL DISCARD ALL SAMPLES ***
IRRADIATED SAMPLES AFTER 30 DAYS. ANY OTHER MATERIAL AFTER 120 DAYS.

NUCLEAR ACTIVATION SERVICES LIMITED

DATE: 07-AUG-85 REPORT: 4380 FILE NUMBER: 6061 PAGE: 1

SAMPLE NUMBERS

ELEMENT UNITS	** D-1**
SC PPM	14
TH PPM	130
U PPM	210
LA PPM	18.6
CE PPM	31
ND PPM	INTERFER
SM PPM	7.80
EU PPM	1.60
TB PPM	3.1
YB PPM	14.4
LU PPM	2.15

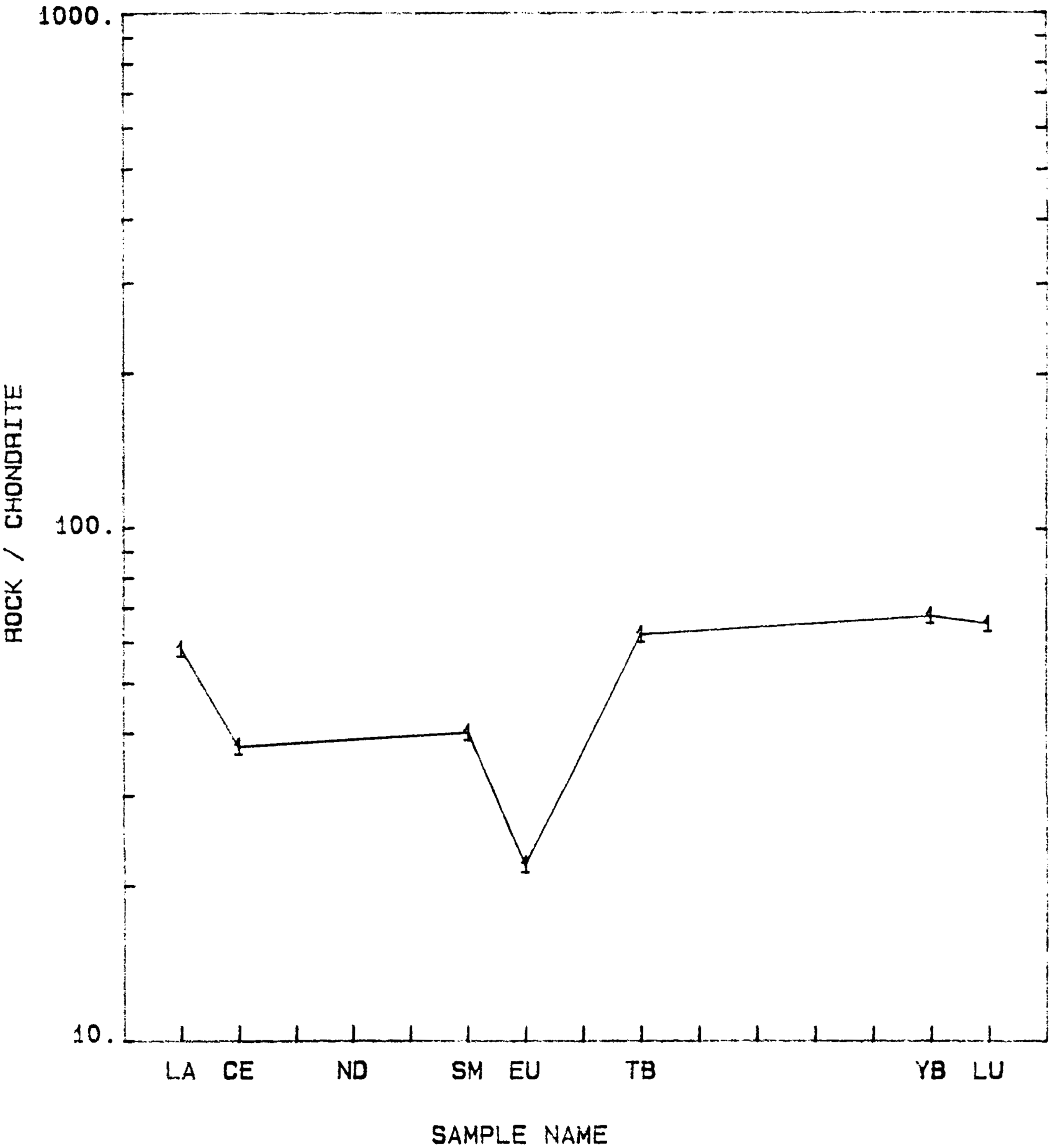
EXPLANATION OF CODES

INTERFER - DETECTION NOT POSSIBLE DUE TO COMPOSITION

NUCLEAR ACTIVATION SERVICES LIMITED

WORK ORDER: 6061

RARE EARTH CHONDRITE PLOT



1 D-1

APPENDIX II

PETROGRAPHIC AND MICROPROBE ANALYSIS OF ROCK SAMPLE D-1

ELECTRON MICROPROBE ANALYSIS OF TITANIFEROUS PHASES FROM B.C.

Graham Wilson

Turnstone Geological Services Ltd,

Toronto, Ontario

On Behalf Of

Active Minerals Explorations Ltd, Vancouver, B.C.

30 July 1985

ABSTRACT

Three samples were subjected to a brief mineralogical examination, including energy-dispersive (EDS) electron microprobe (EPM) analysis. Samples 1-2 contain manganiferous ilmenite and minor rutile. Sample 3 contains a Ti-rich oxide phase, ilmenorutile (some prefer 'niobian rutile'), with a major (>20 oxide percent) content of niobium (Nb, alias columbium, Cb). This report focuses particularly on ilmenorutile, and comments on the potential of the microprobe for diagnosis of less-common elements, such as Nb, Ta, Ga and the rare earth elements (REE).

CONTENTS:

☆ Note Only Sample 3 (D-1) is from the Crescent Claims

ELECTRON MICROPROBE ANALYSIS OF TITANIFEROUS PHASES FROM B.C.

Graham Wilson

Turnstone Geological Services Ltd,

30 July 1985

1. NATURE OF THE SAMPLES

