UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CHEMICAL COMPOSITION OF PRECAMBRIAN, PALEOZOIC, MESOZOIC AND TERTIARY ROCKS FROM EAST-CENTRAL ALASKA

OPEN-FILE REPORT 77-631

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature

Menlo Park, California

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By

Earl E. Brabb and Bette R. Hamachi

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INTRODUCTION

The purpose of this report is to make available 108 analyses of a variety of igneous, sedimentary, and metamorphic rocks from east-central Alaska. The rocks were collected by the senior author, Michael Churkin, Jr., G. Donald Eberlein, Reuben J. Ross, Jr., and James Melik from 1960 to 1963.

The major rock constituents were analyzed by six-step spectrographic methods as described by Shapiro and Brannock (1962). These methods were revised subsequently by Shapiro (1975). The minor elements were analyzed by X-ray fluorescence using the techniques described by Myers and others (1961). The norm for the volcanic rocks were calculated by computer, generally following the method of Washington (1917, appendix 3).

The rock samples have field numbers that show the year the sample was collected and who made the collection. The first two digits of the field number are the year; "A" refers to Alaska; "Ba" to Brabb, "Cn" to Churkin, "E" to Eberlein, "Mc" to Melik, and "RJR" to Ross. The rock name given to each sample is the name used by the geologist in the field; no attempt was made to reconcile these field terms with subsequent chemical analyses and thin sections.

The formations from which the samples were collected are shown on several geologic maps of the region. Most of the samples were collected from the Charley River quadrangle, scale 1:250,000, mapped by Brabb and Churkin (1969). Several are from the Eagle D-1 quadrangle, scale 1:63,360, mapped by Brabb and Churkin (1965). A few are from the Eagle quadrangle, scale 1:250,000, mapped by Foster (1972) and from the Tanacross quadrangle, scale 1:250,000, mapped by Foster (1970). One

sample is from the Black River quadrangle, scale 1:250,000, mapped by Brabb (1970), and three are from the Circle quadrangle, scale 1:250,000, mapped partially by Mertie (1930).

The geologic units are described in greater detail in a number of publications. The report by Churkin and Brabb (1969) has a nearly complete bibliography of the reports describing most of the rocks except for the metamorphic and igneous rocks of the Yukon-Tanana Upland; these are described by Foster and others (1973). The Tahkandit Limestone was described in a report by Brabb and Grant (1971).

ACKNOWLEDGMENTS

The rapid-rock analyses were done by Paul Elmore, Sam Botts, and Lowell Artis under the direction of Leonard Shapiro. The semiquantitative spectrographic analyses were done by Marcelyn Cremer and Chris Heropoulos under the direction of the late Harry Bastron. The author is also indebted to Michael Churkin, Jr., G. Donald Eberlein, Reuben J. Ross, and James Melik, who collected some of the samples.

FORMAT OF THE REPORT

The samples are grouped in approximate stratigraphic order, from oldest to youngest, except for the metamorphic and igneous rocks of the Yukon-Tanana Upland which are grouped simply by rock type. Within each group, no attempt was made to list the samples in stratigraphic order.

1. TINDIR GROUP

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63AB 3624	164355	64M-2426	Tindir carbon. shale	Charley River A-1
62ABa2821A	164356	64M-2427	Tindir platy ls.	Charley River A-1
60ABa371A	164358	64M-2429	Tindir claystone	Charley River A-1
62ABa2813	163348	64M-1412	Tindir greenstone	Charley River A-1
60ABa363	163649	64M-1413	Tindir basalt	Charley River A-1
63ABa3625	163650	64M-1414	Tindir basalt	Charley River A-1

RAPID ROCK ANALYSIS

Lab No.	164355	164356	164358	163648	163649	163650
SiO_2	52.8	11.2	39.2	56.0	51.5	41.0
Al_2O_3	11.1	2.7	12.0	14.5	13.6	15.4
Fe_2O_3	4.5	.37	1.9	2.4	6.0	1.9
FeO	1.3	.14	2.1	3.9	6.8	8.2
MgO	.7	2.4	9.0	5.7	5.7	8.5
CaO	.20	43.3	11.5	8.0	5.2	8.5
Na_2O	< .05	< .05	.15	1.2	5.1	2.2
K_2O	3.5	1.0	2.4	1.1	.00	.77
H_2O^-	1.2	.23	1.6	1.0	1.1	1.0
H_2O^+	5.1	.87	3.1	3.3	2.6	5.8
TiO_2	.58	.08	.81	.53	1.5	.47
P_2O_5	.44	.19	.19	.26	.24	.17
MnO	.00	.00	.03	.06	.21	.09
CO_2	< .05	35.7	15.6	1.3	.10	6.0
Aqua Regia Sol. S. as SO_3	(9.2)[1/]	1.2				
Volatiles Other Than H_2O & CO_2	17.6	.00				
Sum	99	99	100	99	100	100
Powder Density by Air Pycnometer	2.54	2.84	2.84			

[1/] Not in the summation as it is probably all part of the volatiles.

1. TINDIR GROUP

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2426	64M-2427	64M-2429	64M-1412	64M-1413	64M-1414
Si	M.	3.	M.	M.	M.	M.
Al	5.	3.	7.	10.	7.	10.
Fe	3.	.7	3.	5.	7.	7.
Mg	.3	1.	5.	5.	3.	5.
Ca	.2	M.	10.	5.	3.	5.
Na	.5	.05	.3	1.	2.	1.5
K	3.	1.5	5.	1.5	0	1.
Ti	.3	.07	.2	.3	1.	.3
P	0	0	0	0	0	0
Mn	.01	.007	.05	.07	.2	.07
Ag	.0002	0	0	0	0	0
As	0	0	0	0	0	0
Au	0	0	0	0	0	0
B	.01	.0015	.015	.0007	.0015	.003
Ba	.05	.015	.03	.05	.005	.03
Be	.00015	0	.0002	0	0	0
Bi	0	0	0	0	0	0
Cd	0	0	0	0	0	0
Ce	0	*	*	0	0	0
Co	.0015	0	.0015	.003	.007	.005
Cr	.01	.002	.01	.05	.015	.07
Cu	.015	.0005	.007	.005	.02	.01
Ga	.0015	.0005	.0015	.002	.002	.002
Ge	0	0	0	0	0	0
Hf	0	0	0	0	0	0
Hg	0	0	0	0	0	0
In	0	0	0	0	0	0
La	0	0	.005	0	0	0
Li	0	0	0	0	0	0
Mo	.01	0	0	0	0	0

* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.

1. TINDIR GROUP

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-2426	64M-2427	64M-2429	64M-1412	64M-1413	64M-1414
Nb	.001	0	.001	0	.001	0
Ni	.01	.001	.005	.015	.01	.03
Pb	.005	0	.002	0	0	0
Pd	0	0	0	0	0	0
Pt	0	0	0	0	0	0
Re	0	0	0	0	0	0
Sb	0	0	0	0	0	0
Sc	.001	.0005	.002	.005	.007	.007
Sn	0	0	0	0	0	0
Sr	.003	.07	.007	.02	.015	.02
Ta	0	0	0	0	0	0
Te	0	0	0	0	0	0
Th	0	0	0	0	0	0
Tl	0	0	0	0	0	0
U	0	0	0	0	0	0
V	.07	.003	.015	.05	.1	.05
W	0	0	0	0	0	0
Y	.002	.001	.003	.005	.007	.003
Yb	.0003	.0001	.0003	.0005	.001	.0003
Zn	0	0	0	0	0	0
Zr	.01	.003	.01	.01	.01	.007
Looked for only when La or Ce found:						
Pr		0	0			
Nd		*	*			
Sm		0	0			
Eu	0	0	0			
Looked for only when Y is found above .005%:						
Gd					0	
Tb					0	
Dy					0	
Ho					0	
Er					0	
Tm					0	
Lu					0	

*High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<$.02% and $<$.07%, respectively.

CIPW NORM FOR SAMPLE NO. 3648 Loc. No. 62ABa2813

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	56.00	14.50	2.40	3.90	5.70	8.00	1.20	1.10	3.30	0.53	0.26	0.259
MOL. AMTS.	0.9320	0.1422	0.0150	0.0543	0.1414	0.1427	0.0194	0.0117	0.1832	0.0066	0.0018	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.06	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.25	1.625
MOL. AMTS.	0.0008	0.0000	0.0295	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	57.00	14.76	2.44	3.97	5.80	8.14	1.22	1.12	3.36	0.54	0.26	0.259
MOL. AMTS.	0.9486	0.1447	0.0153	0.0552	0.1439	0.1452	0.0197	0.0119	0.1864	0.0068	0.0019	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.06	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.625
MOL. AMTS.	0.0009	0.0000	0.0301	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.3633	0.0042	0.0000	0.0119	0.0197	0.1089	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	21.826	0.432	0.000	6.616	10.335	30.302	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1439	0.0341	0.0000	0.0000	0.0000	0.0153	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	14.449	4.494	0.000	0.000	0.000	3.542	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0068	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0301	0.0000			
PERCENTAGES	1.025	0.000	0.000	0.000	0.627	0.000	0.000	3.009	0.000	96.656	69.511	27.145

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	NOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1780	0.1439	0.0341	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	18.943	14.449	4.494	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	45.38	13.85	1.46	2.64	6.88	6.95	1.89	1.14	17.84	0.32	0.18	0.04
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	26.21	41.77	26.30	5.72	171.80	1.22	0.34	33.77	0.38	0.62	122.89	48.92

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 29.33 : 25.01 : 45.27 A:K:F = 8.19 : 5.15 : 86.66 A:N:F = 7.92 : 8.26 : 83.10

Q:OR:AB = 92.00 : 3.01 : 4.99 Q:OR:(AB+AN) = 72.11 : 2.36 : 25.53 OR:AB:AN = 8.46 : 14.03 : 77.52

CIPW NORM FOR SAMPLE NO. 3449 Loc. No. 60ABa363

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	51.50	13.60	6.00	6.80	5.70	5.20	5.10	0.00	2.60	1.50	0.24	0.264
MOL. AMTS.	0.8571	0.1334	0.0376	0.0946	0.1414	0.0927	0.0823	0.0000	0.1443	0.0188	0.0017	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.21	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.55	1.133
MOL. AMTS.	0.0030	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	52.26	13.80	6.09	6.90	5.78	5.28	5.18	0.00	2.64	1.52	0.24	0.264
MOL. AMTS.	0.8697	0.1353	0.0381	0.0960	0.1435	0.0941	0.0835	0.0000	0.1464	0.0190	0.0017	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.21	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.133
MOL. AMTS.	0.0030	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0455	0.0000	0.0000	0.0000	0.0835	0.0518	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	2.733	0.000	0.000	0.000	43.790	14.425	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0342	0.1435	0.0419	0.0000	0.0000	0.0000	0.0381	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	3.975	16.405	5.524	0.000	0.000	0.000	8.827	0.000	0.000

MINERALS	IL	FR	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0190	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0023	0.0000			
PERCENTAGES	2.891	0.000	0.000	0.000	0.577	0.000	0.000	0.231	0.000	97.377	60.948	36.429

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	MOL
MOL. AMTS.	0.0342	0.0342	0.0265	0.0077	0.1511	0.1170	0.0341	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	7.653	3.975	2.659	1.020	16.250	11.746	4.504	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	42.68	13.28	3.74	4.71	7.04	4.62	8.19	0.00	14.37	0.93	0.17	0.15

	ZR	C	S1	CL	F	S2	CN	NI	HA
	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SIM	QZ
	21.43	50.46	10.89	13.22	137.68	3.02	0.27	23.18	0.00	0.45	152.87	-15.19

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 21.47 : 20.67 : 56.43 A:K:F = 1.36 : 0.00 : 98.64 A:N:F = 1.01 : 25.35 : 71.81

Q:OR:AB = 35.27 : 0.00 : 64.73 Q:OR:(AB+AN) = 25.16 : 0.00 : 74.84 OR:AB:AN = 0.00 : 61.69 : 38.31

CIPW NORM FOR SAMPLE NO. 3650 Loc. No. 63ABa3625

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	41.00	15.40	1.90	8.20	8.50	8.50	2.20	0.77	5.80	0.47	0.17	0.376
MOL. AMTS.	0.6824	0.1510	0.0119	0.1141	0.2109	0.1516	0.0355	0.0082	0.3219	0.0059	0.0012	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.09	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.00	4.316
MOL. AMTS.	0.0013	0.0000	0.1363	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	41.41	15.56	1.92	8.28	8.59	8.59	2.22	0.78	5.86	0.47	0.17	0.376
MOL. AMTS.	0.6893	0.1526	0.0120	0.1153	0.2130	0.1531	0.0359	0.0083	0.3252	0.0059	0.0012	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.09	0.00	6.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	4.316
MOL. AMTS.	0.0013	0.0000	0.1377	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	ML	TH	NC
MOL. AMTS.	0.0903	0.0971	0.0000	0.0083	0.0359	0.0114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	5.425	9.900	0.000	4.596	18.804	3.160	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2130	0.0986	0.0000	0.0000	0.0000	0.0120	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	21.383	13.009	0.000	0.000	0.000	2.783	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0059	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.1377	0.0000			
PERCENTAGES	0.902	0.000	0.000	0.000	0.407	0.000	0.000	13.783	0.000	94.151	41.885	52.267

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.3116	0.2130	0.0986	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	34.393	21.383	13.009	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	28.89	12.79	1.01	4.83	8.93	6.42	3.01	0.69	27.26	0.25	0.10	0.05

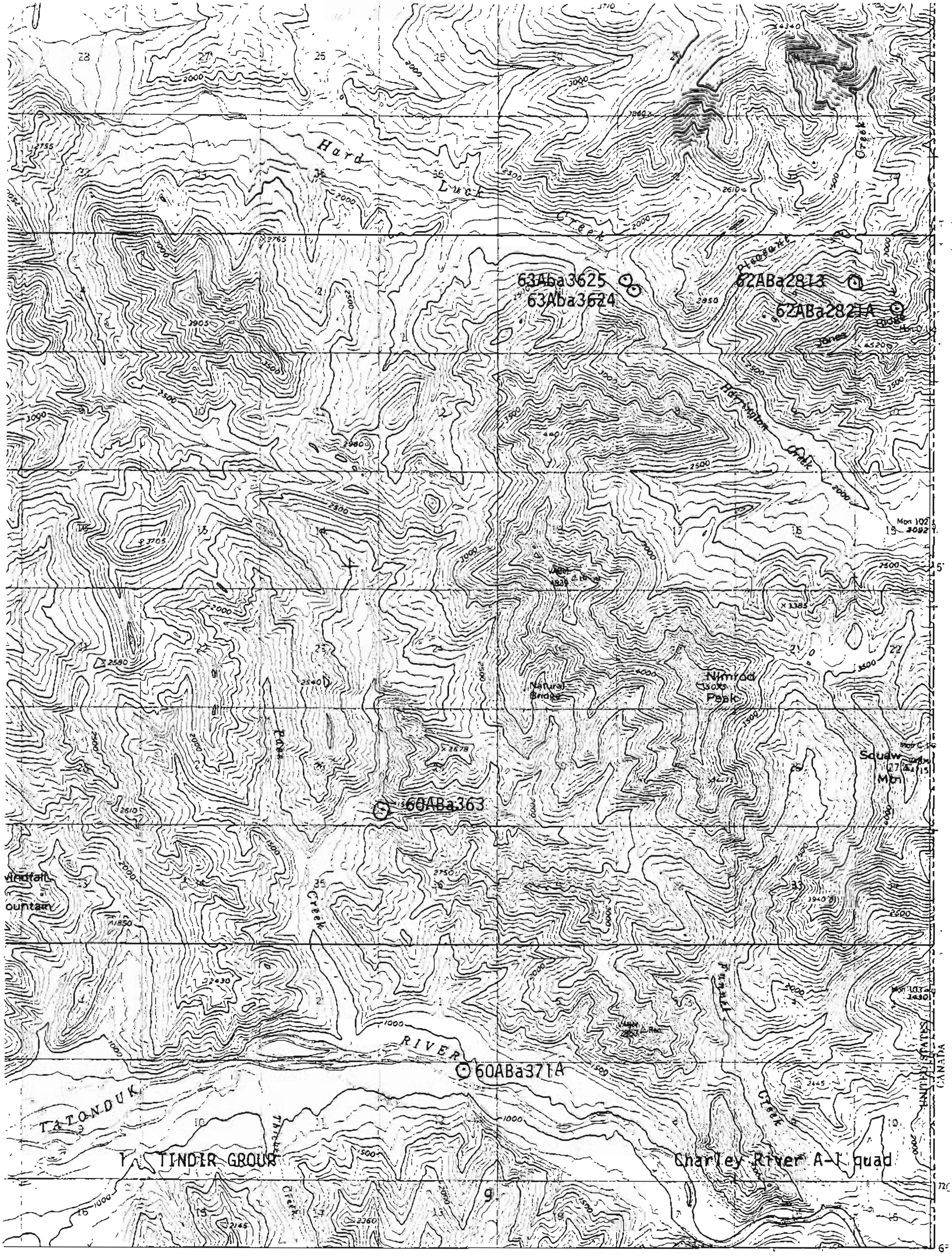
	ZR	C	SI	CL	F	S2	CR	NI	BA
	0.00	5.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	21.69	50.27	21.77	6.27	97.99	0.84	0.17	46.23	0.19	0.60	125.09	-27.09

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 26.09 : 2.55 : 70.81 A:K:F = 24.35 : 1.85 : 73.81 A:N:F = 22.93 : 7.56 : 68.97

Q:OR:AB = 67.18 : 6.14 : 26.68 Q:OR:(AR+AN) = 61.94 : 5.66 : 32.39 OR:AB:AN = 18.88 : 64.64 : 20.48



63ABa3625
63ABa3624
62ABa2813
62ABa2821A
60ABa363
60ABa371A
Hard Luck Creek
Pleasant Creek
Jones Ridge
Harrington Creek
Natural Bridge
Nimrod Peak
Squaw Mtn
Windfall Mountain
Funnel Creek
TATONDUK RIVER
UNITED STATES
CANADA
1. TINDIR GROUP
Charley River A-1 quad

2. TINDIR GROUP

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ABa3621	163651	64M-1415	Tindir lithic tuff	Charley River A-1
63ABa3372	163652	64M-1416	Tindir greenstone	Charley River A-1
63ACn1861	163653	64M-1417	Tindir dike(?)	Charley River A-1
63ABa3763	164357	64M-2428	Tindir red shale	Charley River B-1
63ACn2241	163657	64M-1421	Tindir lithic tuff	Charley River B-2

RAPID ROCK ANALYSIS

Lab No.	163651	163652	163653	164357	163657
SiO_2	49.2	50.1	52.2	44.4	40.4
Al_2O_3	12.6	15.1	15.3	5.4	11.2
Fe_2O3	5.0	1.4	1.3	32.8	1.2
FeO	8.7	3.7	8.0	3.4	7.8
MgO	5.3	5.8	5.9	3.6	7.0
CaO	4.0	14.3	9.4	2.3	13.0
Na_2O	.68	1.4	1.1	.18	.00
K_2O	3.3	.82	.77	.66	2.7
H_2O^-	3.0	.70	.31	.71	.78
H_2O^+	4.7	1.7	2.6	2.3	4.8
TiO_2	1.5	.47	.73	.74	.69
P_2O_5	.44	.24	.30	.64	.45
MnO	.25	.15	.20	.28	.18
CO_2	1.3	3.2	1.6	2.6	9.6
Sum	100	99	100	100	100
Powder Density by Air Pycnometer				3.34	

2. TINDIR GROUP

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1415	64M-1416	64M-1417	64M-2428	64M-1421
Si	M.	M.	M.	M.	M.
Al	10.	10.	7.	3.	7.
Fe	10.	5.	7.	M.	7.
Mg	3.	5.	3.	1.5	3.
Ca	5.	7.	5.	2.	7.
Na	1.5	1.5	1.	.15	.2
K	5.	1.	1.	1.	3.
Ti	.7	.3	.5	.15	.5
P	.3	0	0	0	0
Mn	.2	.1	.15	.7	.15
Ag	0	0	0	0	0
As	0	0	0	0	0
Au	0	0	0	0	0
B	.0015	0	.0015	.001	0
Ba	.2	.05	.03	.02	.2
Be	.00015	0	0	.00015	0
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	0	0	0	0
Co	.005	.003	.005	.007	.005
Cr	.002	.07	.02	.002	.007
Cu	.001	.005	.007	.003	.015
Ga	.003	.002	.003	*	.002
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	.007	0	0	0	0
Li	0	0	0	0	0
Mo	0	0	0	0	0

*High Fe interferes with the most sensitive Ga and Yb lines. Ga, if present, would be $<.002\%$.