Hand specimen and microscopic properties of the three samples are set out in Appendix II. In brief, samples 1-2 are coarse-grained, and contain plagioclase, garnet, amphibole and ilmenite with minor chlorite, muscovite, rutile and traces of other phases; some of these are seen in hand specimen only, some only in thin section. Sample 3 is from a contrasting environment (granitic pegmatite as opposed to (reported) carbonatite), and is largely composed of muscovite, albite, quartz and ilmenorutile.

2. MICROPROBE ANALYSES

a)Methods-

Electron microprobe analysis (EPM) was performed using the ETEC Autoprobe machine at Dept. of Geology, Univ. of Toronto. Electron beam current was 65.6 ± 0.1 nA on column aperture; more usefully, count rates were approx 5650 s^{-1} on Co, and 4420, 4500 and 4780 (mean) on ilmenite, rutile and ilmenorutile respectively. Detector resolution (FWHM at 1 kHz, 5.9 keV, i.e. for Mn) is approx 150 eV. Three pure (99.9% plus) elemental standards were used; Nb, Ti and Fe from U of T standard mount 92. The L lines of niobium lie between the K lines of phosphorus and sulphur in the x-ray energy spectrum (for the appearance of such spectra, see Gasparrini 1980). EDS analysis of percent levels of this element presented no problem. Willemite and cobalt standards were used for beam focusing, energy calibration and optimization of count rates. Count times were 100 live s, except for the cobalt (200 live s). 15 quantitative / semiquantitative analyses of samples 2/3 and of the three elemental standards were supplemented by qualitative examination of additional x-ray spectra.