2. TINDIR GROUP

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1415	64M-1416	64M-1417	64M-2428	64M-1421
Nb	.0015	0	.0015	.0015	0
Ni	.002	.015	.01	.007	.005
Pb	0	0	0	0	0
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	0	0	0
Sc	.005	.007	.005	.001	.007
Sn	0	0	0	0	0
Sr	.05	.02	.02	.003	.03
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.05	.05	.05	.015	.05
W	0	0	0	0	0
Y	.007	.005	.005	.003	.005
Yb	.0007	.0005	.0005	*	.0007
Zn	0	0	0	0	0
Zr	.015	.01	.01	.007	.007
Looked for only when Ca or Ce found:					
Pr	0				
Nd	0				
Sm	0				
Eu	0			0	
Looked for only when Y is found above .005%:					
Gd	0				
Tb	0				
Dy	0				
Ho	0				
Er	0				
Tm	0				
Lu	0				

*High Fe interferes with the most sensitive Ga and Yb lines. Ga, if present, would be $<$.002%.

CIPW NORM FOR SAMPLE NO. 3651 Loc. No. 63ABa3621

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.20	12.60	5.00	8.70	5.30	4.00	0.68	3.30	4.70	1.50	0.44	0.256
MOL. AMTS.	0.8188	0.1236	0.0313	0.1211	0.1315	0.0713	0.0110	0.0350	0.2609	0.0188	0.0031	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.25	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.97	1.740
MOL. AMTS.	0.0035	0.0000	0.0295	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	50.74	12.99	5.16	8.97	5.47	4.12	0.70	3.40	4.85	1.55	0.45	0.256
MOL. AMTS.	0.8444	0.1274	0.0323	0.1249	0.1356	0.0736	0.0113	0.0361	0.2690	0.0194	0.0032	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.26	0.00	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.740
MOL. AMTS.	0.0036	0.0000	0.0305	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.2825	0.0476	0.0000	0.0361	0.0113	0.0324	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	16.972	4.849	0.000	20.110	5.934	9.025	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1356	0.0769	0.0000	0.0000	0.0000	0.0323	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	13.612	10.140	0.000	0.000	0.000	7.476	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0194	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0305	0.0000			
PERCENTAGES	2.938	0.000	0.000	0.000	1.075	0.000	0.000	3.049	0.000	95.180	56.890	38.290

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2124	0.1356	0.0769	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	23.753	13.612	10.140	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	38.55	11.63	2.95	5.70	6.19	3.36	1.03	3.30	24.56	0.88	0.29	0.17
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	22.08	56.95	12.75	8.22	146.32	3.35	0.55	46.62	0.76	0.41	132.88	13.44

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 27.39 : 8.17 : 62.66 A:K:F = 20.79 : 9.53 : 69.68 A:N:F = 22.24 : 3.19 : 72.51

Q:OR:AB = 85.62 : 10.95 : 3.43 Q:OR:(AB+AN) = 77.96 : 9.97 : 12.07 OR:AB:AN = 45.23 : 14.16 : 40.61

CIPW NORM FOR SAMPLE NO, 3452 Loc. No. 63ABa3372

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	50.10	15.10	1.00	3.70	5.80	14.30	1.40	0.82	1.70	0.47	0.24	0.301
MOL. AMTS.	0.8338	0.1481	0.0063	0.0515	0.1439	0.2550	0.0226	0.0087	0.0944	0.0059	0.0017	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.38	2.643
MOL. AMTS.	0.0021	0.0000	0.0727	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	50.92	15.35	1.42	3.76	5.90	14.54	1.42	0.83	1.73	0.48	0.24	0.301
MOL. AMTS.	0.8476	0.1505	0.0089	0.0523	0.1462	0.2592	0.0230	0.0088	0.0959	0.0060	0.0017	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	3.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.643
MOL. AMTS.	0.0021	0.0000	0.0739	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.1726	0.0000	0.0000	0.0488	0.0230	0.1187	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	10.369	0.000	0.000	4.925	12.041	33.031	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0608	0.1462	0.0396	0.0000	0.0000	0.0000	0.0089	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	7.066	14.683	5.225	0.000	0.000	0.000	2.063	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	HG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0060	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0739	0.0000			
PERCENTAGES	0.907	0.000	0.000	0.000	0.578	0.000	0.000	7.397	0.000	98.287	60.366	37.920

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0608	0.0608	0.0479	0.0130	0.1250	0.0984	0.0266	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	13.582	7.066	4.806	1.710	13.392	9.877	3.515	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	43.13	15.32	0.91	2.66	7.49	13.19	2.34	0.90	9.76	0.30	0.17	0.11

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	22.80	33.11	39.27	4.82	128.40	0.91	0.26	14.53	0.28	0.67	119.27	9.12

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 25.10 : 35.42 : 39.63 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 13.81 : *****

Q:OR:AB = 84.44 : 4.33 : 11.23 Q:OR:(AB+AN) = 53.41 : 2.74 : 43.85 OR:ABIAN = 5.88 : 15.25 : 78.87

CIPW NORM FOR SAMPLE NO. 3653 Loc. No. 63ACn1861

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	52.20	15.30	1.30	8.00	5.90	9.40	1.10	0.77	2.60	0.73	0.30	0.293
MOL. AMTS.	0.8688	0.1501	0.0081	0.1113	0.1464	0.1676	0.0177	0.0082	0.1443	0.0091	0.0021	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.20	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.40	6.154
MOL. AMTS.	0.0028	0.0000	0.0364	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	52.52	15.39	1.31	8.05	5.94	9.46	1.11	0.77	2.62	0.73	0.30	0.293
MOL. AMTS.	0.8740	0.1510	0.0082	0.1120	0.1472	0.1686	0.0179	0.0082	0.1452	0.0092	0.0021	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.20	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	6.154
MOL. AMTS.	0.0028	0.0000	0.0366	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.2230	0.0000	0.0000	0.0082	0.0179	0.1249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	13.397	0.000	0.000	4.578	9.364	34.744	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0001	0.1472	0.0975	0.0000	0.0000	0.0000	0.0082	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.010	14.783	12.860	0.000	0.000	0.000	1.896	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0092	0.0000	0.0000	0.0000	0.0021	0.0000	0.0000	0.0366	0.0000			
PERCENTAGES	1.395	0.000	0.000	0.000	0.715	0.000	0.000	3.661	0.000	97.402	62.083	35.319

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0001	0.0001	0.0001	0.0000	0.2446	0.1472	0.0974	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.019	0.010	0.005	0.004	27.633	14.778	12.856	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	43.36	14.98	0.81	5.56	7.31	8.37	1.77	0.82	14.41	0.46	0.21	0.14

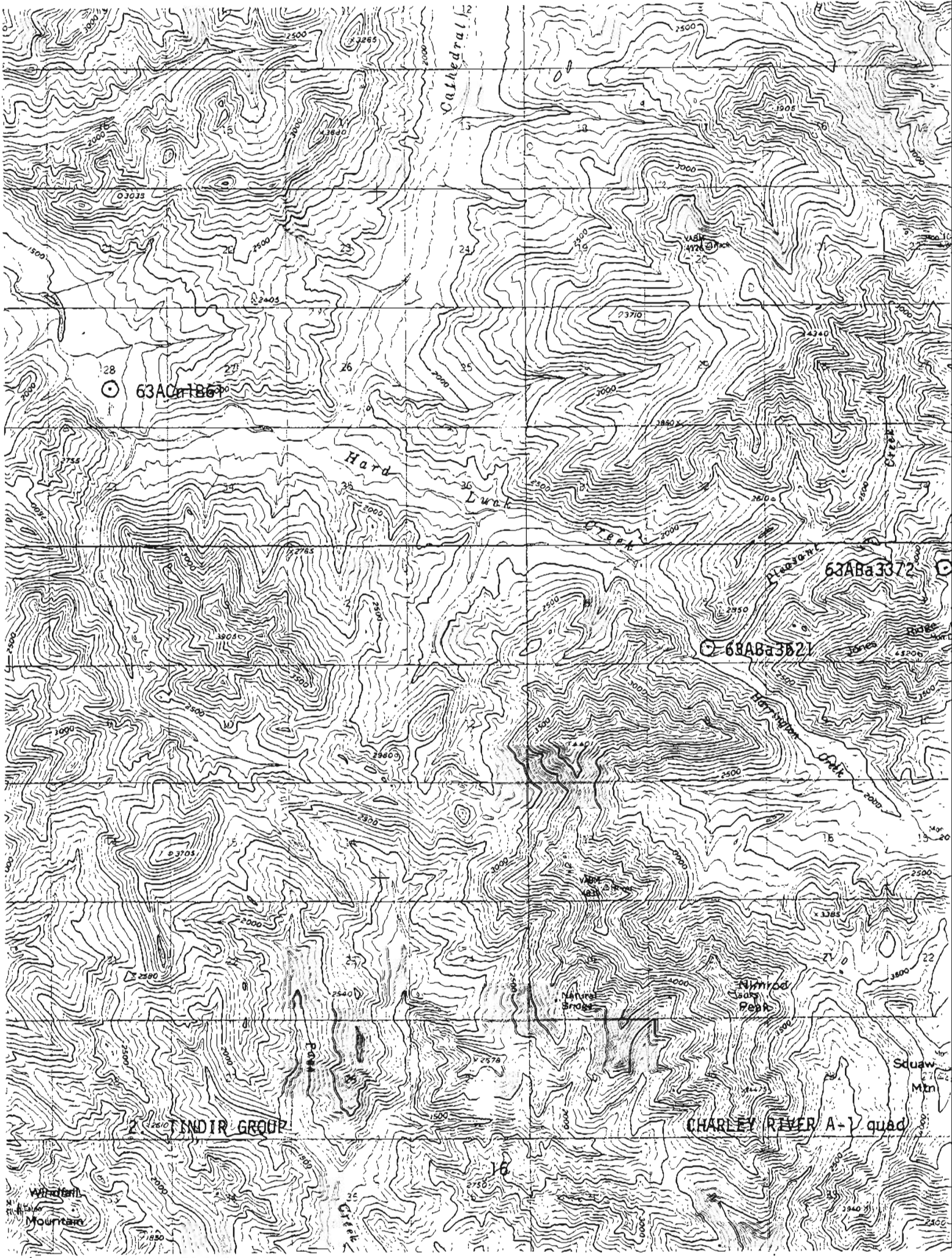
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00

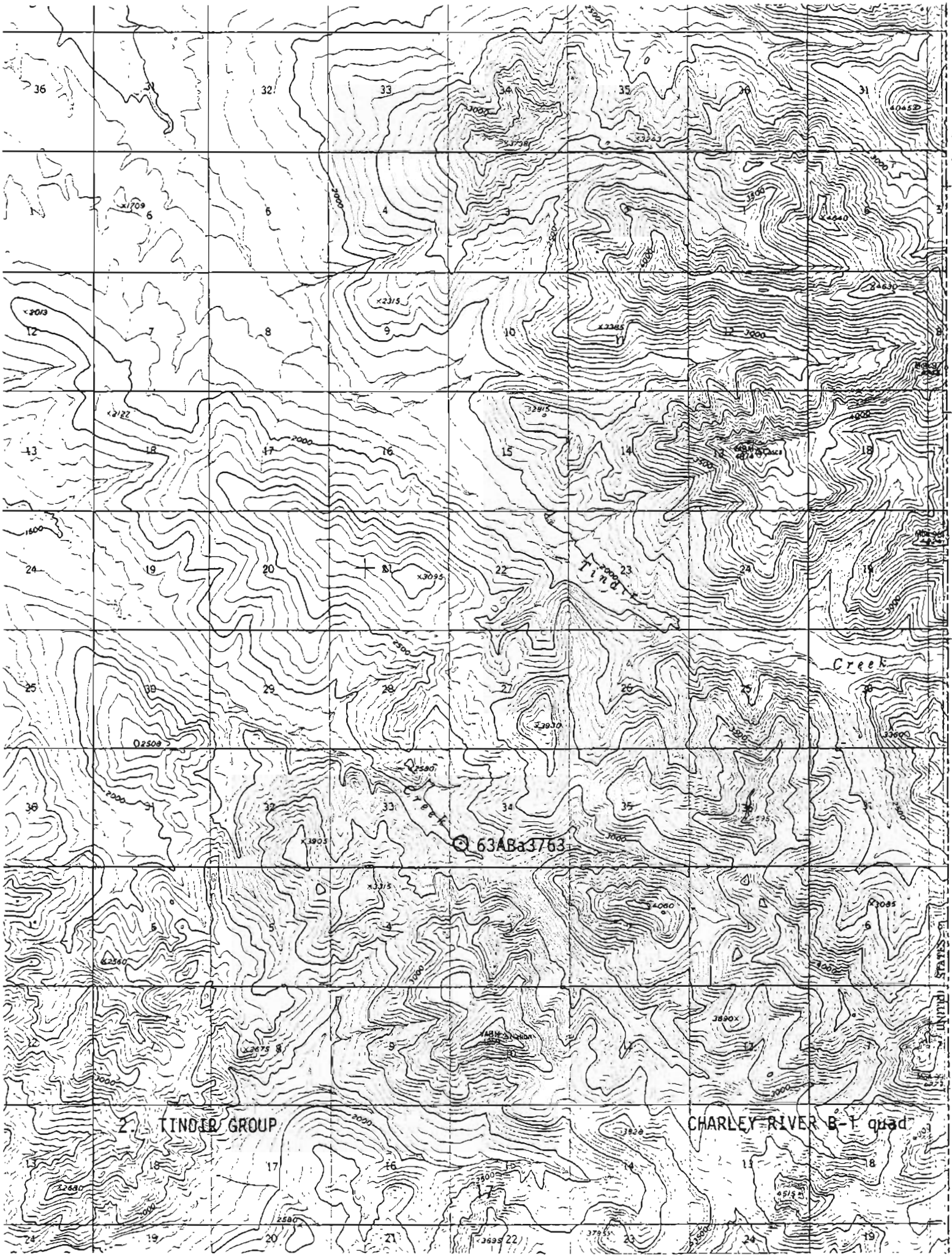
NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	24.19	44.62	27.02	4.18	140.03	1.47	0.34	23.26	0.32	0.53	116.71	23.32

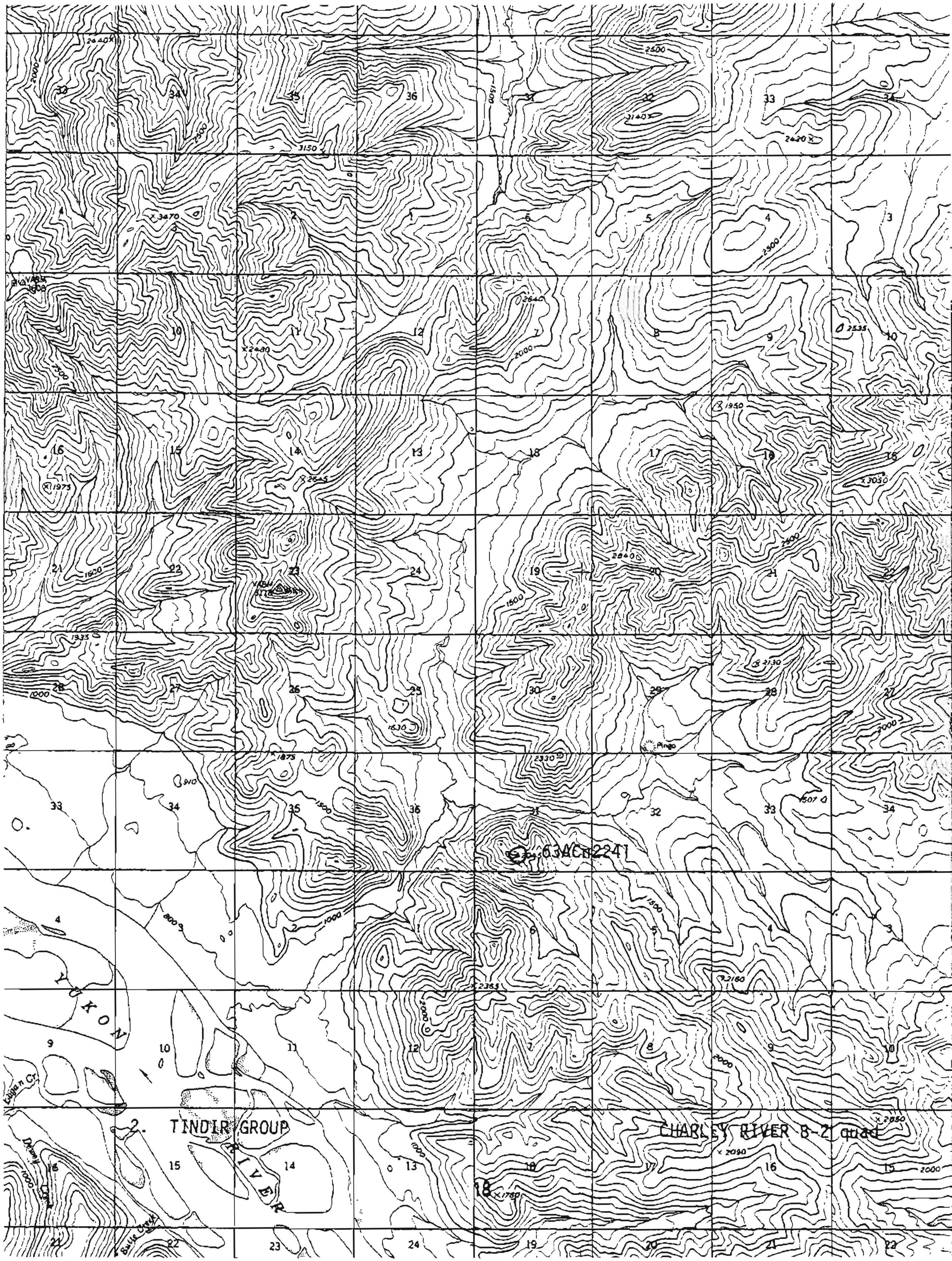
RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 25.55 : 24.13 : 49.23 A:K:F = 2.66 : 2.96 : 94.38 A:NA:F = 2.57 : 6.21 : 89.24

Q:OR:AB = 89.53 : 3.30 : 7.17 Q:OR:(AB+AN) = 59.63 : 2.20 : 38.17 OR:AB:AN = 5.45 : 11.83 : 82.73


63ACn1861
63ABa3372
63ABa3621
Cathedral
Hard Luck Creek
Pleasant
Ridge
Horseshoe Creek
Natural Bridge
Nimrod Lake Peak
Squaw Mtn
Windfall Mountain
Creek
2. TINDIR GROUP
CHARLEY RIVER A-1 quad
16


63ABa3763
Creek
Creek
2. TINDIR GROUP
CHARLEY RIVER B-1 quad


63ACh2241
2. TINDIR GROUP
CHARLEY RIVER B-2 quad
YUKON
RIVER
Pingo
Butte Creek

3. UNNAMED VOLCANIC ROCKS OF PRECAMBRIAN(?) AGE

Field No.	R.R. Lab No.	SQ Lab No.	Description	Location
62ABa2234	163658	64M-1422	basalt	Charley River C-5
62ACn201	163659	64M-1423	basalt	Charley River C-5
62ACn141	163860	64M-1517	diorite(?)	Charley River B-5

RAPID ROCK ANALYSIS

Lab No.	163658	163659	163860
SiO_2	47.1	46.7	39.6
Al_2O_3	14.0	15.9	15.6
Fe_2O_3	1.7	.00	.26
FeO	10.0	9.7	10.4
MgO	6.9	6.3	7.1
CaO	12.0	8.9	6.0
Na_2O	1.8	2.2	4.4
K_2O	.23	2.3	.57
H_2O^-	.26	.76	.26
H_2O^+	3.5	3.0	3.9
TiO_2	1.6	3.0	2.6
P_2O_5	.54	1.1	.61
MnO	.18	.11	.23
CO_2	.12	$<$ .05	8.1
Sum	100	100	100

3. UNNAMED VOLCANIC ROCKS OF PRECAMBRIAN(?) AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1422	64M-1423	64M-1517
Si	M.	M.	M.
Al	7.	10.	10.
Fe	10.	7.	7.
Mg	3.	3.	3.
Ca	7.	5.	5.
Na	1.5	1.5	2.
K	0	2.	1.
Ti	.7	1.5	1.5
P	0	.5	0
Mn	.15	.1	.1
Ag	0	0	0
As	0	0	0
Au	0	0	0
B	0	.001	.0015
Ba	.003	.3	.07
Be	0	.00015	.00015
Bi	0	0	0
Cd	0	0	0
Ce	0	.02	0
Co	.007	.005	.007
Cr	.03	.001	.005
Cu	.015	.003	.01
Ga	.003	.003	.003
Ge	0	0	0
Hf	0	0	0
Hg	0	0	0
In	0	0	0
La	0	.01	.007
Li	0	0	0
Mo	0	0	0

3. UNNAMED VOLCANIC ROCKS OF PRECAMBRIAN(?) AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1422	64M-1423	64M-1517
Nb	0	.01	.007
Ni	.015	.002	.007
Pb	0	0	0
Pd	0	0	0
Pt	0	0	0
Re	0	0	0
Sb	0	0	0
Sc	.007	.0015	.003
Sn	0	0	0
Sr	.02	.2	.07
Ta	0	0	0
Te	0	0	0
Th	0	0	0
Tl	0	0	0
U	0	0	0
V	.1	.05	.05
W	0	0	0
Y	.005	.007	.005
Yb	.0007	.0005	.0005
Zn	0	0	0
Zr	.01	.05	.02
Looked for only when Ca or Ce found:			
Pr		.005	0
Nd		.01	0
Sm		0	0
Eu		0	0
Looked for only when Y is found above .005%:			
Gd		0	
Tb		0	
Dy		0	
Ho		0	
Er		0	
Tm		0	
Lu		0	

CIPW NORM FOR SAMPLE NO. 3658 Loc. No. 62ABa2234

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	47.10	14.00	1.70	10.00	6.90	12.00	1.80	0.23	3.50	1.60	0.54	0.297
MOL. AMTS.	0.7839	0.1373	0.0106	0.1392	0.1712	0.2140	0.0290	0.0024	0.1943	0.0200	0.0038	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.67	5.882
MOL. AMTS.	0.0025	0.0000	0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	47.26	14.05	1.71	10.03	6.92	12.04	1.81	0.23	3.51	1.61	0.54	0.297
MOL. AMTS.	0.7865	0.1378	0.0107	0.1396	0.1717	0.2147	0.0291	0.0024	0.1949	0.0201	0.0038	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	5.882
MOL. AMTS.	0.0025	0.0000	0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0084	0.0000	0.0000	0.0024	0.0291	0.1062	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.505	0.000	0.000	1.364	15.282	29.539	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0931	0.1717	0.1114	0.0000	0.0000	0.0000	0.0107	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	10.810	17.241	14.700	0.000	0.000	0.000	2.473	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0201	0.0000	0.0000	0.0000	0.0038	0.0000	0.0000	0.0027	0.0000			
PERCENTAGES	3.049	0.000	0.000	0.000	1.283	0.000	0.000	0.274	0.000	96.519	46.689	49.830

MINERALS	OI	OI-WO	OI-EN	OI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0931	0.0931	0.0564	0.0366	0.1901	0.1153	0.0748	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	21.307	10.810	5.666	4.831	21.444	11.575	9.869	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	37.53	13.15	1.02	6.66	8.20	10.25	2.78	0.23	18.60	0.96	0.36	0.12

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	19.15	46.61	29.85	4.39	109.34	2.79	0.53	27.10	0.08	0.51	117.57	-8.23

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 18.51 : 31.76 : 48.92 A:K:F = 0.00 : 0.00 : 0.00 A:K:F = ***** : 11.23 : *****

Q:OR:AB = 21.01 : 6.13 : 72.87 Q:OR:(AB+AN) = 5.75 : 1.68 : 92.58 OR:AB:AN = 1.78 : 21.15 : 77.07

CIPW NORM FOR SAMPLE NO. 3659 Loc. No. 62ACn201

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	46.70	15.90	0.00	9.70	6.30	8.90	2.20	2.30	3.00	3.00	1.10	0.340
MOL. AMTS.	0.7772	0.1559	0.0000	0.1350	0.1563	0.1587	0.0355	0.0244	0.1665	0.0375	0.0077	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.21	0.000
MOL. AMTS.	0.0016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	47.07	16.03	0.00	9.78	6.35	8.97	2.22	2.32	3.02	3.02	1.11	0.340
MOL. AMTS.	0.7834	0.1572	0.0000	0.1361	0.1575	0.1600	0.0358	0.0246	0.1679	0.0378	0.0078	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.000
MOL. AMTS.	0.0016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0246	0.0358	0.0968	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	13.700	18.764	26.929	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0371	0.0755	0.0479	0.0410	0.0260	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	4.314	7.585	6.315	5.768	5.292	0.000	0.000	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0378	0.0000	0.0000	0.0000	0.0078	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	5.743	0.000	0.000	0.000	2.626	0.000	0.000	0.000	0.000	97.035	59.393	37.642

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0371	0.0371	0.0227	0.0144	0.0863	0.0528	0.0335	0.0670	0.0410	0.0260	0.0000
PERCENTAGES	8.496	4.314	2.282	1.900	9.717	5.302	4.414	11.060	5.768	5.292	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	37.98	15.24	0.00	6.60	7.64	7.75	3.47	2.39	16.27	1.83	0.76	0.08

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	23.37	43.88	23.78	8.98	116.46	5.63	1.16	24.95	0.41	0.53	135.91	-19.45

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 18.31 : 25.83 : 55.26 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 12.29 : *****

Q:OR:AB = 0.00 : 40.75 : 59.25 Q:OR:(AB+AN) = 0.00 : 15.66 : 84.34 OR:AB:AN = 15.66 : 22.76 : 61.58

CIPW NORM FOR SAMPLE NO. 3860 Loc. No. 62ACn141

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	39.60	15.60	0.26	10.40	7.10	6.00	4.40	0.57	3.90	2.60	0.61	0.394
MOL. AMTS.	0.6591	0.1530	0.0016	0.1448	0.1761	0.1070	0.0710	0.0061	0.2165	0.0325	0.0043	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.23	0.00	8.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.37	40.000
MOL. AMTS.	0.0032	0.0000	0.1840	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	39.85	15.70	0.26	10.47	7.15	6.04	4.43	0.57	3.92	2.62	0.61	0.394
MOL. AMTS.	0.6632	0.1540	0.0016	0.1457	0.1772	0.1077	0.0714	0.0061	0.2179	0.0327	0.0043	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.23	0.00	8.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	40.000
MOL. AMTS.	0.0033	0.0000	0.1852	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0764	0.0000	0.0061	0.0714	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	7.794	0.000	3.390	37.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0838	0.1125	0.0008	0.0010	0.0000	0.0016	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	8.410	14.845	0.106	0.207	0.000	0.379	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0327	0.0000	0.0000	0.0000	0.0043	0.0000	0.0000	0.0933	0.0920			
PERCENTAGES	4.969	0.000	0.000	0.000	1.454	0.000	0.000	9.334	7.754	96.110	48.651	47.459

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1963	0.0838	0.1125	0.0018	0.0008	0.0010	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	23.255	8.410	14.845	0.313	0.106	0.207	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	29.80	13.84	0.15	6.54	7.96	4.84	6.42	0.55	19.58	1.47	0.39	0.15

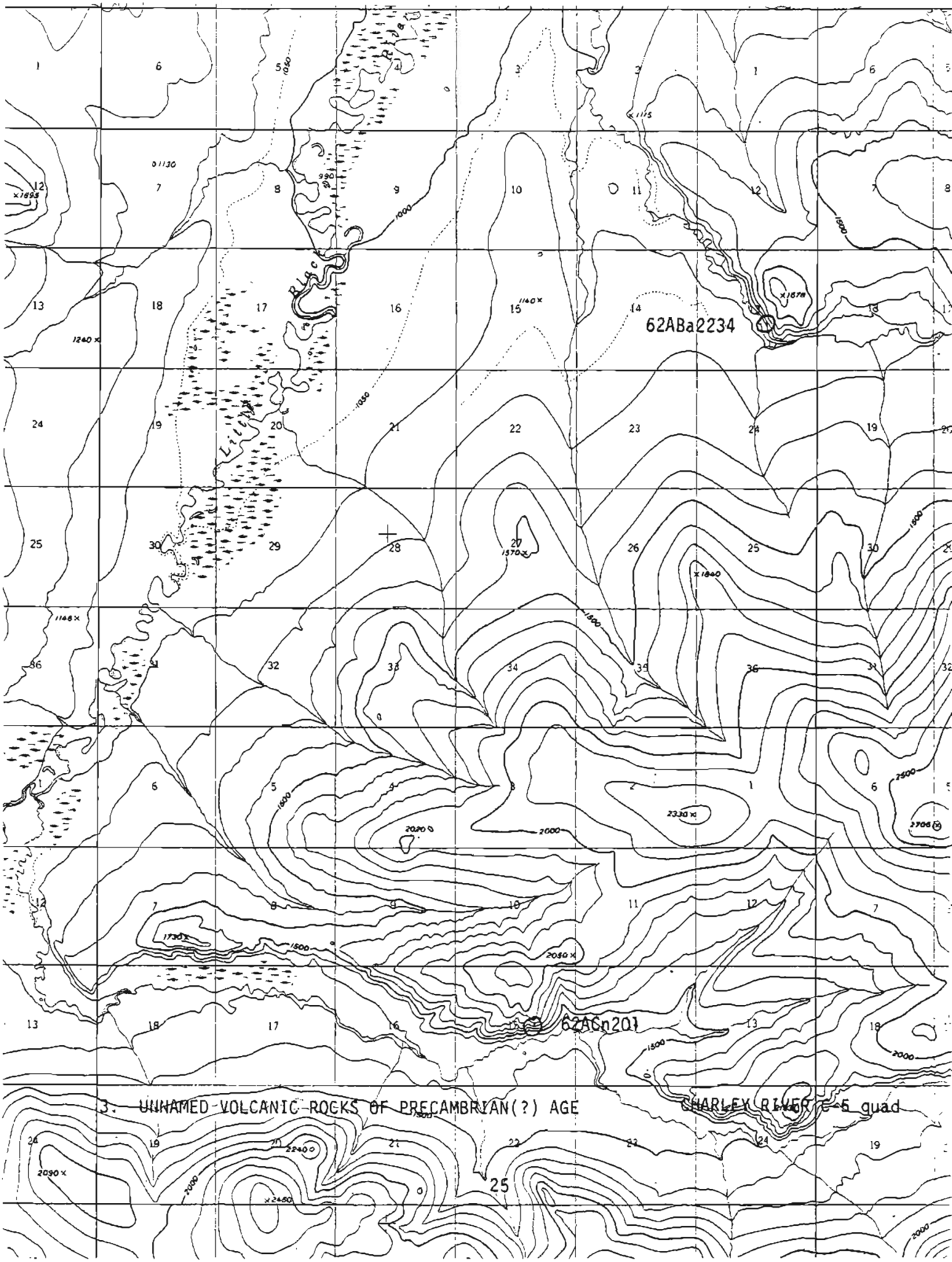
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	8.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	23.03	49.27	16.10	11.60	99.20	4.90	0.65	32.58	0.08	0.54	146.38	-47.19

RATIOS FOR TRIANGULAR DIAGRAMS

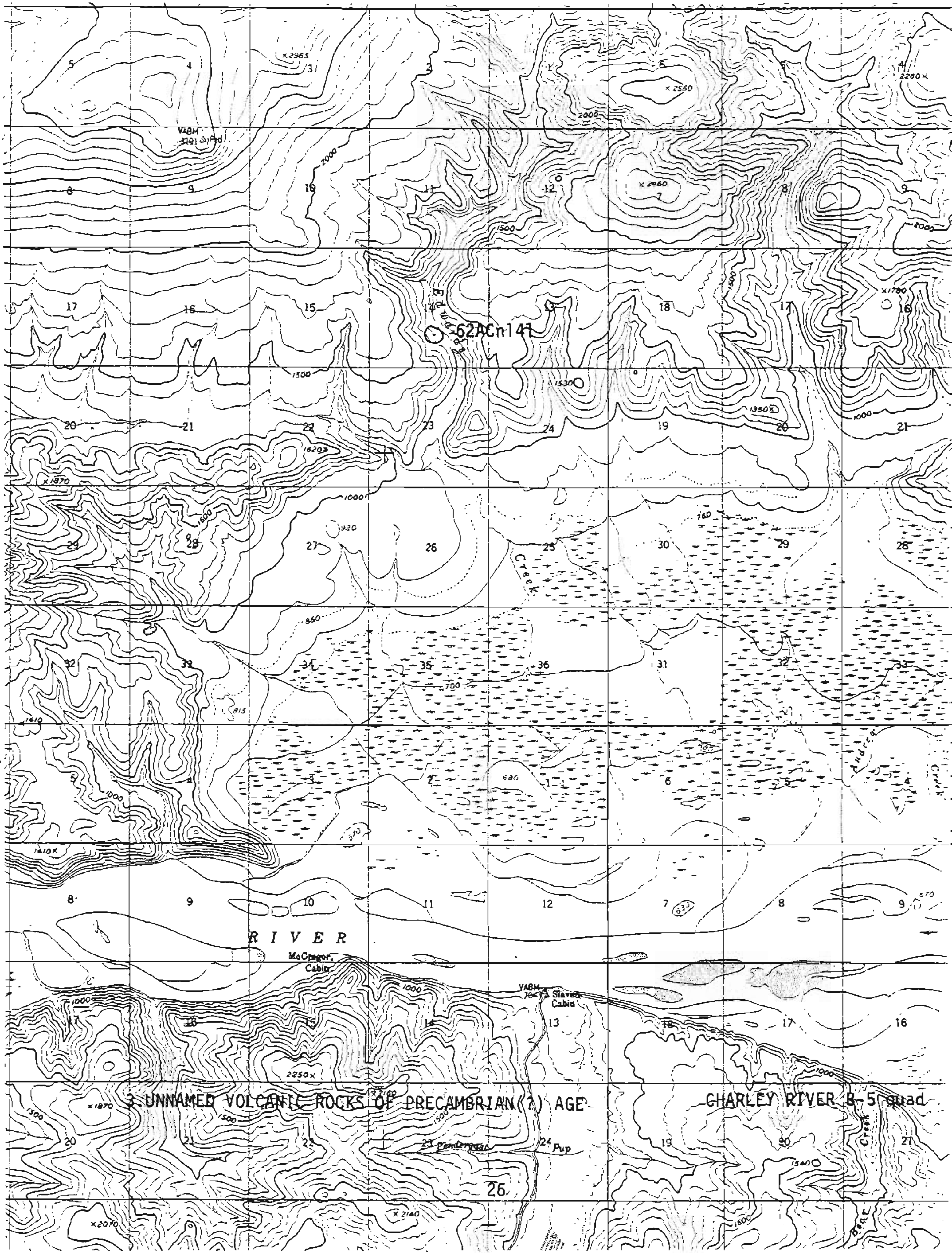
A:C:F = 19.31 : 0.00 : 79.07 A:K:F = 19.03 : 1.48 : 79.49 A:N:F = 16.41 : 15.02 : 67.20

Q:OR:AB = 0.00 : 7.85 : 92.15 Q:OR:(AB+AN) = 0.00 : 7.85 : 92.15 OR:AB:AN = 7.85 : 92.15 : 0.00



3. UNNAMED VOLCANIC ROCKS OF PRECAMBRIAN(?) AGE

CHARLES RIVER C-5 quad



3. UNNAMED VOLCANIC ROCKS OF PRECAMBRIAN(?) AGE

CHARLEY RIVER B-5 quad

4. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ABa3322	164352	64M-2423	dolomite, Funnel Ck. Ls.	Charley River A-1
62ACn912	164353	64M-2424	siltstone, Adams Argillite	Charley River B-2
63ABa3292	163654	64M-1418	diabase, Adams Argillite	Eagle D-1
60ABa644	163656	64M-1420	basalt, Adams Argillite	Charley River A-2
63ABa3333A	164350	64M-2421	limestone, Jones Ridge Ls.	Charley River A-1
63ABa3333D	164351	64M-2422	limestone, Jones Ridge Ls.	Charley River A-1
61AMc941	165574	65M-1071	limestone cgl., Hillard Ls.	Eagle D-1

RAPID ROCK ANALYSIS

Lab No.	164352	164353	163654	163656	164350	164351	165574
SiO_2	.95	81.6	49.5	25.1	.00	.77	2.1
Al_2O_3	.18	8.2	7.2	12.9	.08	.35	.49
Fe_2O_3	.00	2.3	3.3	1.8	.00	.00	.12
FeO	.08	1.7	5.7	10.5	.00	.04	.04
MgO	20.0	.6	7.6	7.7	1.0	2.2	.5
CaO	31.7	.32	8.4	15.3	54.1	52.5	53.0
Na_2O	<.05	<.05	.00	.00	<.05	<.05	1.4
K_2O	.11	2.0	1.1	1.2	.22	.28	.12
H_2O^-	.03	.40	1.0	1.6	.03	.09	.15
H_2O^+	.59	2.0	3.7	6.6	.35	.33	.44
TiO_2	.00	.45	3.0	4.4	.00	.00	.03
P_2O_5	.07	.24	.93	.80	.03	.14	2.0
MnO	.00	.00	.03	.08	.00	.00	.02
CO_2	46.3	.12	7.9	11.3	43.9	42.7	39.5
Aqua Regia Sol. S as SO_3							
Volatiles Other Than H_2O & CO_2							
Sum	100	100	99	99	100	99	100
Powder Density by Air Pycnometer	2.87	2.73			2.72	2.76	

4. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2423	64M-2424	64M-1418	64M-1420	64M-2421	64M-2422	65M-1071
Si	.15	M.	M.	10.	.03	.5	1.5
Al	.03	5.	5.	7.	.05	.5	.5
Fe	.05	2.	7.	10.	.015	.07	.15
Mg	5.	.5	5.	5.	.1	.7	.3
Ca	M.	.1	5.	10.	M.	M.	M.
Na	.05	.05	0	.05	0	0	0
K	0	2.	1.5	1.5	0	0	0
Ti	0	.3	1.5	2.	.0007	.015	.03
P	0	0	.5	0	0	0	.7
Mn	.015	.007	.05	.1	.005	.015	.02
Ag	0	0	0	0	0	0	0
As	0	0	0	0	0	0	0
Au	0	0	0	0	0	0	0
B	0	.007	.001	.002	0	0	0
Ba	.0015	.03	.2	.15	.002	.003	.07
Be	0	.00015	.00015	.0003	0	0	0
Bi	0	0	0	0	0	0	0
Cd	0	0	0	0	0	0	0
Ce	*	0	.02	.05	*	*	*
Co	0	.0007	.003	.005	0	0	0
Cr	.0003	.003	.07	.02	.0005	.0015	.002
Cu	.0003	.001	.015	.007	.00015	.0002	.001
Ga	0	.001	.002	.005	0	0	0
Ge	0	0	0	0	0	0	0
Hf	0	0	0	0	0	0	0
Hg	0	0	0	0	0	0	0
In	0	0	0	0	0	0	0
La	0	0	.01	.02	0	0	0
Li	0	0	0	0	0	0	0
Mo	0	0	0	0	0	0	.001

* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.

4. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-2423	64M-2424	64M-1418	64M-1420	64M-2421	64M-2422	65M-1071
Nb	0	.001	.01	.01	0	0	0
Ni	.0005	.003	.03	.02	.0005	.001	.0015
Pb	0	.01	.002	0	0	0	0
Pd	0	0	0	0	0	0	0
Pt	0	0	0	0	0	0	0
Re	0	0	0	0	0	0	0
Sb	0	0	0	0	0	0	0
Sc	0	.0007	.002	.003	0	0	0
Sn	0	0	0	0	0	0	0
Sr	.005	.0015	.05	.05	.015	.02	.07
Ta	0	0	0	0	0	0	0
Te	0	0	0	0	0	0	0
Th	0	0	0	0	0	0	0
Tl	0	0	0	0	0	0	0
U	0	0	0	0	0	0	0
V	.001	.005	.05	.07	.002	.003	.005
W	0	0	0	0	0	0	0
Y	0	.002	.003	.01	0	0	.003
Yb	0	.0002	.0003	.0007	0	0	.0001
Zn	0	.02	0	0	0	0	0
Zr	0	.015	.03	.05	0	0	0
Looked for only when La or Ce found:							
Pr	0		0	.007	0	0	
Nd	*		.01	.02	*	*	
Sm	0		0	.015	0	0	
Eu	0	0	0	0	0	0	0
Looked for only when Y is found above .005%:							
Gd				0			
Tb				0			
Dy				0			
Ho				0			
Er				0			
Tm				0			
Lu				0			

* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.