b)Samples 1-2;

The stack of platy laths in sample 2 proved to be Mn ilmenite. The ilmenite analysis is not unusual, although compared to a set of analyses by Rollinson (1980) the Ti oxide total is slightly high (relative to a quoted maximum of 52.03 wt.%), the Mn content middling (upto 8.38 wt.% was reported) and the Si and Al contents quoted here are high, probably due to lack of adequate correction factors. A ragged (corroded?) grain of rutile, surrounded by a narrow low-reflectivity rim (Ti, Fe, Si present) was analysed within the main mass of ilmenite. Reconnaissance analysis of the feldspar suggests oligoclase, circa An_{20}. See Appendix I, analyses 1-2.

c)Sample 3;

The opaque ore phase in sample 3 was found to consist of Ti, Nb and Fe oxides, with minor Ta and a consistent minor SiO_2 content. Analyses (3-8) plus mean values are given in Appendix I. Analysed in 1 or more points, but not detected, were Zr, Y, U, Th, Sn, Ca and P, Mn, Ni, Cr and Zn, Ga, Er and Ce.

A great many complex oxides of Fe, Ti, Nb and Ta are known (c.f. Dana 1944). Most are ruled out by the high Ti contents of the analyses, and by the fact that they commonly contain substantial amounts (several oxide/element wt.%) of U and Th (Frandel and Fleischer 1950), and/or other elements such as alkali metals, Y or REE (Florke et al 1974). The absence or relatively low concentration of these other elements eliminates fergusonite, the samarskite family, euxenite-polycrase, priorite (etc) from further consideration.

Returning to the high Ti content, it appears that only ilmenorutile adequately fits the available data, and the identity of the ore in sample 3 is ilmenorutile or niobian rutile. Although ilmenorutile is of restricted occurrence, and has more than once been discredited as an intergrowth of columbite and rutile (e.g. Hutchinson 1955) it has more recently been described in various localities in the USSR, Sierra Leone, Scandinavia and elsewhere, and seems to be a valid mineral species (e.g. Ramdohr 1980). A number of analyses have been published; Lima de Fario and Quadrado (1966) cite oxide contents (Ti,Nb,Ta,Fe) of 43,21,22 and 13%; a very high (Nb,Ta) total. Banas and Kucha (1975) report late (post-albitization) ilmenorutile with 'high and constant Nb content' (approx 10 wt.% Nb, or 14.3 oxide wt.%). Lower (Nb,Ta) contents are also found (7 oxide wt.% or less), e.g. Desborough et al (1980). The wide composition range is demonstrated by the published TiO_2 contents, which range (papers cited here) from about 43-95 wt. %. Similar analyses to those given here are quoted by Foord (1982, pp.198-201).

3. DISCUSSION

Possible reasons for the <100% oxide totals in the ilmenorutile include:

a)Inadequate standardisation of the major elements; unlikely in view of the 100% totals returned for the standards during the analysis. It is possible that the less-abundant Ta is too low in these analyses, although no major Ta peaks were noted in the spectra.

b)Occurrence of part/all of the Fe as Fe_2O_3, and not FeO, as returned by the EPM software. This seems likely (Foord 1982, p.200). However, even if all the Fe were in the ferric form, the Fe oxide total would only rise by a factor of 1.1113, from 11.71 to 13.01 wt.%, leaving 2.48 wt% unaccounted for (see mean M1, Appendix 1).

c)Presence of other elements in minor, undetected amounts. The x-ray spectra showed no peaks in the 0-10 keV range that were not analysed and reported. Nevertheless, minor elements may have escaped detection, e.g. W, U or Sn (ilmenorutile from an area in S.Norway 'usually contains more than 0.5% Sn' (Oftedahl 1972)).