CIPW NORM FOR SAMPLE NO. 3654 Loc. No. 63ABa3292

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.50	7.20	3.30	5.70	7.60	8.40	0.00	1.10	3.70	3.00	0.93	0.145
MOL. AMTS.	0.8238	0.0706	0.0207	0.0793	0.1885	0.1498	0.0000	0.0117	0.2054	0.0375	0.0066	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.03	0.00	7.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.36	1.727
MOL. AMTS.	0.0004	0.0000	0.1795	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	50.33	7.32	3.36	5.80	7.73	8.54	0.00	1.12	3.76	3.05	0.95	0.145
MOL. AMTS.	0.8376	0.0718	0.0210	0.0807	0.1917	0.1523	0.0000	0.0119	0.2088	0.0382	0.0067	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.03	0.00	8.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.727
MOL. AMTS.	0.0004	0.0000	0.1825	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.6052	0.0599	0.0000	0.0119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	36.362	6.110	0.000	6.609	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	NT	CM	RM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1393	0.0219	0.0000	0.0000	0.0000	0.0210	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	13.981	2.890	0.000	0.000	0.000	4.869	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0382	0.0000	0.0000	0.0000	0.0067	0.0000	0.0000	0.1301	0.0524			
PERCENTAGES	5.793	0.000	0.000	0.000	2.240	0.000	0.000	13.020	4.420	96.288	49.080	47.207

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1612	0.1393	0.0219	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	16.871	13.981	2.890	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	M	TI	P	MN
	39.49	6.76	1.98	3.80	9.03	7.17	0.00	1.12	19.67	1.80	0.63	0.02

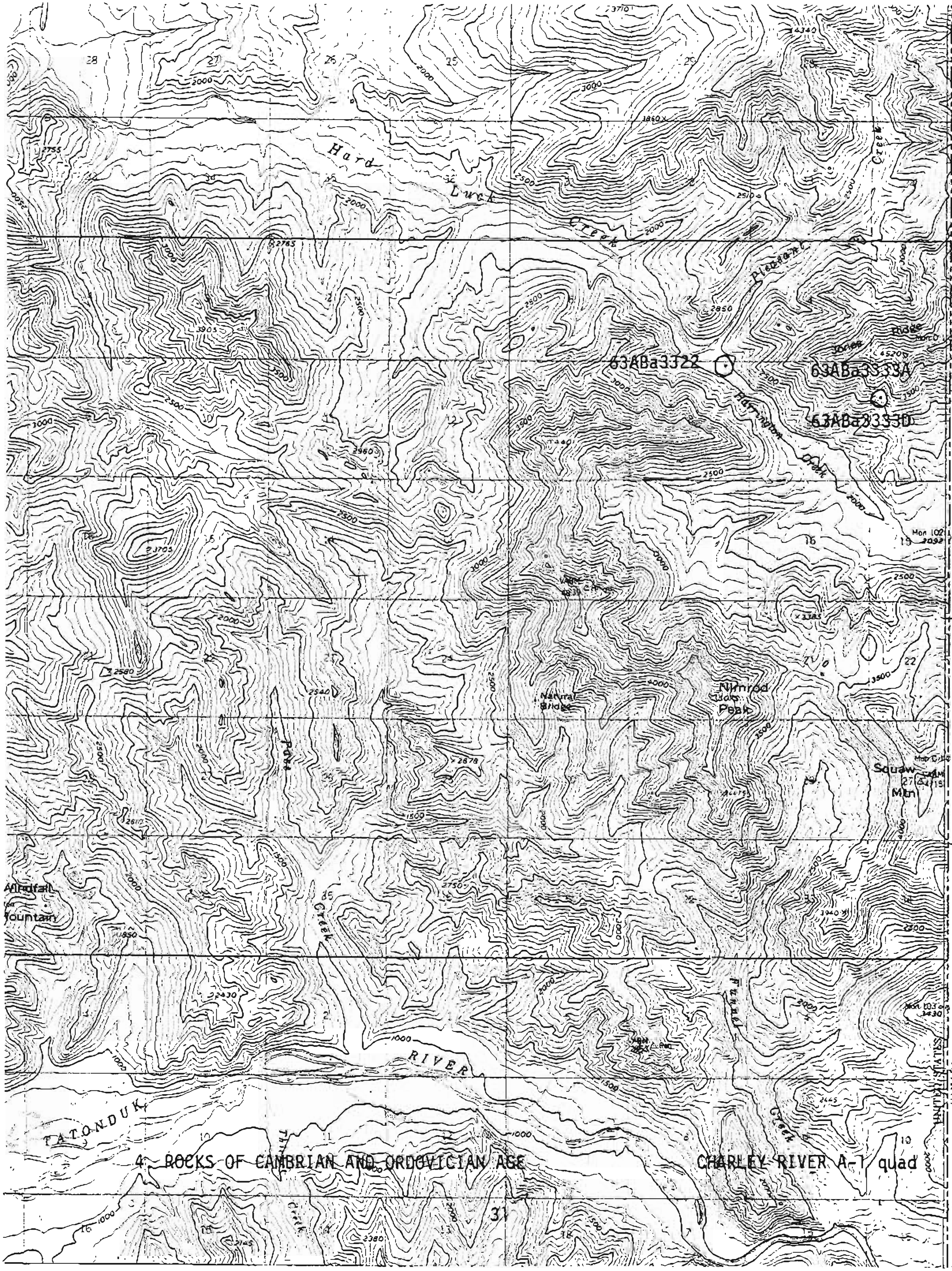
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	8.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	M	K	MG	SI*	QZ
	13.04	57.16	27.65	2.16	152.08	6.93	1.21	37.91	1.00	0.61	108.62	43.46

RATIOS FOR TRIANGULAR DIAGRAMS

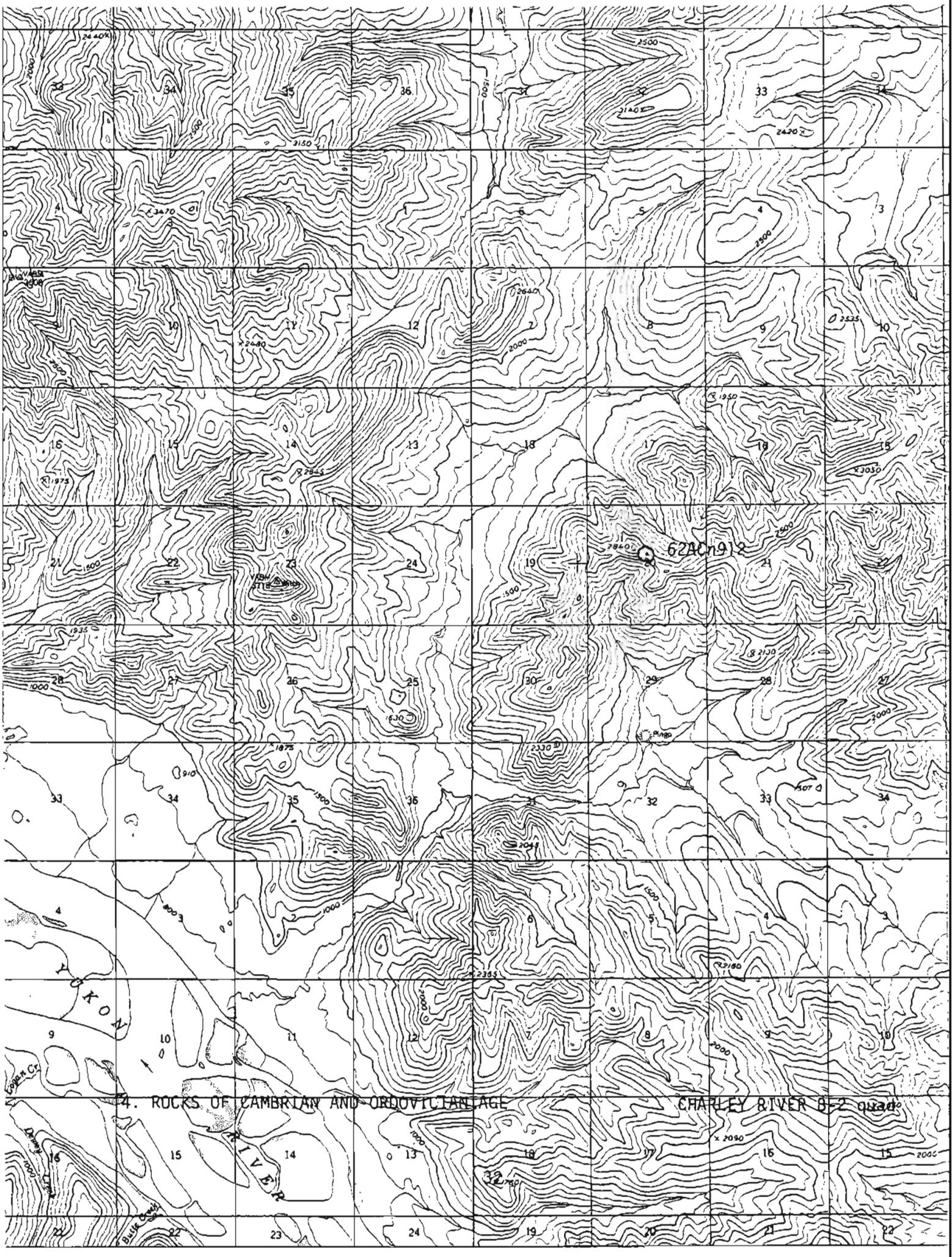
AICIF = 22.88 : 0.00 : 76.88 AIKIF = 22.14 : 3.25 : 74.61 AIKIF = 22.88 : 0.00 : 76.88

QIORIAB = 98.08 : 1.92 : 0.00 QIORI(AB+AN) = 98.08 : 1.92 : 0.00 ORIABIAN = ***** : 0.00 : 0.00

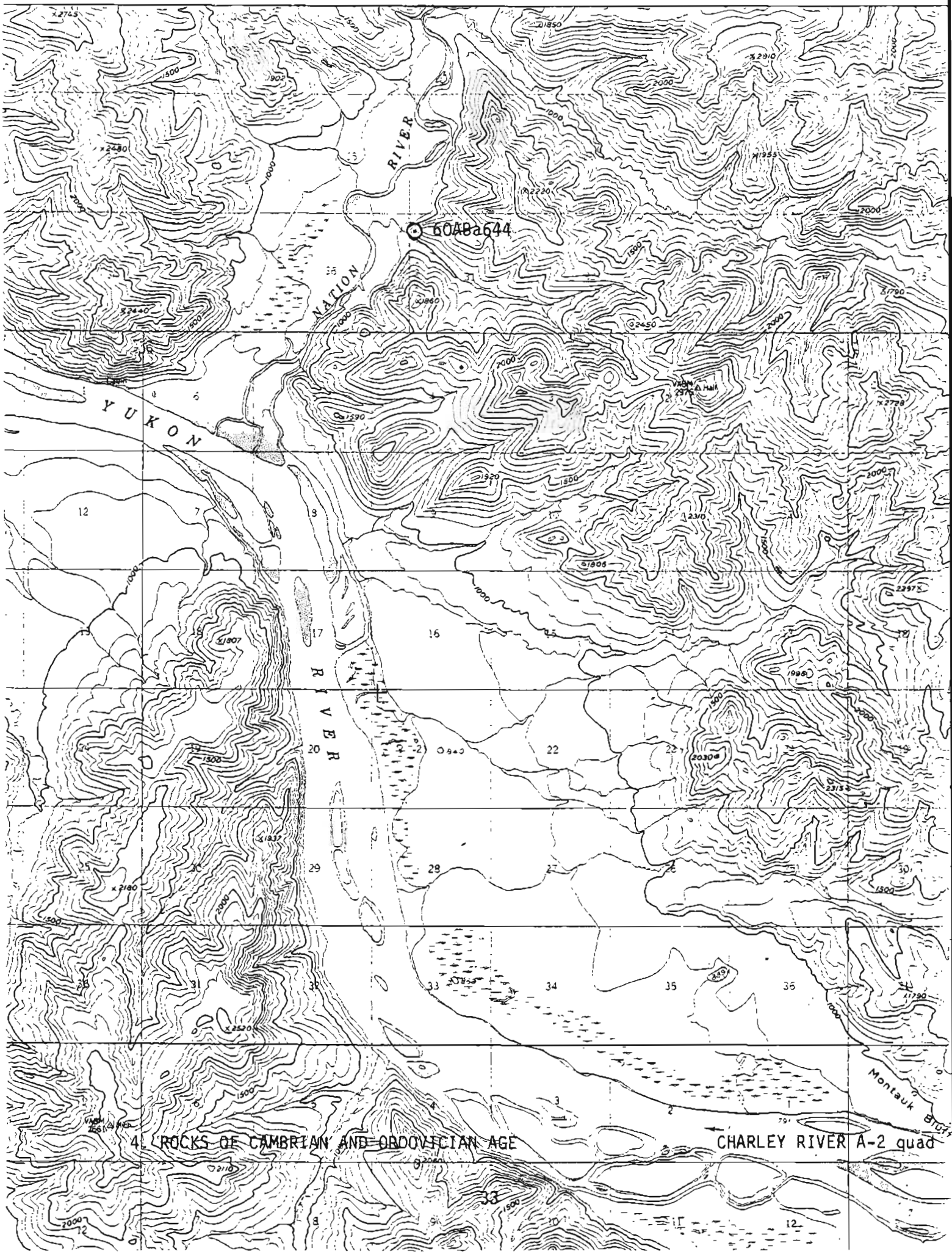


4. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE

CHARLEY RIVER A-1 quad

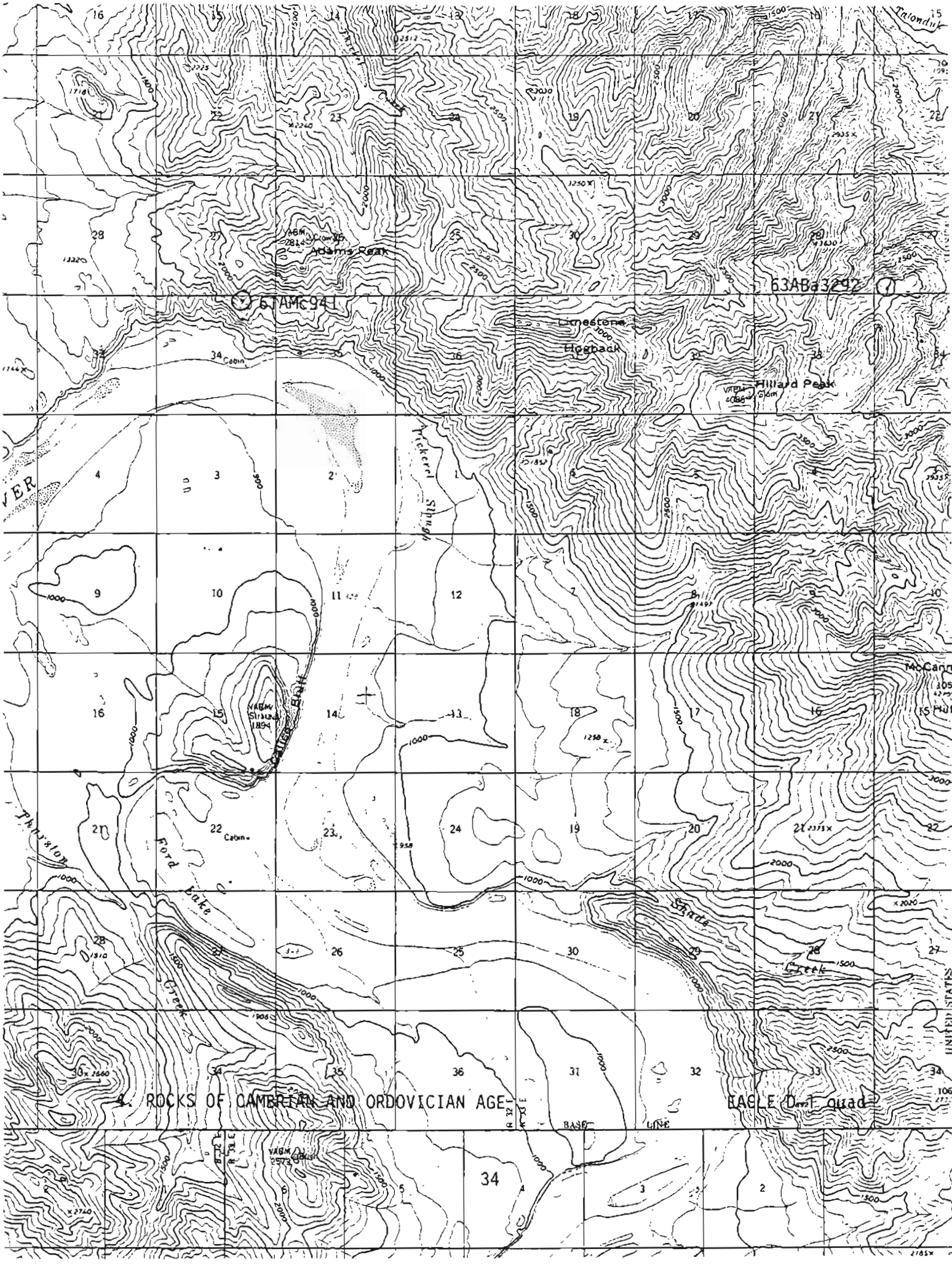


54. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE



4. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE

CHARLEY RIVER A-2 quad



4. ROCKS OF CAMBRIAN AND ORDOVICIAN AGE

5. ROCKS OF ORDOVICIAN, SILURIAN AND DEVONIAN AGE

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ABa3293	164354	64M-2425	argillite, Road River Fm.	Eagle D-1
62RJR-3	164345	64M-2416	shale, Road River Fm.	Charley River A-1
62ABa2771A	164344	64M-2415	limestone, Road River Fm.	Charley River B-2
60ABa192	164343	64M-2414	limestone, McCann Hill Ch.	Charley River A-1
62ABa2802	164346	64M-2417	limestone, McCann Hill Ch.	Charley River A-1
60ABa83A	164340	64M-2411	argillite, McCann Hill Ch.	Eagle D-1
60ABa632	164342	64M-2413	limestone, McCann Hill Ch.	Charley River B-2

RAPID ROCK ANALYSIS

Lab No.	164354	164345	164344	164343	164346	164340	164342
SiO_2	74.1	65.4	9.2	15.6	.00	88.3	5.2
Al_2O_3	2.7	12.2	1.4	1.6	.45	1.0	1.8
Fe_2O_3	.41	2.9	.48	.35	.00	.11	.56
FeO	.30	.80	.56	.08	.04	.16	.16
MgO	.2	1.4	.9	1.0	.8	.0	1.2
CaO	8.6	1.3	47.1	44.7	54.3	4.0	48.8
Na_2O	.04	.39	.06	< .05	< .05	.05	.05
K_2O	.52	3.2	.33	.45	.18	.15	.55
H_2O^-	.74	.80	.23	.17	.02	.17	.20
H_2O^+	1.3	3.7	.57	.76	.47	1.3	.73
TiO_2	.05	.90	.05	.04	.00	.00	.04
P_2O_5	6.4	.31	.07	.14	.03	2.8	.12
MnO	.00	.00	.00	.00	.00	.00	.02
CO_2	.10	1.5	38.0	34.8	43.7	.05	39.7
Aqua Regia Sol. S as SO_3	.06	(4.5)[1/]	.65			.16	
Volatiles Other Than H_2O & CO_2	3.9	4.6				1.3	
Sum	99	99	100	100	100	100	99
Powder Density by Air Pycnometer	2.62	2.65	2.77	2.74	2.74	2.62	2.78

[1/] Not in the summation as it is probably all part of the volatiles.

5. ROCKS OF ORDOVICIAN, SILURIAN AND DEVONIAN AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2425	64M-2416	64M-2415	64M-2414	64M-2417	64M-2411	64M-2413
Si	M.	M.	3.	5.	.05	M.	1.5
Al	2.	7.	1.5	1.5	.05	.7	1.5
Fe	.5	3.	1.	.3	.015	.15	.7
Mg	.1	.7	.5	.5	.1	.02	.5
Ca	7.	1.5	M.	M.	M.	3.	M.
Na	.03	.5	.15	.03	0	.03	.07
K	0	3.	0	.7	0	0	.7
Ti	.05	.7	.1	.07	.002	.01	.1
P	3.	0	0	0	0	1.5	0
Mn	.002	.015	.05	.01	.007	.0005	.05
Ag	.0002	0	0	0	0	.00007	0
As	0	0	0	0	0	0	0
Au	0	0	0	0	0	0	0
B	.003	.01	.001	.001	0	.0015	.001
Ba	.15	.3	.15	.07	.007	.05	.07
Be	0	.0002	.00015	0	0	0	0
Bi	0	0	0	0	0	0	0
Cd	0	0	0	0	0	0	0
Ce	0	0	*	*	*	0	*
Co	.0005	.0015	0	0	0	0	0
Cr	.02	.01	.002	.002	.0005	.005	.003
Cu	.07	.005	.0002	.0005	.0001	.015	.0005
Ga	.001	.0015	.0003	.0003	0	0	.0003
Ge	0	0	0	0	0	0	0
Hf	0	0	0	0	0	0	0
Hg	0	0	0	0	0	0	0
In	0	0	0	0	0	0	0
La	.003	0	.007	0	0	0	0
Li	0	0	0	0	0	0	0
Mo	.0015	.003	.0007	0	0	.001	.0005

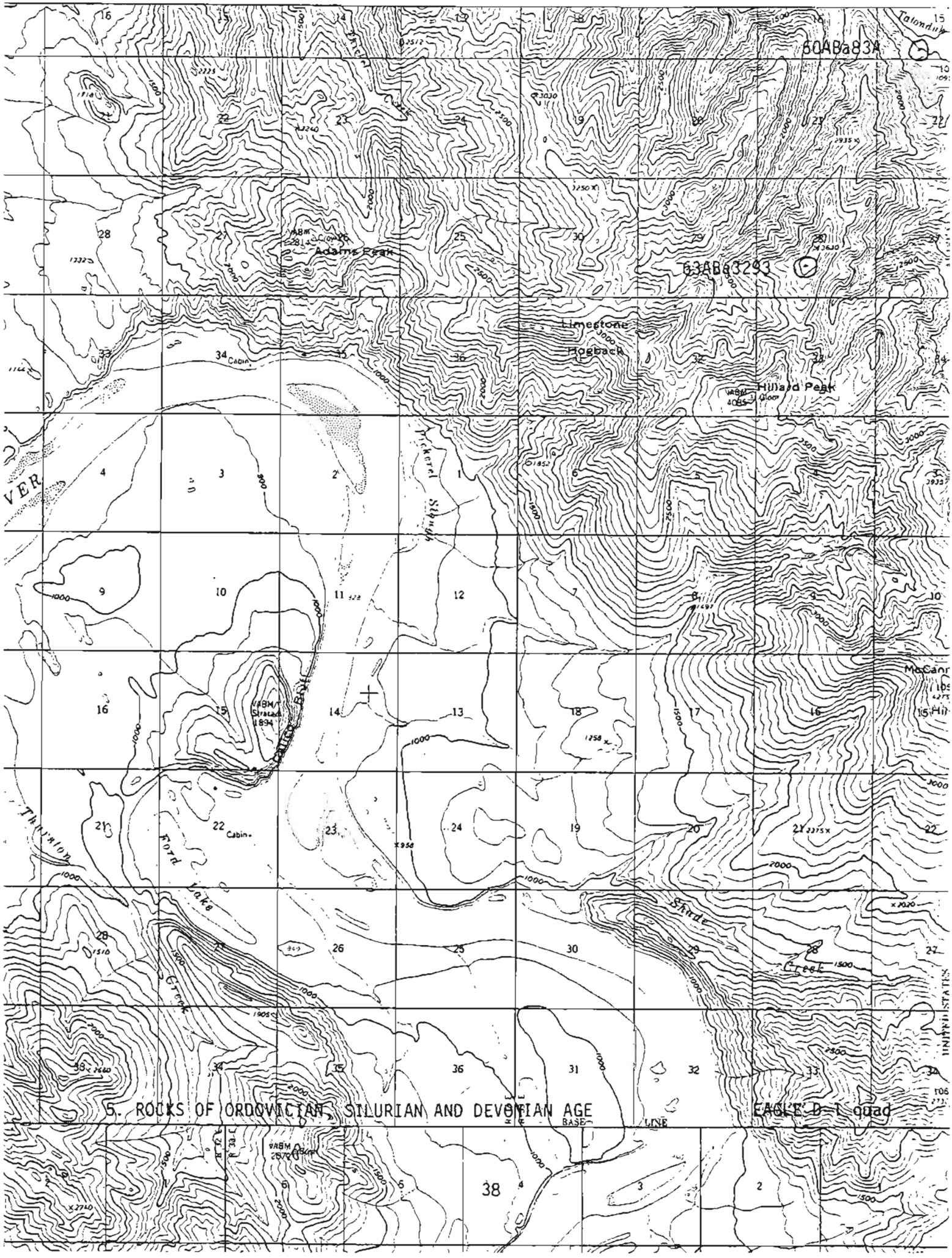
* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.