The minor amounts of Si and Ta (standards not applied) could be somewhat inaccurate, but the 3.78% deficit is not explained by that alone. The fact that Si is fairly constant in all analyses suggests that it is not an artifact (e.g., an 'edge effect' produced by the sub-surface volume of x-ray emission sampling a silicate phase located beside/below the niobate surface, a problem in the case of much smaller (<20 micron) crystals).

Two means are quoted (Appendix 1), since one analysis ('7') differs significantly (>$3\sigma_{n-1}$) from the other five in all major elements. It is hard to choose between the means for 5/6 points however, since these complex phases are often heterogeneous (Foord 1982), and the reported assay from sample 3 indicates a much higher Ta:Nb ratio. Minor amounts of columbite-tantalite may thus be present in the bulk sample (Foord 1982 p.200), although in this section 'ilmenorutile' is by far the main ore phase.

Common associates of Nb (besides Ta) include Zr, LREE (such as Ce), Th and sometimes Mo (Ginzburg and Fel'dman 1977). These authors suggest that the Ta:Nb oxide ratio of Ta/Nb deposits is commonly much higher in pegmatites than the 1:100 (approx) indicated by the present analyses, and that such ratios are more often associated with albitites of peralkaline affinities, carbonatites and secondary deposits.

4. MICROPROBE ANALYSIS OF LESS-COMMON ELEMENTS

Analysis of substantial (say, >0.1 oxide wt.%) contents of Nb and Ta should not present a problem in these oxide matrices. Analysis of REE is frequently more difficult, particularly below the level of 1.0 oxide wt.% of a given element. For perspective, Taylor (1964) quotes continental crustal abundances of Nb and Ta at 20 and 2 ppm respectively, and those of Ce (the most abundant REE) and Ga at 60 and 15 ppm.

REE standards are available (e.g. Drake and Weill 1972) and useful data can be derived for minerals with several wt.% of these elements (for a critical study of REE analysis by electron microprobe, see Roeder 1985). The mineralogy of REE deposits is very variable and complex (Nevsky and Chirkov 1977). Interesting wavelength-dispersive (WDS) EPM spectra for REE-rich phases are given by Siivola (1976), in which 13 REE (excluding only unstable Pm and interference-covered Eu) are resolved. A trend toward concentration of the HREE late in pegmatite paragenesis was established.

Ga is a 'dispersed element' (Ivanov and Yushko-Zakharova 1977) and although it shows some correlation with Zn, Al and Fe it forms only two mineral species of its own and subsists in other minerals, exceeding 100ppm only occasionally, e.g. in sphalerite and magnetite. At its usual low levels, it is not readily accessible to EPM; longer count times with a WDS system might improve the position marginally, but only concentrations approaching the highest reported (e.g. 1600 ppm in sphalerite) are likely to be detectable. Ga is locally concentrated into albitized granites (mostly in the albite) and into certain carbonaceous rocks (Gottardi et al 1972).

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APPENDIX 1 - TABLE OF ANALYSES

Oxide	1	2	3	4	5	6	7	8	M1	M2
SiO_2	0.36	0.35	3.45	3.55	3.84	3.39	2.74	3.39	3.52 ± 0.19	3.39 ± 0.36
Al_2O_3	0.54	nd	-	-	-	-	-	-	-	
Nb_2O_5	nd	nd	22.05	22.45	24.18	22.18	18.77	22.41	22.65 ± 0.87	22.01 ± 1.77
TiO_2	52.21	99.76	59.54	57.25	55.65	59.92	65.79	58.51	58.17 ± 0.18	59.44 ± 3.48
FeO	44.87	nd	11.74	11.70	12.37	11.24	9.85	11.49	11.71 ± 0.42	11.40 ± 0.85
Ta_2O_5	-	nd	nd	nd	0.24	0.22	nd	0.33	0.20 ± 0.14	0.16 ± 0.15
MnO	1.44	nd	nd	nd	-	-	-	-	-	-
Total	99.42	100.11	96.79	94.94	96.29	96.24	97.15	96.13	96.22 ± 0.79	96.37 ± 0.80

Analyses 1-2; Mn ilmenite and rutile, sample 2. Analyses 3-8; ilmenorutile, sample 3. Mean M1 excludes analysis 7 (n=5), whereas M2 includes all data (analyses 3-8, n=6). M1,2 quote one standard deviation, σ_{n-1}.