5. ROCKS OF ORDOVICIAN, SILURIAN AND DEVONIAN AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

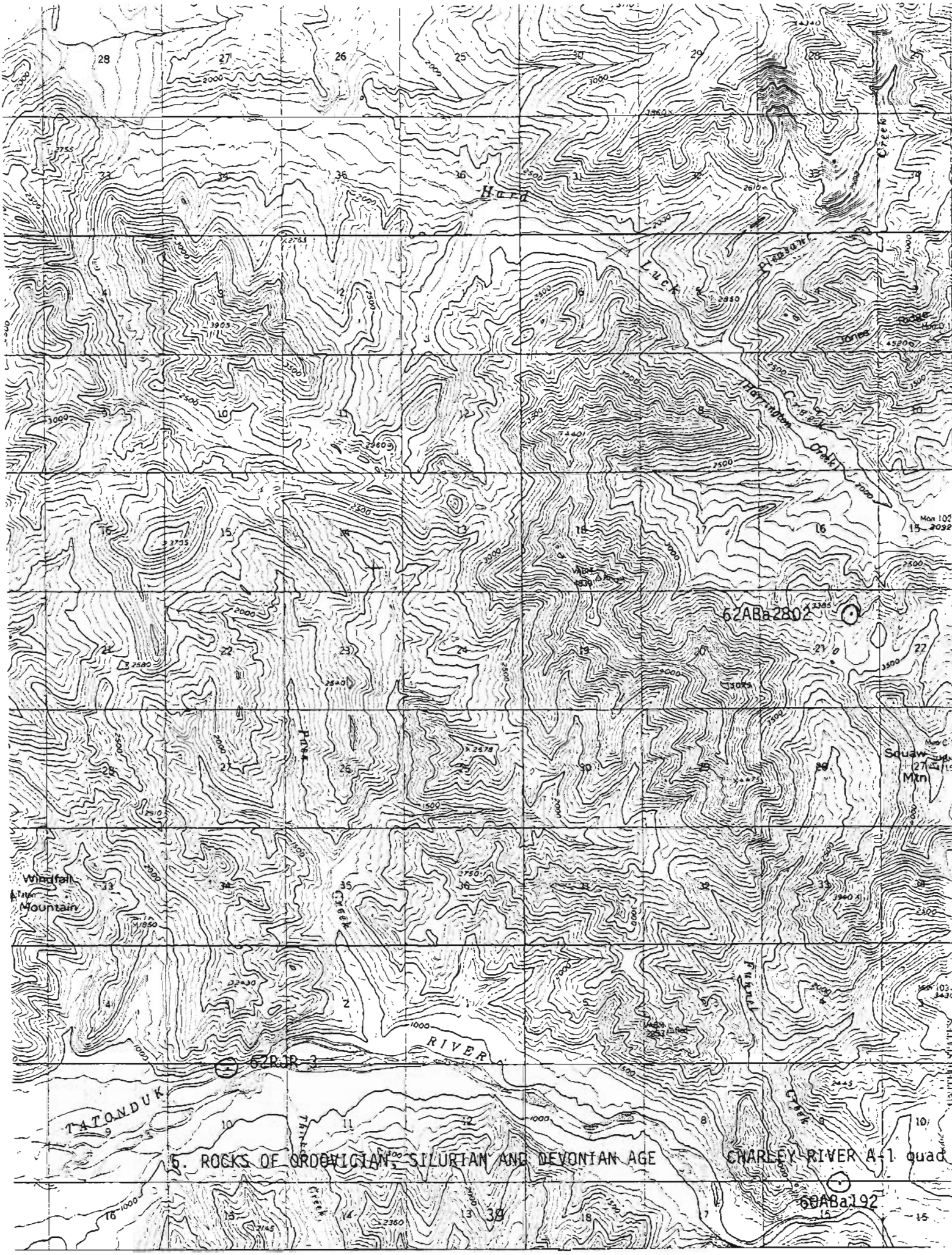
Lab No.	64M-2425	64M-2416	64M-2415	64M-2414	64M-2417	64M-2411	64M-2413
Nb	0	.002	.0015	0	0	0	.001
Ni	.01	.015	.003	.002	.0005	.002	.001
Pb	.001	.0015	0	0	0	.0015	0
Pd	0	0	0	0	0	0	0
Pt	0	0	0	0	0	0	0
Re	0	0	0	0	0	0	0
Sb	0	0	0	0	0	0	0
Sc	.0005	.001	0	.0005	0	0	.0005
Sn	0	0	0	0	0	0	0
Sr	.01	.015	.2	.05	.015	.003	.1
Ta	0	0	0	0	0	0	0
Te	0	0	0	0	0	0	0
Th	0	0	0	0	0	0	0
Tl	0	0	0	0	0	0	0
U	0	0	0	0	0	0	0
V	.07	.07	.02	.015	.002	.05	.005
W	0	0	0	0	0	0	0
Y	.01	.002	.005	.003	0	.003	.001
Yb	.001	.0003	.0003	.0002	0	.0005	.0001
Zn	.03	0	0	0	0	0	0
Zr	.002	.01	.01	.0015	0	0	.007
Looked for only when La or Ce found:							
Pr	0		0	0	0	0	0
Nd	0		*	*	*	0	*
Sm	0		0	0	0	0	0
Eu	0	0	0	0	0	0	0

*High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.

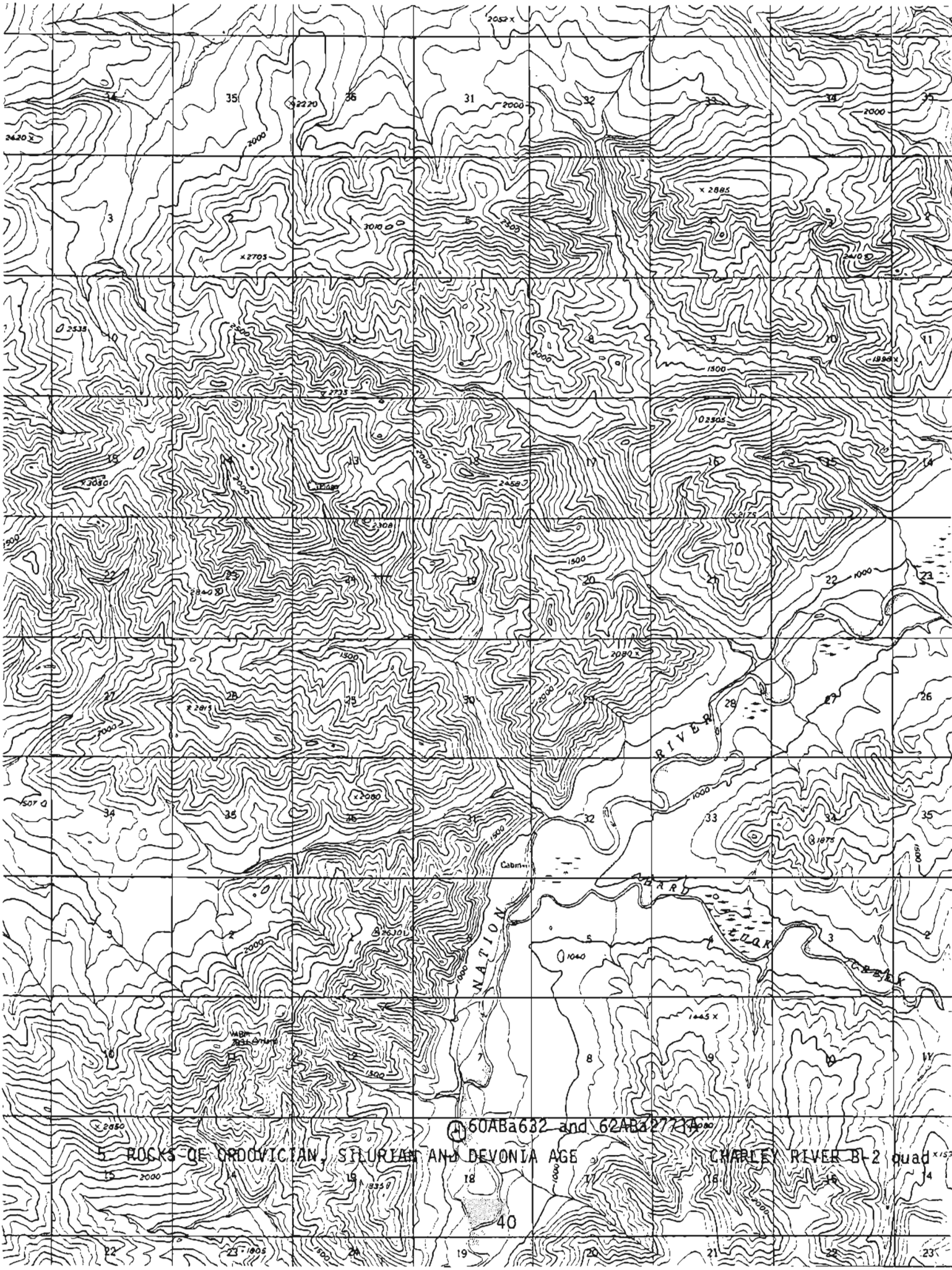


5. ROCKS OF ORDOVICIAN, SILURIAN AND DEVONIAN AGE

EAGLE D-1 quad



5. ROCKS OF ORDOVICIAN, SILURIAN AND DEVONIAN AGE



60ABa632 and 62ABa27??

5 ROCKS OF ORDOVICIAN, SILURIAN AND DEVONIA AGE — CHARLEY RIVER B-2 quad

6. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE; FORD LAKE SHALE AND NATION RIVER FM.

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
60ABa322	164338	64M-2409	argillite, Ford Lake Shale	Eagle D-1
63ABa4092	164339	64M-2410	argillite, Ford Lake Shale	Charley River B-2
60ABa322	165575	65M-1072	phos. nodules, Ford Lake Sh.	Eagle D-1
60ABa651	164347	64M-2418	sandstone, Nation River Fm.	Charley River A-2
60ABa723	164348	64M-2419	sandstone, Nation River Fm.	Eagle D-1
62ACn1011	164349	64M-2420	claystone, Nation River Fm.	Charley River A-2

RAPID ROCK ANALYSIS

Lab No.	164338	164339	165575	164347	164348	164349
SiO_2	86.1	76.7	6.1	86.6	73.6	64.0
Al_2O_3	3.8	12.7	.49	5.5	4.8	15.1
Fe_2O_3	.64	.66	.54	1.8	.54	2.0
FeO	.24	.28	.08	.28	2.6	3.0
MgO	.2	.6	.3	.4	1.8	3.2
CaO	.06	.15	46.1	.72	6.6	1.4
Na_2O	$<$.05	$<$.05	1.7	$<$.05	.31	.15
K_2O	.75	2.5	.10	.54	.67	2.9
H_2O^-	.38	.80	1.2	.31	.29	1.6
H_2O^+	2.3	2.3	1.8	2.1	1.4	4.2
TiO_2	.13	.70	.08	.24	.28	.95
P_2O_5	.23	.23	35.1	.31	.40	.30
MnO	.00	.00	.17	.00	.10	.00
CO_2	$<$.05	.06	.75	.52	6.4	1.1
Aqua Regia Sol. S. as SO_2						
Volatiles Other Than H_2O and CO_2	5.0	2.0				
Sum	100	100	1/	99	100	100
Powder Density by Air Pycnometer	2.52	2.72		2.69	2.76	2.72

1/ Considerable BaO and SrO.

6. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE; FORD LAKE SHALE AND NATION RIVER FM.

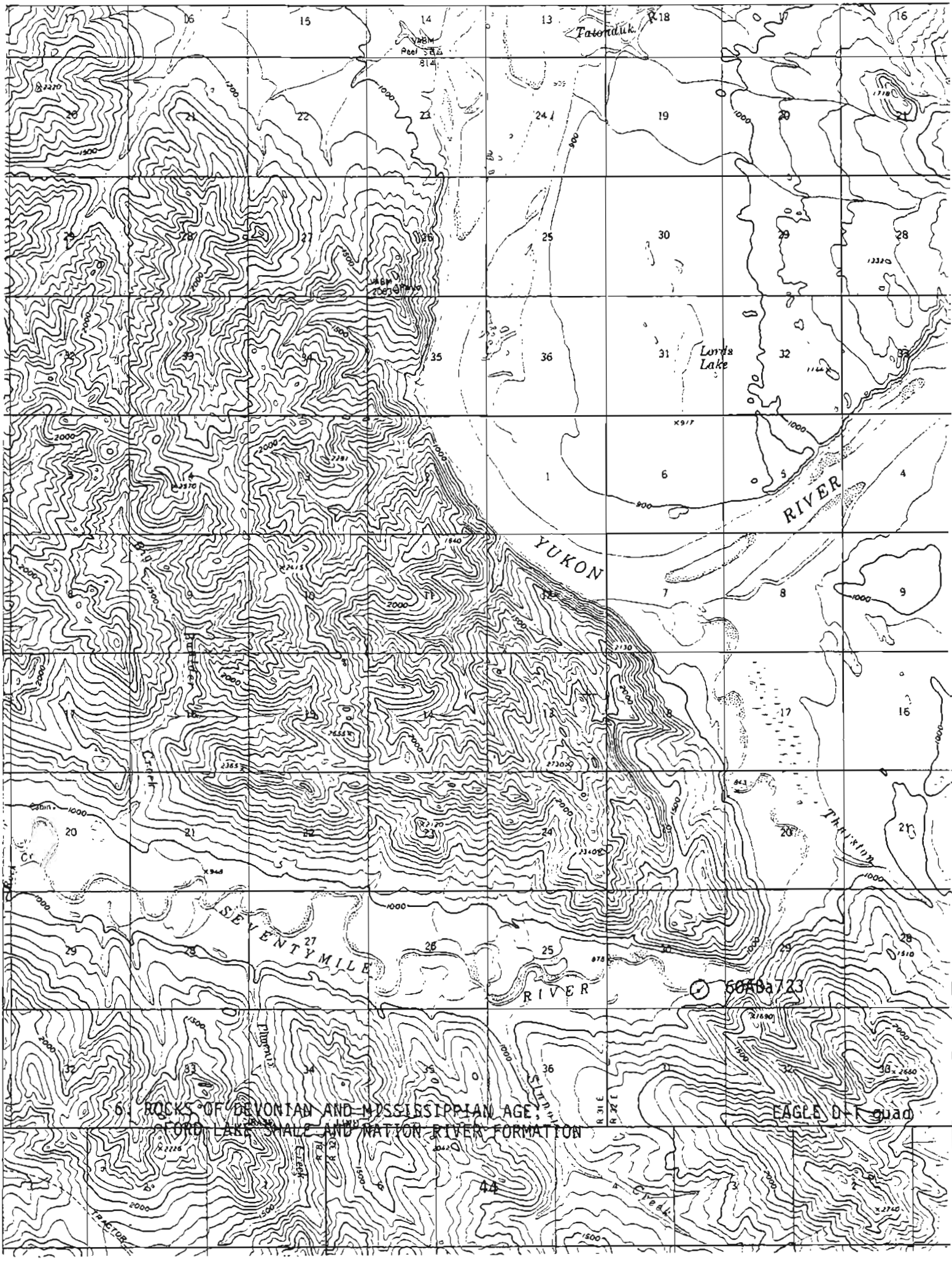
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2409	64M-2410	65M-1072	64M-2418	64M-2419	64M-2420
Si	M.	M.	3.	M.	M.	M.
Al	2.	7.	.7	3.	3.	7.
Fe	.7	.7	.5	1.5	2.	3.
Mg	.15	.3	.07	.3	1.	1.5
Ca	.15	.03	M.	.7	5.	1.5
Na	.15	.1	.2	.02	.5	.5
K	1.	2.	0	0	.7	3.
Ti	.1	.5	.01	.15	.2	.7
P	0	0	M.	0	0	0
Mn	.001	.0015	.015	.015	.1	.03
Ag	.0003	0	.0001	0	0	0
As	0	0	0	0	0	0
Au	0	0	0	0	0	0
B	.005	.01	0	.003	.0015	.01
Ba	.2	.2	2.	.03	.05	.05
Be	0	.00015	.001	0	0	.00015
Bi	0	0	0	0	0	0
Cd	0	0	0	0	0	0
Ce	0	0	*	0	0	0
Co	0	0	0	.0005	.0007	.0015
Cr	.015	.01	.003	.01	.007	.015
Cu	.003	.0015	.015	.005	.003	.015
Ga	.0005	.001	0	.0005	.0007	.0015
Ge	0	0	0	0	0	0
Hf	0	0	0	0	0	0
Hg	0	0	0	0	0	0
In	0	0	0	0	0	0
La	0	.003	.015	0	0	0
Li	0	0	0	0	0	0
Mo	0	.0005	.0007	0	0	0

6. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE; FORD LAKE SHALE AND NATION RIVER FM.

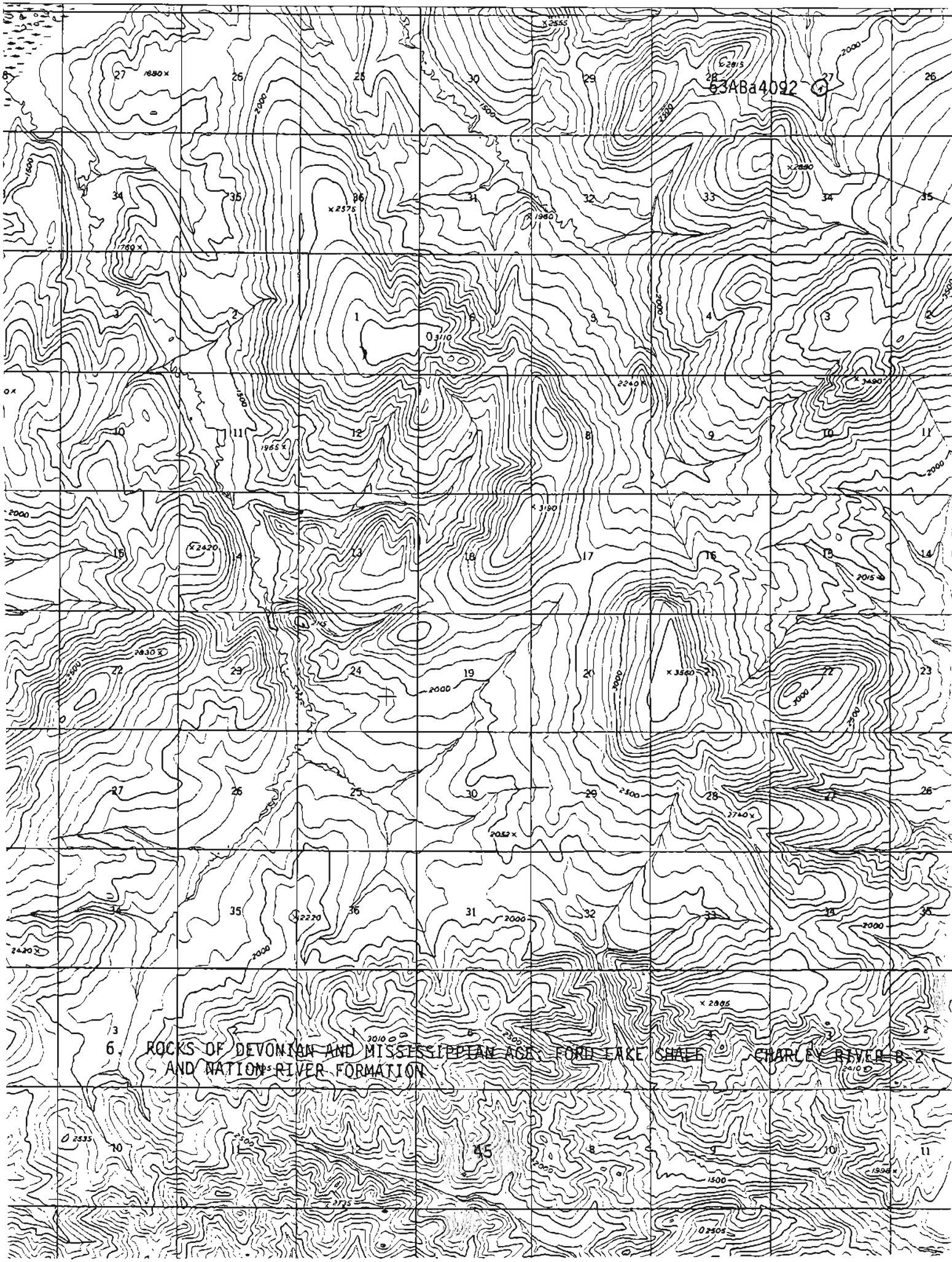
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab. No.	64M-2409	64M-2410	65M-1072	64M-2418	64M-2419	64M-2420
Nb	0	.0015	0	0	0	.001
Ni	.007	.002	.01	.003	.005	.01
Pb	.001	.001	0	.001	0	.002
Pd	0	0	0	0	0	0
Pt	0	0	0	0	0	0
Re	0	0	0	0	0	0
Sb	0	0	0	0	0	0
Sc	0	.001	.01	.0007	.0007	.002
Sn	0	0	0	0	0	0
Sr	.003	.007	.3	.002	.01	.007
Ta	0	0	0	0	0	0
Te	0	0	0	0	0	0
Th	0	0	0	0	0	0
Tl	0	0	0	0	0	0
U	0	0	0	0	0	0
V	.02	.05	.05	.007	.01	.02
W	0	0	0	0	0	0
Y	0	.0015	.07	.001	.0015	.002
Yb	.0001	.0003	.003	.0001	.00015	.0002
Zn	0	0	.05	.02	0	0
Zr	.002	.01	.03	.005	.005	.01
Looked for only when La or Ce found:						
Pr		0	0			
Nd		0	.015			
Sm		0	0			
Eu	0	0	0	0	0	0
Looked for only when Y is found above .005%:						
Gd			0			
Tb			0			
Dy			.01			
Ho			.002			
Er			0			
Tm			0			
Lu			0			

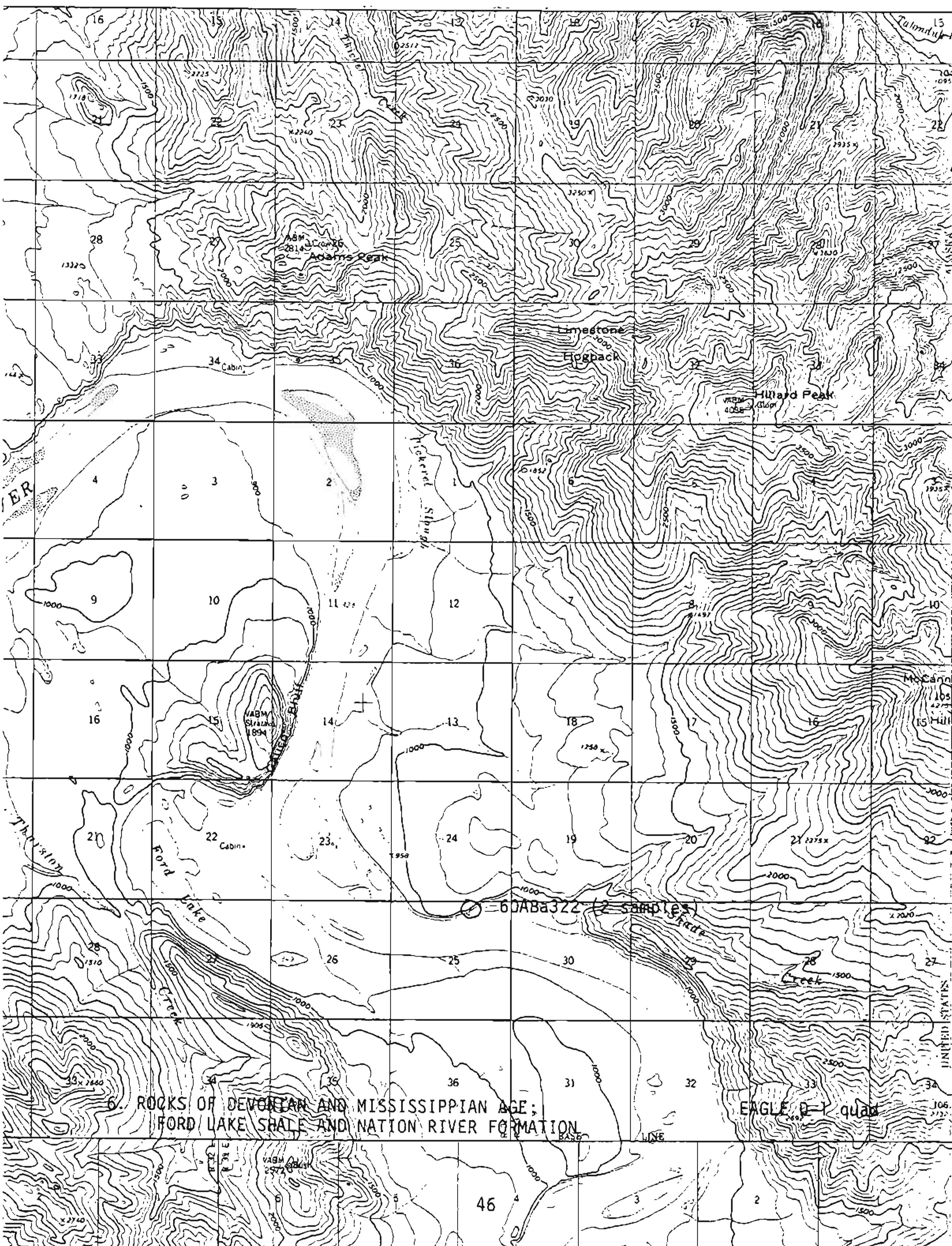


6. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE; OXFORD LAKE SHALE AND NATION RIVER FORMATION

EAGLE D-1 quad

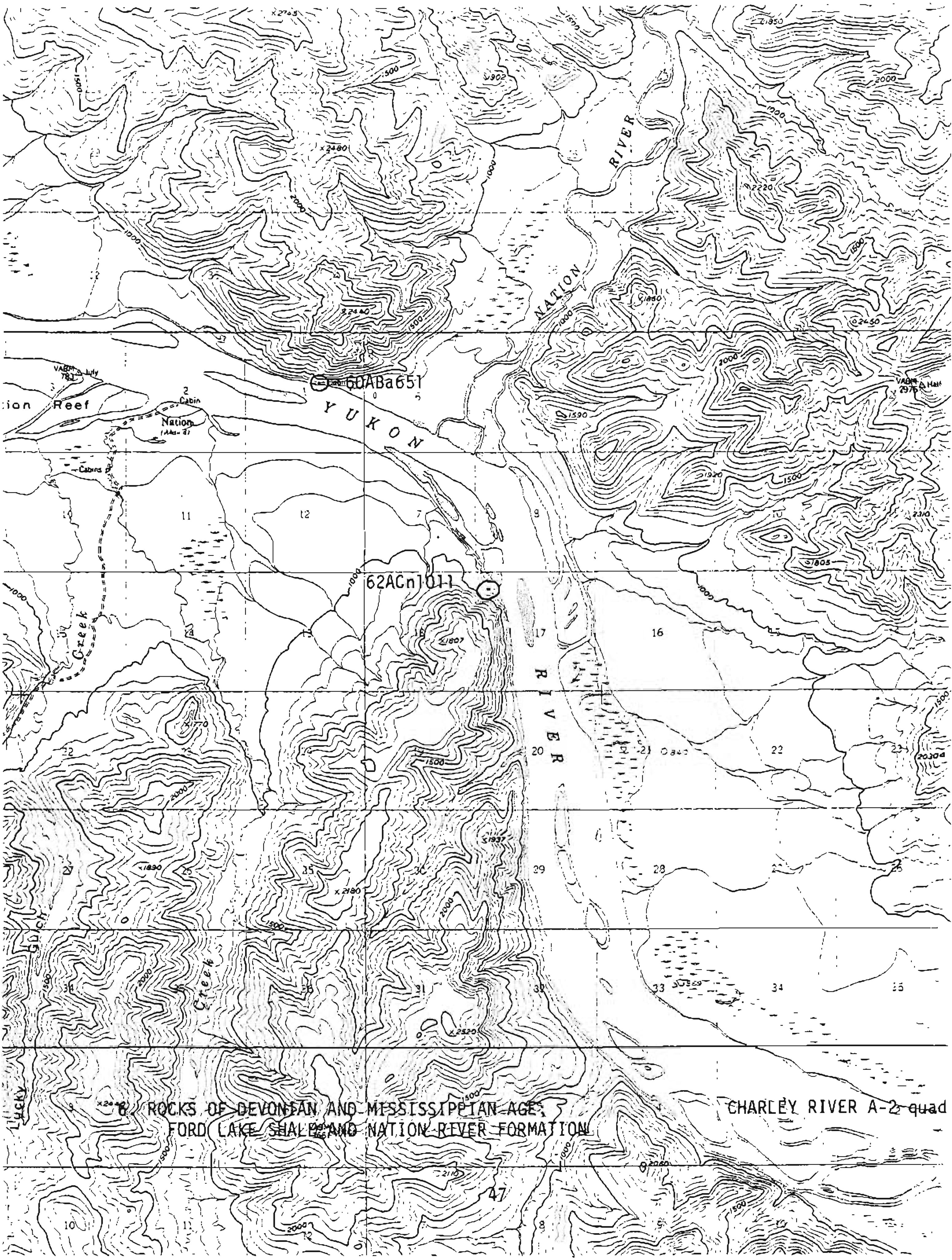


6. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE, FORD LAKE SHALE, CHARLEY RIVER B-2 AND NATION RIVER FORMATION



6. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE;
FORD LAKE SHALE AND NATION RIVER FORMATION

EAGLE D-1 quad



8. ROCKS OF DEVONIAN AND MISSISSIPPIAN AGE;
FORD LAKE SHALE AND NATION RIVER FORMATION

7. ROCKS OF DEVONIAN AGE; WOODCHOPPER VOLCANICS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
61ABa1734	163642	64M-1406	lithic tuff	Charley River B-5
62ACn341A	163643	64M-1407	basalt	Charley River B-5
61ABa1791	163644	64M-1408	basalt	Charley River B-6
61ABa1735	163645	64M-1409	lithic tuff	Charley River B-5
61ABa1781	163646	64M-1410	basalt	Charley River B-5
61ABa1741	163647	64M-1411	basalt	Charley River B-5
62ABa2552	163655	64M-1419	greenstone	Charley River D-1

RAPID ROCK ANALYSIS

Lab No.	163642	163643	163644	163645	163646	163647	163655
SiO_2	49.8	39.1	46.2	48.8	29.7	45.0	50.9
Al_2O_3	13.1	13.3	17.0	13.4	9.5	13.3	16.5
Fe_2O_3	1.4	2.3	3.0	2.1	1.1	1.4	2.0
FeO	9.1	6.6	8.5	8.5	4.9	6.6	8.4
MgO	5.7	3.9	4.1	6.6	4.4	5.0	5.6
CaO	5.1	13.8	10.4	8.2	25.4	12.1	6.0
Na_2O	2.8	3.4	3.2	3.5	1.6	2.2	4.2
K_2O	.47	1.3	.53	1.2	.78	.65	1.1
H_2O^-	.54	.59	.41	.71	.55	.47	.36
H_2O^+	5.1	3.7	3.7	3.1	2.8	2.9	3.2
TiO_2	2.4	2.7	2.1	2.8	.95	2.6	1.1
P_2O_5	.58	.74	.45	.65	.17	.47	.40
MnO	..12	.11	.14	.15	.14	.12	.15
CO_2	3.5	8.3	.20	.24	17.4	6.6	.06
Sum	100	100	100	100	99	99	100

7. ROCKS OF DEVONIAN AGE; WOODCHOPPER VOLCANICS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1406	64M-1407	64M-1408	64M-1409	64M-1410	64M-1411	64M-1419
Si	M.	M.	M.	M.	M.	M.	M.
Al	7.	7.	10.	7.	7.	7.	10.
Fe	7.	7.	10.	7.	5.	7.	7.
Mg	3.	2.	3.	5.	3.	3.	3.
Ca	3.	7.	5.	5.	M.	7.	5.
Na	2.	2.	2.	2.	1.5	1.5	2.
K	.7	1.5	.7	1.5	1.	1.	1.5
Ti	1.5	1.5	1.	1.5	.7	1.5	.5
P	0	.3	0	0	0	0	0
Mn	.1	.1	.1	.15	.15	.1	.1
Ag	0	0	0	0	0	0	0
As	0	0	0	0	0	0	0
Au	0	0	0	0	0	0	0
B	0	0	.003	0	0	.003	0
Ba	.1	.2	.1	.2	.2	.3	.05
Be	0	.00015	0	.00015	0	.00015	0
Bi	0	0	0	0	0	0	0
Cd	0	0	0	0	0	0	0
Ce	0	0	0	0	0	0	0
Co	.007	.003	.005	.007	.005	.005	.003
Cr	.02	.015	.01	.03	.07	.03	.003
Cu	.01	.005	.005	.01	.007	.01	.01
Ga	.003	.003	.003	.003	.0015	.003	.002
Ge	0	0	0	0	0	0	0
Hf	0	0	0	0	0	0	0
Hg	0	0	0	0	0	0	0
In	0	0	0	0	0	0	0
La	.005	.007	.005	.005	.003	.005	0
Li	0	0	0	0	0	0	0
Mo	0	0	0	0	0	0	0

7. ROCKS OF DEVONIAN AGE; WOODCHOPPER VOLCANICS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1406	64M-1407	64M-1408	64M-1409	64M-1410	64M-1411	64M-1419
Nb	.005	.005	.003	.003	.0015	.005	0
Ni	.02	.01	.005	.02	.03	.015	.003
Pb	0	0	0	0	0	0	0
Pd	0	0	0	0	0	0	0
Pt	0	0	0	0	0	0	0
Re	0	0	0	0	0	0	0
Sb	0	0	0	0	0	0	0
Sc	.003	.005	.003	.005	.005	.005	.005
Sn	0	0	0	0	0	0	0
Sr	.1	.1	.15	.1	.1	.15	.1
Ta	0	0	0	0	0	0	0
Te	0	0	0	0	0	0	0
Th	0	0	0	0	0	0	0
Tl	0	0	0	0	0	0	0
U	0	0	0	0	0	0	0
V	.05	.05	.05	.07	.05	.05	.07
W	0	0	0	0	0	0	0
Y	.005	.005	.005	.005	.003	.005	.003
Yb	.0005	.0005	.0005	.0005	.0003	.0005	.0005
Zn	0	0	0	0	0	0	0
Zr	.02	.02	.015	.03	.01	.02	.007
Looked for only when La or Ce found:							
Pr	0	0	0	0	0	0	
Nd	0	0	0	0	0	0	
Sm	0	0	0	0	0	0	
Eu	0	0	0	0	0	0	

CIPW NORM FOR SAMPLE NO. 3642 Loc. No. 61ABa1734

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.80	13.10	1.40	9.10	5.70	5.10	2.80	0.47	5.10	2.40	0.58	0.263
MOL. AMTS.	0.8288	0.1285	0.0088	0.1267	0.1414	0.0909	0.0452	0.0050	0.2831	0.0300	0.0041	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.17	6.500
MOL. AMTS.	0.0017	0.0000	0.0795	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	50.22	13.21	1.41	9.18	5.75	5.14	2.82	0.47	5.14	2.42	0.58	0.263
MOL. AMTS.	0.8358	0.1296	0.0088	0.1277	0.1426	0.0917	0.0456	0.0050	0.2855	0.0303	0.0041	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	3.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	6.500
MOL. AMTS.	0.0017	0.0000	0.0802	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.3016	0.0790	0.0000	0.0050	0.0456	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	18.121	8.052	0.000	2.801	23.891	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1404	0.0903	0.0000	0.0000	0.0000	0.0088	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	14.091	11.913	0.000	0.000	0.000	2.047	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0303	0.0000	0.0000	0.0000	0.0041	0.0000	0.0000	0.0780	0.0022			
PERCENTAGES	4.596	0.000	0.000	0.000	1.385	0.000	0.000	7.804	0.188	94.889	52.865	42.024

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2307	0.1404	0.0903	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	26.004	14.091	11.913	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	36.87	11.43	0.78	5.63	6.29	4.05	4.02	0.44	25.18	1.34	0.36	0.08

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	3.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	23.07	51.59	16.33	9.01	148.84	5.39	0.73	50.84	0.10	0.49	136.03	12.80

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 24.40 : 0.00 : 74.65 A:K:F = 24.07 : 1.38 : 74.55 A:N:F = 21.66 : 11.24 : 66.26

Q:OR:AB = 85.64 : 1.43 : 12.93 Q:OR:(AB+AN) = 85.64 : 1.43 : 12.93 OR:AB:AN = 9.95 : 90.05 : 0.00

CIPW NORM FOR SAMPLE NO. 3643 Loc. No. 62ACn341A

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	39.10	13.30	2.30	6.60	3.90	13.80	3.40	1.30	3.70	2.70	0.74	0.340
MOL. AMTS.	0.6507	0.1304	0.0144	0.0919	0.0967	0.2461	0.0549	0.0138	0.2054	0.0338	0.0052	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.11	0.00	8.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.25	2.870
MOL. AMTS.	0.0016	0.0000	0.1886	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	39.40	13.40	2.32	6.65	3.93	13.90	3.43	1.31	3.73	2.72	0.75	0.340
MOL. AMTS.	0.6557	0.1314	0.0145	0.0926	0.0975	0.2479	0.0553	0.0139	0.2069	0.0340	0.0053	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.11	0.00	8.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.870
MOL. AMTS.	0.0016	0.0000	0.1900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	/	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0167	0.0218	0.0000	0.0139	0.0553	0.0404	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	1.006	2.227	0.000	7.740	28.987	11.243	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0975	0.0456	0.0000	0.0000	0.0000	0.0145	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	9.786	6.011	0.000	0.000	0.000	3.360	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0340	0.0000	0.0000	0.0000	0.0053	0.0000	0.0000	0.1900	0.0000			
PERCENTAGES	5.167	0.000	0.000	0.000	1.766	0.000	0.000	19.019	0.000	96.312	51.203	45.109

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1430	0.0975	0.0456	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	15.797	9.786	6.011	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	30.16	12.09	1.34	4.26	4.48	11.41	5.09	1.28	19.04	1.57	0.48	0.07

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	8.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	19.64	32.97	37.05	10.34	97.98	5.09	0.78	30.92	0.20	0.44	141.35	-43.37

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 24.72 : 13.58 : 60.70 A:K:F = 14.41 : 5.79 : 79.80 A:N:F = 12.29 : 19.64 : 66.96

Q:OR:AB = 19.49 : 16.18 : 64.33 Q:OR:(AB+AN) = 13.26 : 11.01 : 75.74 OR:AB:AN = 12.69 : 50.44 : 36.88

CIPW NORM FOR SAMPLE NO. 3644 Loc. No. 61ABa1791

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	46.20	17.00	3.00	8.50	4.10	10.40	3.20	0.53	3.70	2.10	0.45	0.368
MOL. AMTS.	0.7689	0.1667	0.0188	0.1183	0.1017	0.1855	0.0516	0.0056	0.2054	0.0263	0.0032	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.52	2.833
MOL. AMTS.	0.0020	0.0000	0.0045	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	46.42	17.08	3.01	8.54	4.12	10.45	3.22	0.53	3.72	2.11	0.45	0.368
MOL. AMTS.	0.7726	0.1675	0.0189	0.1189	0.1022	0.1863	0.0519	0.0057	0.2064	0.0264	0.0032	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.833
MOL. AMTS.	0.0020	0.0000	0.0046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0057	0.0519	0.1100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	3.147	27.208	30.604	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0612	0.0660	0.0488	0.0181	0.0134	0.0000	0.0189	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	7.105	6.623	6.436	2.549	2.730	0.000	4.371	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0264	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0046	0.0000			
PERCENTAGES	4.008	0.000	0.000	0.000	1.071	0.000	0.000	0.457	0.000	96.307	60.959	35.349