With all Fe as Fe(II) mean Fe (total oxide) contents would be 13.01 and 12.67 wt.% in M1 and M2 respectively.

NB; 'nd' - not detected, '-' = not analysed. Fe determined as FeO. Analyses 1-8 are numbered 325-326, 328-333 in GCW notes.

APPENDIX II - BRIEF DESCRIPTIONS OF THE SAMPLES

The following descriptions detail the material on which this report is based; they can stand alone, or as a part of it.

TURNSTONE PETROGRAPHIC DESCRIPTION Status; CONFIDENTIAL

Sample ; 3 Description; 112
Client/job ; Active Minerals Explorations Ltd

Locality ; BC / 'Locality 2' - pegmatite prospect
Collection details; CWG, in situ, 1985
Format ; PTS(C), Geoplastech, TO - approx 30-40um

Hand specimen data; Pegmatitic sample with pink feld, black-brown bi, pale musc and grey-white qz. Mn (pyrolusite) dendrite on surface. A large dull black crystal of an ore mineral is associated with the musc. 4 chips after cutting.

Major Minerals;
* Muscovite- surrounds much of the ore phase. Brilliant int colours suggest a locally thick section. 65%.
* Feldspar- low bir phase occurring as large plates, locally altered to dark (?) kaolinite. Fine synthetic twinning locally bent and deformed. Examination of X-ray spectrum suggests sodic albite composition, circa An_2 plag. 25%.
* Ore phase- Anhedral habit, c.f. the ore of descr. 111. Somewhat porous. Fractured, cracks locally filled by musc. One fragment is coated by a rim of dark grey mag(?). An inclusion of mag (?) (150x70um) occurs in the larger ore mass nearby. 10%.

Minor and Accessory Minerals (Tr.);
* Quartz- Tr.
* Magnetite(?)- minor phase assoc with the main ore. Tr.
* Rutile- brown granular phase of high relief; a trace inclusion in the main ore.

Texture; Pegmatitic intergrowth.

Summary; Granite pegmatite with ilmenorutile, identified by EPM [1]. Sample reported to contain 0.1% Ta_2O_5 and 0.25% Nb_2O_5 with significant U.

Age; No data

Reference;
1. Wilson,GC (1985) Electron microprobe analysis of titaniferous phases from B.C. TGSL Rep., 8pp.

Petrography; GCW, Turnstone Geological Services Ltd, TO
Mon 15-Jul-85

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To:C.W. Graf
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Dear Chris,

I enclose a pile of literature nuggets I've been saving for you, and a note concerning your three samples, to enlarge on the terse note left with your secretary. After a brief hassle with the section preparation, I probed two of the three samples with the following results;

Samples 1-2; the platy opaque phase turns out to be Mn ilmenite, with approx 1% Mn and subsidiary amounts of granular rutile.

Sample 3; I spent most of my time on this, since I figure you're not much concerned with simple Fe-Ti oxides. The ore appears quite uniform in composition, EPM of 5/6 spots analysed averaging (roughly, as oxides) 22% Nb, 58% Ti, 12% Fe and 4% Si. 3/5 spots probed registered 0.2-0.3% Ta (oxide). I have still to figure out a name for this mineral..... the Ti content is higher than most of the contenders possess. I looked out for exotic elements (besides Nb/Ta) but found no evidence for them; I'll speculate a little (on the missing 4% in the analyses) in my report.

I will send you analyses, report and invoice (circa 350 dollars) within the next week. I look forward to getting the Platinum Symposium out of the way so that I can hit road, rocks and good times in August and September. Hope your summer is going well, More Shortly,

Graham