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0612	0.0612	0.0352	0.0260	0.0536	0.0308	0.0228	0.0315	0.0181	0.0134	0.0000
PERCENTAGES	14.065	7.105	3.530	3.430	6.099	3.093	3.006	5.279	2.549	2.730	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	36.44	15.81	1.78	5.61	4.82	8.79	4.89	0.53	19.47	1.25	0.30	0.09

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	29.92	38.80	27.72	8.56	114.93	3.93	0.47	30.70	0.10	0.39	134.23	-19.30

RATIOS FOR TRIANGULAR DIAGRAMS

AICIF = 24.59 : 32.86 : 41.80 AIKIF = 0.00 : 0.00 : 0.00 AINIF = ***** : 22.40 : 94.60

QIORIAB = 0.00 : 9.83 : 90.17 QIORI(AB+AN) = 0.00 : 3.37 : 96.63 ORIABIAN = 3.37 : 30.97 : 65.66

CIPW NORM FOR SAMPLE NO. 3645 Loc. No. 61ABa1735

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	48.40	13.40	2.10	8.50	6.60	8.20	3.50	1.20	3.10	2.80	0.65	0.275
MOL. AMTS.	0.8122	0.1314	0.0132	0.1183	0.1637	0.1462	0.0565	0.0127	0.1721	0.0350	0.0046	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.24	4.048
MOL. AMTS.	0.0021	0.0000	0.0055	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.17	13.59	2.12	8.57	6.65	8.26	3.53	1.21	3.12	2.82	0.65	0.275
MOL. AMTS.	0.8184	0.1324	0.0133	0.1192	0.1650	0.1473	0.0569	0.0128	0.1734	0.0353	0.0046	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	4.048
MOL. AMTS.	0.0021	0.0000	0.0055	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0128	0.0569	0.0627	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	7.145	29.843	17.441	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0638	0.1276	0.0563	0.0187	0.0082	0.0000	0.0133	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	7.408	12.809	7.426	2.631	1.681	0.000	3.068	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0353	0.0000	0.0000	0.0000	0.0046	0.0000	0.0000	0.0055	0.0000			
PERCENTAGES	5.359	0.000	0.000	0.000	1.551	0.000	0.000	0.550	0.000	96.912	54.429	42.483

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0638	0.0638	0.0443	0.0195	0.1201	0.0833	0.0368	0.0269	0.0187	0.0082	0.0000
PERCENTAGES	14.427	7.408	4.443	2.574	13.216	8.366	4.850	4.312	2.631	1.681	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	39.35	12.74	1.27	5.73	7.93	7.08	5.47	1.23	16.67	1.70	0.44	0.10

	ZR	C	S1	CL	F	S2	CR	A1	BA
	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	19.99	47.21	22.25	10.53	123.56	5.33	0.70	26.18	0.18	0.53	142.12	-18.55

RATIOS FOR TRIANGULAR DIAGRAMS

AICH = 15.49 : 26.11 : 57.53 AIKF = 0.00 : 0.00 : 0.00 A:NF = ***** : 19.54 : 96.87

QIORIAB = 0.00 : 18.41 : 81.59 QIORI(AB+AN) = 0.00 : 9.69 : 90.31 ORIAB:AN = 9.69 : 42.97 : 47.34

CIPW NORM FOR SAMPLE NO. 3647 Loc. No. 61ABa1741

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	45.00	13.30	1.40	6.60	5.00	12.10	2.20	0.65	2.90	2.60	0.47	0.296
MOL. AMTS.	0.7489	0.1304	0.0088	0.0919	0.1240	0.2158	0.0355	0.0069	0.1610	0.0325	0.0033	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	6.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.94	4.714
MOL. AMTS.	0.0017	0.0000	0.1500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	45.48	13.44	1.41	6.67	5.05	12.23	2.22	0.66	2.93	2.63	0.48	0.296
MOL. AMTS.	0.7570	0.1318	0.0089	0.0928	0.1254	0.2181	0.0359	0.0070	0.1627	0.0329	0.0033	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	6.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	4.714
MOL. AMTS.	0.0017	0.0000	0.1516	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.2110	0.0336	0.0000	0.0070	0.0359	0.0553	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	12.678	3.430	0.000	3.882	18.815	15.399	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1254	0.0528	0.0000	0.0000	0.0000	0.0089	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	12.586	6.967	0.000	0.000	0.000	2.052	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0329	0.0000	0.0000	0.0000	0.0033	0.0000	0.0000	0.1516	0.0000			
PERCENTAGES	4.991	0.000	0.000	0.000	1.125	0.000	0.000	15.171	0.000	97.095	54.204	42.891

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1782	0.1254	0.0528	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	19.553	12.586	6.967	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	36.42	12.69	0.85	4.47	6.03	10.49	3.45	0.67	15.65	1.58	0.32	0.08

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	7.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	20.91	37.70	34.59	6.80	120.08	5.22	0.53	25.81	0.16	0.53	127.19	-7.11

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 26.15 : 15.09 : 57.85 A:K:F = 15.43 : 2.60 : 81.97 A:N:F = 13.93 : 12.07 : 72.85

Q:OR:AB = 83.12 : 2.75 : 14.13 Q:OR:(AB+AN) = 68.24 : 2.26 : 29.50 OR:AB:AN = 7.10 : 36.53 : 56.36

CIPW NORM FOR SAMPLE NO. 3655 Loc. No. 62ABa2552

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	50.90	16.50	2.00	8.40	5.60	6.00	4.20	1.10	3.20	1.10	0.40	0.324
MOL. AMTS.	0.8471	0.1618	0.0125	0.1169	0.1389	0.1070	0.0678	0.0117	0.1776	0.0138	0.0028	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.55	4.200
MOL. AMTS.	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	51.13	16.57	2.01	8.44	5.63	6.03	4.22	1.10	3.21	1.10	0.40	0.324
MOL. AMTS.	0.8510	0.1626	0.0126	0.1174	0.1395	0.1075	0.0681	0.0117	0.1784	0.0138	0.0028	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	4.200
MOL. AMTS.	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0117	0.0681	0.0828	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	6.530	35.700	23.024	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0153	0.0900	0.0601	0.0248	0.0165	0.0000	0.0126	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	1.775	9.032	7.924	3.488	3.372	0.000	2.913	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0138	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	2.099	0.000	0.000	0.000	0.952	0.000	0.000	0.000	0.000	96.808	65.253	31.555

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0153	0.0153	0.0092	0.0061	0.1347	0.0808	0.0539	0.0413	0.0248	0.0165	0.0000
PERCENTAGES	3.502	1.775	0.920	0.807	15.229	8.112	7.116	6.861	3.488	3.372	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	40.45	15.45	1.20	5.58	6.63	5.11	6.47	1.12	16.96	0.66	0.27	0.10

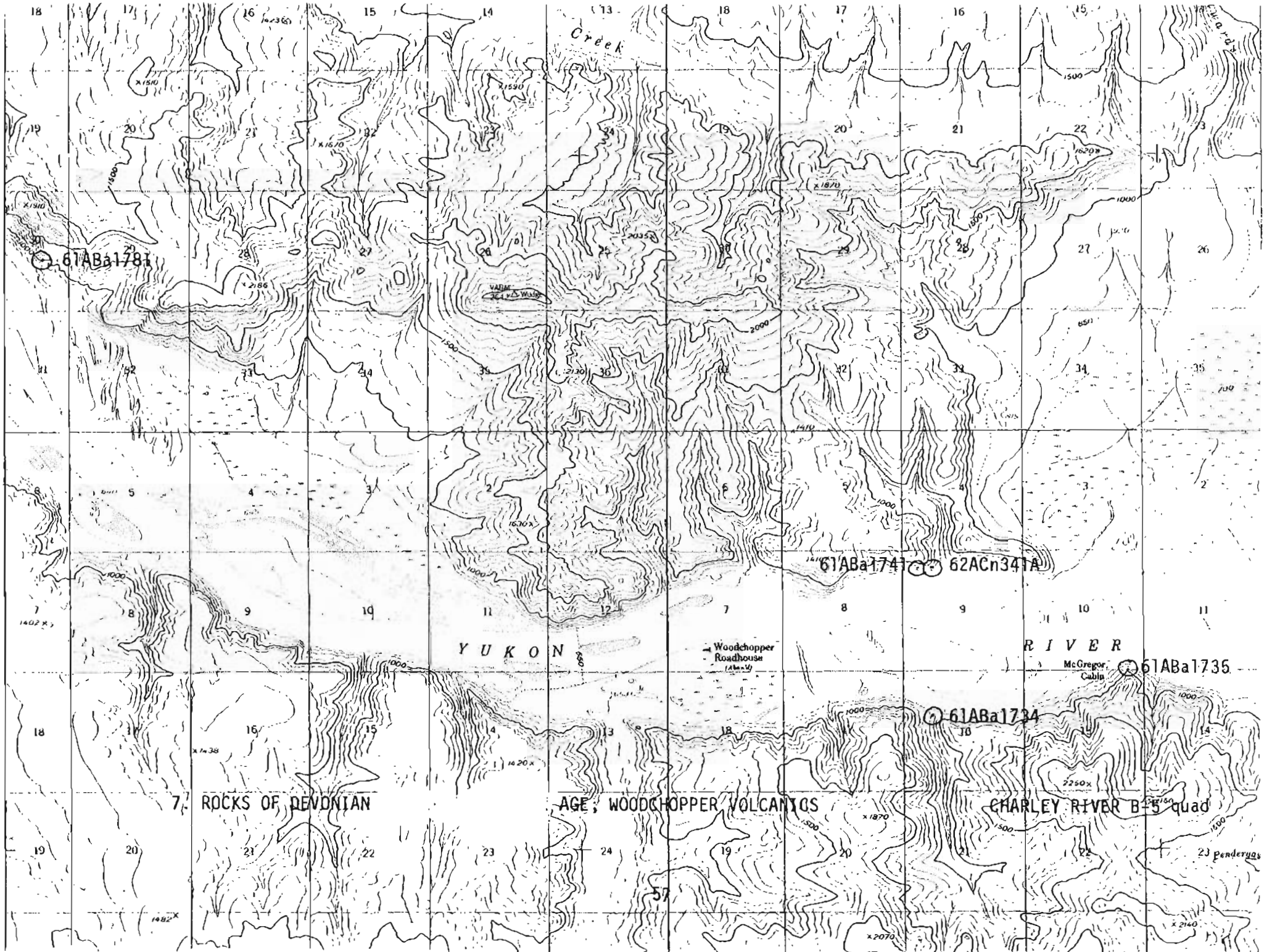
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

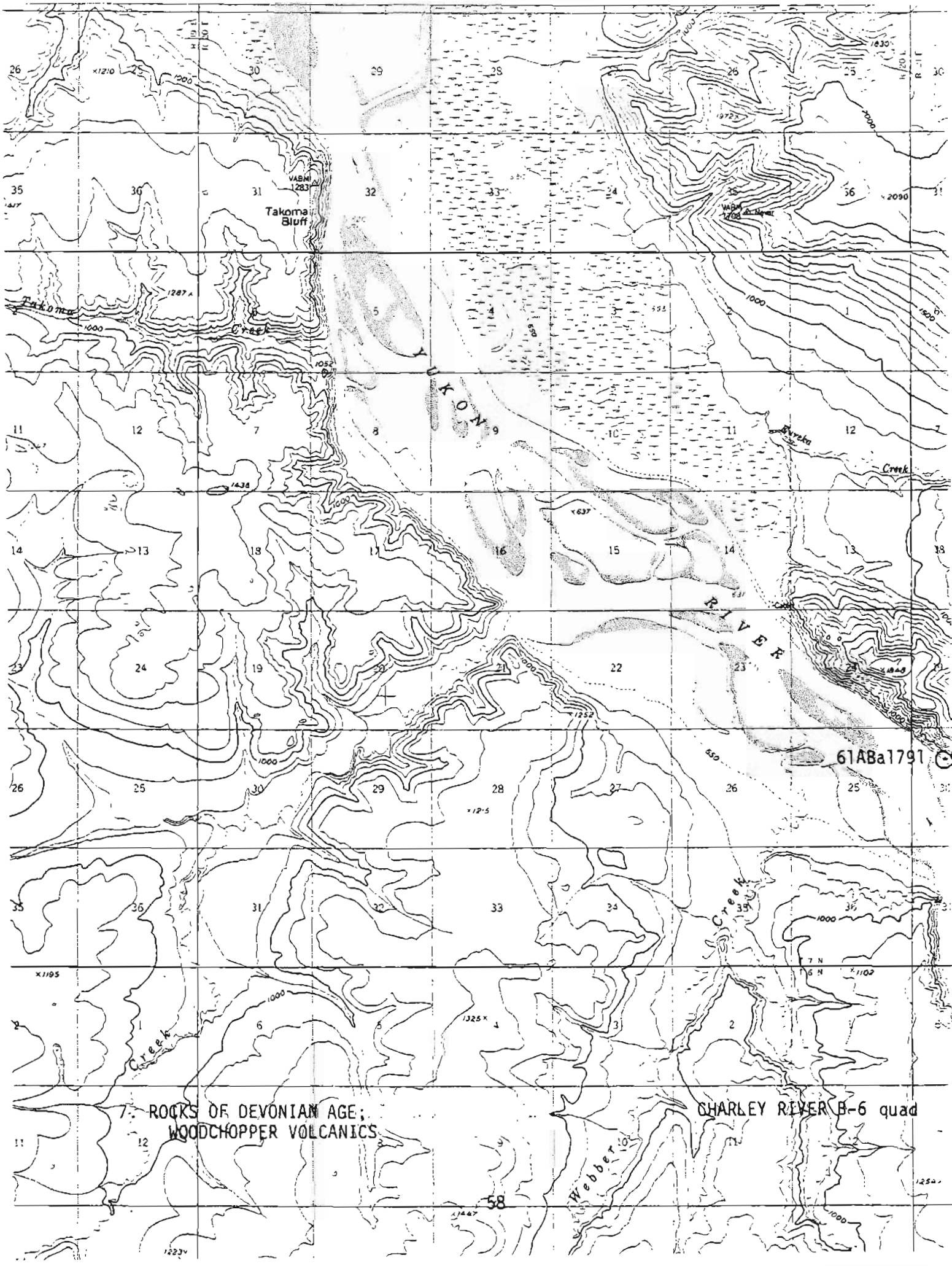
NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	25.64	44.83	16.95	12.58	134.20	2.18	0.45	28.14	0.15	0.49	150.34	-16.14

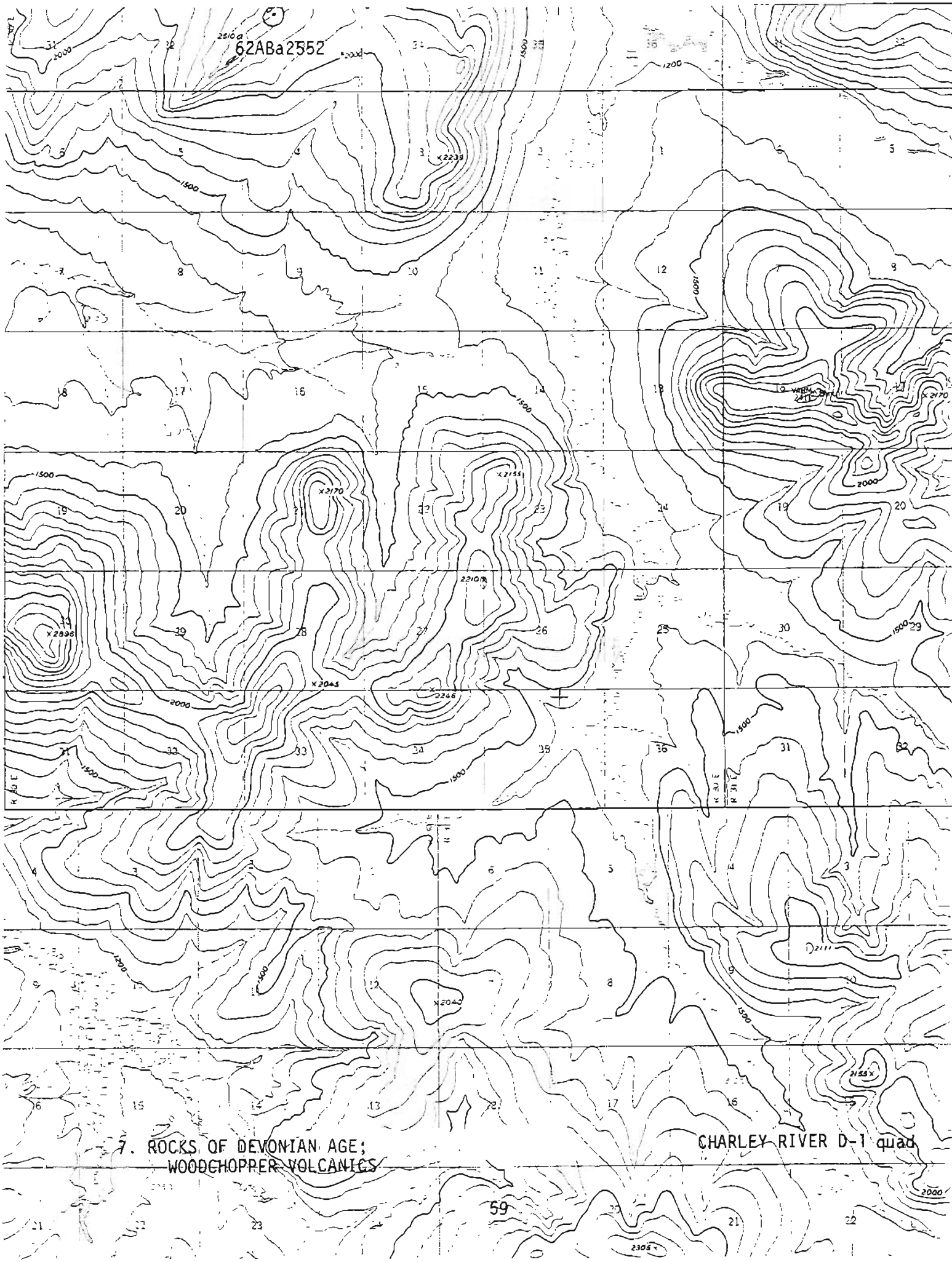
RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 21.03 : 21.83 : 56.21 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = -1.13 : 21.04 : 78.77

Q:OR:AB = 0.00 : 14.70 : 85.30 Q:OR:(AB+AN) = 0.00 : 7.22 : 92.78 OR:AB:AN = 7.22 : 41.88 : 50.91


61ABa1781
61ABa1741
62ACn341A
61ABa1735
61ABa1734
Woodchopper Roadhouse
McGregor Cabin
YUKON
RIVER
7. ROCKS OF DEVONIAN AGE; WOODCHOPPER VOLCANICS
CHARLEY RIVER B-5 quad
57


Takoma Bluff
Takoma Creek
YUKON RIVER
Eureka Creek
Webber Creek
61ABa1791
7. ROCKS OF DEVONIAN AGE; WOODCHOPPER VOLCANICS
CHARLEY RIVER B-6 quad


62ABa2552
7. ROCKS OF DEVONIAN AGE;
WOODCHOPPER VOLCANICS
CHARLEY RIVER D-1 quad

8. ROCKS OF DEVONIAN AND CARBONIFEROUS AGE; CALICO BLUFF FORMATION AND LIMESTONE WITHIN WOODCHOPPER VOLCANICS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
60ABal063	164341	64M-2412	bioclastic limestone	Charley River B-5
61ABal961A-1	164336	64M-2407	fine grain limestone	Eagle D-1
61ABal961A-2	164337	64M-2408	bioclastic limestone	Eagle D-1
61ABal891A	164334	64M-2405	bioclastic limestone	Eagle D-1

RAPID ROCK ANALYSIS

Lab No.	164341	164336	164337	164334
SiO_2	.00	36.5	5.7	39.9
Al_2O_3	.18	2.0	.45	.51
Fe_2O_3	.34	.40	.00	.07
FeO	.08	.16	.04	.20
MgO	1.6	.6	.6	.6
CaO	53.2	31.3	51.0	31.0
Na_2O	< .05	.09	< .05	< .05
K_2O	.25	.32	.25	.20
H_2O^-	.07	.17	.11	.16
H_2O^+	.33	1.6	.60	1.0
TiO_2	.00	.14	.00	.07
P_2O_5	.05	.22	.45	.36
MnO	.00	.00	.00	.00
CO_2	43.2	23.8	40.3	23.6
Aqua Regia Sol. S as SO_3		.93		.26
Volatiles Other Than H_2O & CO_2		1.4		1.4
Sum	99	100	100	99
Powder Density by Air Pycnometer	2.74	2.66	2.72	2.67

8. ROCKS OF DEVONIAN AND CARBONIFEROUS AGE; CALICO BLUFF FORMATION AND LIMESTONE WITHIN WOODCHOPPER VOLCANICS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2412	64M-2407	64M-2408	64M-2405
Si	.05	M.	2.	M.
Al	.05	2.	.5	.7
Fe	.3	.5	.07	.15
Mg	.2	.3	.5	.3
Ca	M.	M.	M.	M.
Na	.02	.15	.05	.03
K	0	.7	0	0
Ti	.005	.07	.01	.02
P	0	0	0	0
Mn	.007	.003	.002	.003
Ag	0	.0005	.00007	.0005
As	0	0	0	0
Au	0	0	0	0
B	0	.005	0	.0015
Ba	.07	.3	.07	1.
Be	0	0	0	0
Bi	0	0	0	0
Cd	0	0	0	0
Ce	*	*	*	*
Co	0	0	0	0
Cr	.0007	.03	.01	.015
Cu	.0002	.002	.001	.0007
Ga	0	.0003	0	0
Ge	0	0	0	0
Hf	0	0	0	0
Hg	0	0	0	0
In	0	0	0	0
La	0	.003	0	0
Li	0	0	0	0
Mo	.0005	.002	.0005	.0007

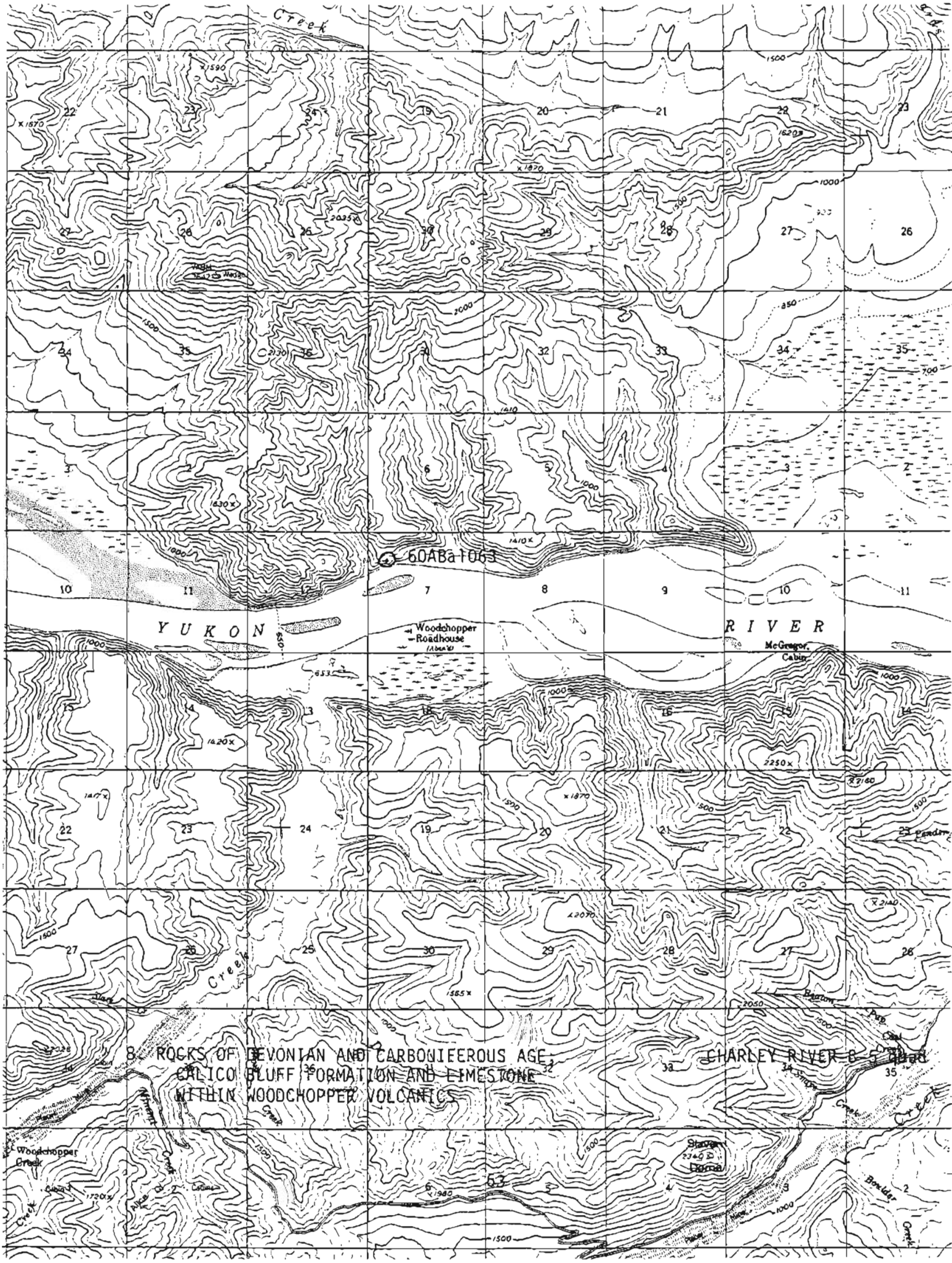
* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.

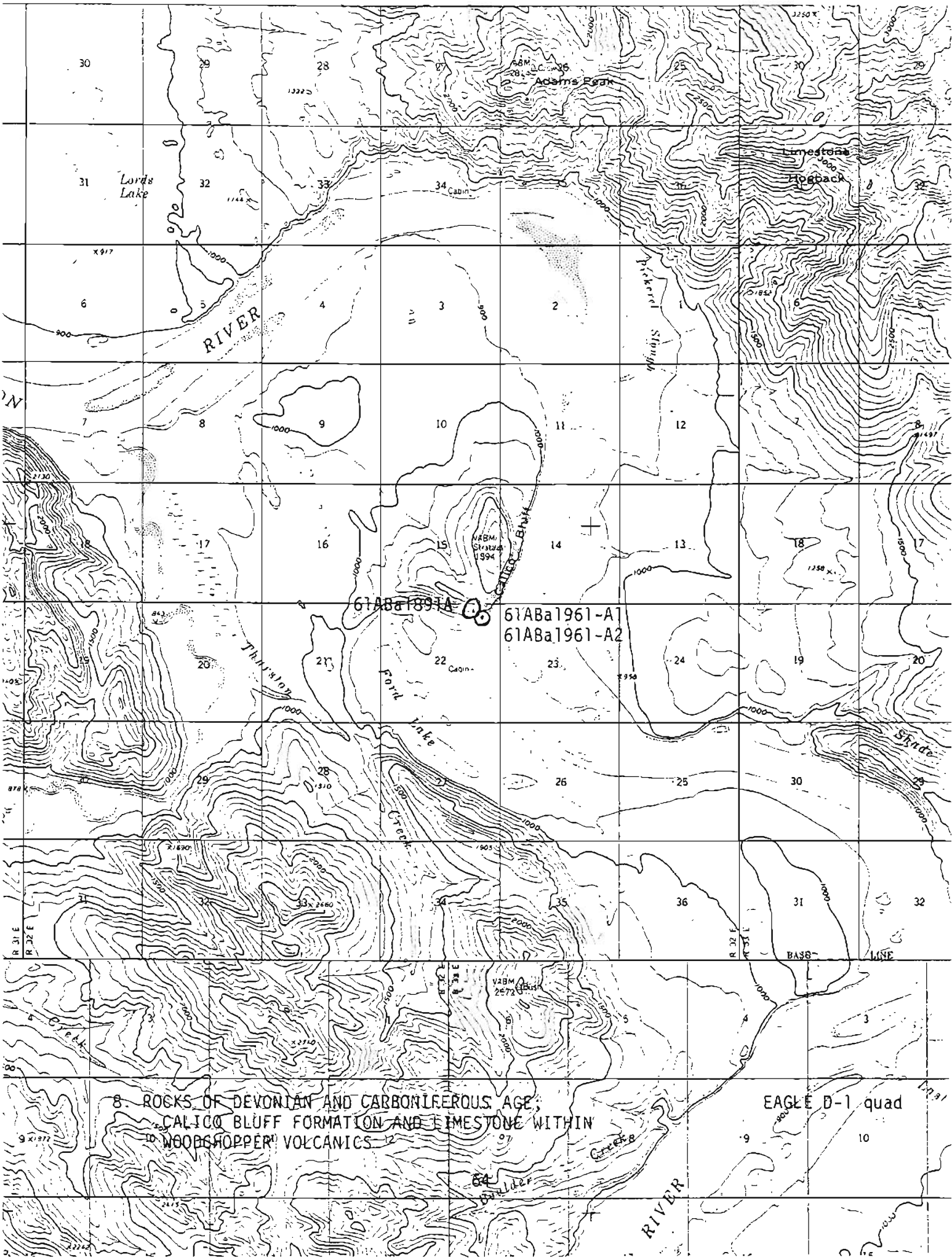
8. ROCKS OF DEVONIAN AND CARBONIFEROUS AGE; CALICO BLUFF FORMATION AND LIMESTONE WITHIN WOODCHOPPER VOLCANICS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-2412	64M-2407	64M-2408	64M-2405
Nb	0	0	0	0
Ni	0	.01	.0015	.003
Pb	0	0	0	0
Pd	0	0	0	0
Pt	0	0	0	0
Re	0	0	0	0
Sb	0	0	0	0
Sc	0	.0007	.0005	.0007
Sn	0	0	0	0
Sr	.05	.3	.2	.07
Ta	0	0	0	0
Te	0	0	0	0
Th	0	0	0	0
Tl	0	0	0	0
U	0	0	0	0
V	.001	.07	.015	.01
W	0	0	0	0
Y	.001	.003	.001	.0015
Yb	0	.0003	.0001	.00015
Zn	0	0	0	0
Zr	0	.002	.0015	.0015
Looked for only when La or Ce found:				
Pr	0	0	0	0
Nd	*	*	*	*
Sm	0	0	0	0
Eu	0	0	0	0

* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.


60ABa1063
YUKON
RIVER
Woodchopper
Roadhouse
McGregor
Cabin
8. ROCKS OF DEVONIAN AND CARBONIFEROUS AGE
CALICO BLUFF FORMATION AND LIMESTONE
WITHIN WOODCHOPPER VOLCANICS
CHARLEY RIVER 6-5
Woodchopper
Creek
Stacker
Dome
Boulder
Creek



8. ROCKS OF DEVONIAN AND CARBONIFEROUS AGE; CALICO BLUFF FORMATION AND LIMESTONE WITHIN WOODCHOPPER VOLCANICS

EAGLE D-1 quad

9. CIRCLE VOLCANICS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ACn1972	163637	64M-1401	altered sanidine? basalt	Circle C-1
60ABa1175	163638	64M-1402	gabbro	Circle D-1
61ABa1863	163639	64M-1403	gabbro	Circle C-1
61ABa1161	163640	64M-1404	basalt	Charley River C-6
61ABa1823	163641	64M-1405	andesite	Charley River C-6

RAPID ROCK ANALYSIS

Lab No.	163637	163638	163639	163640	163641
SiO_2	66.3	49.0	45.0	47.5	47.8
Al_2O_3	7.9	16.0	3.9	14.6	15.2
Fe_2O_3	.33	1.5	3.9	2.5	1.1
FeO	.88	5.0	8.8	5.4	9.8
MgO	2.1	7.9	23.2	6.3	5.9
CaO	8.4	13.6	8.9	16.3	9.0
Na_2O	.25	1.6	.20	1.2	3.2
K_2O	4.5	.77	.12	.10	.58
H_2O^-	.47	.42	.75	.34	.60
H_2O^+	1.7	2.5	3.7	4.0	2.8
TiO_2	.40	.62	.53	1.1	2.5
P_2O_5	.31	.13	.09	.19	.34
MnO	.05	.12	.20	.12	.29
CO_2	5.9	.05	<.05	.16	.15
Sum	99	99	99	100	99

9. CIRCLE VOLCANICS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1401	64M-1402	64M-1403	64M-1404	64M-1405
Si	M	M.	M.	M.	M.
Al	5.	10.	3.	10.	10.
Fe	1.5	7.	10.	7.	7.
Mg	1.5	7.	M.	3.	3.
Ca	5.	7.	5.	10.	5.
Na	.3	1.	.3	1.	1.5
K	3.	1.	0	0	1.
Ti	.3	.3	.3	.7	1.5
P	0	0	0	0	0
Mn	.07	.1	.2	.1	.3
Ag	0	0	0	0	0
As	0	0	0	0	0
Au	0	0	0	0	0
B	.0015	.001	.005	.007	.002
Ba	.15	.1	.005	.005	.2
Be	.00015	0	0	0	0
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	0	0	0	0
Co	.0007	.005	.015	.005	.007
Cr	.01	.1	.3	.05	.02
Cu	.0005	.015	.015	.01	.02
Ga	.0015	.003	.0015	.005	.003
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	0	0	0	0	0
Li	0	0	0	0	0
Mo	.001	0	0	0	0

9. CIRCLE VOLCANICS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1401	64M-1402	64M-1403	64M-1404	64M-1405
Nb	.002	0	0	.0015	.002
Ni	.003	.03	.07	.015	.01
Pb	0	0	0	0	0
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	0	0	0
Sc	.0015	.007	.005	.005	.005
Sn	0	0	0	0	0
Sr	.02	.1	.007	.015	.07
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.015	.05	.05	.07	.07
W	0	0	0	0	0
Y	.005	.002	.002	.003	.007
Yb	.0005	.0003	.0003	.0003	.0007
Zn	0	0	0	0	0
Zr	.02	.005	.005	.01	.02
Looked for only when Y is found above .005%:					
Gd					0
Tb					0
Dy					0
Ho					0
Er					0
Tm					0
Lu					0

CIPW NORM FOR SAMPLE NO. 3637 Loc. No. 63ACn1972

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	66.30	7.90	0.33	0.88	2.10	8.40	0.25	4.50	1.70	0.40	0.31	0.119
MOL. AMTS.	1.1034	0.0775	0.0021	0.0122	0.0521	0.1498	0.0040	0.0478	0.0944	0.0050	0.0022	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.05	0.00	5.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.02	2.667
MOL. AMTS.	0.0007	0.0000	0.1341	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	66.96	7.98	0.33	0.89	2.12	8.48	0.25	4.54	1.72	0.40	0.31	0.119
MOL. AMTS.	1.1144	0.0782	0.0021	0.0124	0.0526	0.1513	0.0041	0.0482	0.0953	0.0051	0.0022	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.05	0.00	5.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.667
MOL. AMTS.	0.0007	0.0000	0.1354	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.7249	0.0174	0.0000	0.0482	0.0041	0.0085	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	43.553	1.774	0.000	26.855	2.136	2.373	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0526	0.0059	0.0000	0.0000	0.0000	0.0021	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	5.282	0.783	0.000	0.000	0.000	0.483	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0051	0.0000	0.0000	0.0000	0.0022	0.0000	0.0000	0.1354	0.0000			
PERCENTAGES	0.767	0.000	0.000	0.000	0.742	0.000	0.000	13.551	0.000	98.300	76.692	21.608

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0585	0.0526	0.0059	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	6.065	5.282	0.783	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	57.68	8.10	0.22	0.64	2.72	7.83	0.42	4.99	9.86	0.26	0.23	0.04

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	7.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	22.25	19.87	43.01	14.88	316.85	1.44	0.63	27.10	0.92	0.75	159.50	157.35

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 27.21 : 9.00 : 62.41 A:K:F = 14.13 : 36.36 : 49.51 A:N:F = 21.19 : 4.60 : 72.60

Q:OR:AB = 93.27 : 6.21 : 0.52 Q:OR:(AB+AN) = 92.26 : 6.14 : 1.60 OR:AB:AN = 79.28 : 6.69 : 14.02

CIPW NORM FOR SAMPLE NO. 3638 Loc. No. 60ABa1175

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.00	16.00	1.50	5.00	7.90	13.60	1.60	0.77	2.50	0.62	0.13	0.327
MOL. AMTS.	0.8155	0.1569	0.0094	0.0696	0.1960	0.2425	0.0258	0.0082	0.1388	0.0078	0.0009	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.74	3.333
MOL. AMTS.	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.63	16.20	1.52	5.06	8.00	13.77	1.62	0.78	2.53	0.63	0.13	0.327
MOL. AMTS.	0.8259	0.1589	0.0095	0.0705	0.1985	0.2456	0.0261	0.0083	0.1405	0.0079	0.0009	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	3.333
MOL. AMTS.	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0083	0.0261	0.1245	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	4.608	13.712	34.638	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.1180	0.1970	0.0544	0.0007	0.0002	0.0000	0.0095	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	13.709	19.780	7.180	0.103	0.041	0.000	2.203	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0079	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	1.193	0.000	0.000	0.000	0.312	0.000	0.000	0.000	0.000	97.476	52.957	44.519

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.1180	0.1180	0.0925	0.0255	0.1334	0.1045	0.0289	0.0009	0.0007	0.0002	0.0000
PERCENTAGES	26.363	13.709	9.284	3.370	14.306	10.496	3.810	0.144	0.103	0.041	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	40.51	15.59	0.93	3.46	9.74	12.05	2.56	0.81	13.79	0.39	0.09	0.08

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	21.81	39.76	33.71	4.72	113.35	1.08	0.13	19.29	0.24	0.69	118.90	-5.55

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 20.70 : 37.50 : 41.27 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 13.91 : *****

Q:OR:AB = 0.00 : 24.05 : 75.95 Q:OR:(AB+AN) = 0.00 : 5.21 : 94.79 OR:AB:AN = 5.21 : 16.45 : 78.34

CIPW NORM FOR SAMPLE NO. 3639 Loc. No. 61ABa1863

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	45.00	3.90	3.90	8.80	23.20	8.90	0.20	0.12	3.70	0.53	0.09	0.087
MOL. AMTS.	0.7489	0.0382	0.0244	0.1225	0.5755	0.1587	0.0032	0.0013	0.2054	0.0066	0.0006	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.54	2.256
MOL. AMTS.	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	45.67	3.96	3.96	8.93	23.54	9.03	0.20	0.12	3.75	0.54	0.09	0.087
MOL. AMTS.	0.7600	0.0388	0.0248	0.1243	0.5840	0.1611	0.0033	0.0013	0.2084	0.0067	0.0006	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.256
MOL. AMTS.	0.0029	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0013	0.0033	0.0342	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.720	1.717	9.528	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.1247	0.3431	0.0562	0.1205	0.0197	0.0000	0.0248	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	14.481	34.443	7.412	16.953	4.021	0.000	5.738	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0067	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	1.021	0.000	0.000	0.000	0.216	0.000	0.000	0.000	0.000	96.252	11.965	84.287

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.1247	0.1247	0.1071	0.0175	0.2746	0.2360	0.0386	0.1402	0.1205	0.0197	0.0000
PERCENTAGES	27.550	14.481	10.754	2.314	28.787	23.689	5.098	20.974	16.953	4.021	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	34.65	3.54	2.26	5.67	26.63	7.34	0.30	0.12	19.00	0.31	0.06	0.13

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	4.02	78.82	16.69	0.47	78.74	0.70	0.07	21.59	0.28	0.77	101.89	-23.15

RATIOS FOR TRIANGULAR DIAGRAMS

AICIF = 6.35 : 17.12 : 75.91 AIKIF = 0.00 : 0.00 : 0.00 AINIF = ***** : 0.53 : *****

QIORIAB = 0.00 : 28.30 : 71.70 QIORI(AB+AN) = 0.00 : 3.33 : 96.67 ORIABIAN = 3.33 : 8.44 : 88.23

CIPW NORM FOR SAMPLE NO, 3640 Loc. No. 61ABal161

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	47.50	14.60	2.50	5.40	6.30	16.30	1.20	0.10	4.00	1.10	0.19	0.307
MOL. AMTS.	0.7905	0.1432	0.0157	0.0752	0.1563	0.2907	0.0194	0.0011	0.2220	0.0138	0.0013	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.47	2.160
MOL. AMTS.	0.0017	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	47.75	14.68	2.51	5.43	6.33	16.39	1.21	0.10	4.02	1.11	0.19	0.307
MOL. AMTS.	0.7948	0.1440	0.0157	0.0756	0.1571	0.2922	0.0195	0.0011	0.2232	0.0138	0.0013	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.12	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.160
MOL. AMTS.	0.0017	0.0000	0.0037	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0593	0.0000	0.0000	0.0011	0.0195	0.1234	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	3.562	0.000	0.000	0.594	10.208	34.338	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.1606	0.1571	0.0477	0.0000	0.0000	0.0000	0.0157	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	18.661	15.774	6.291	0.000	0.000	0.000	3.644	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0138	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0037	0.0000			
PERCENTAGES	2.100	0.000	0.000	0.000	0.452	0.000	0.000	0.366	0.000	95.990	48.702	47.288

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.1606	0.1606	0.1232	0.0374	0.0442	0.0339	0.0103	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	35.969	18.661	12.373	4.935	4.757	3.401	1.356	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	36.99	13.40	1.47	3.52	7.31	13.60	1.81	0.10	20.78	0.64	0.13	0.08
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	19.92	36.79	40.44	2.84	109.99	1.92	0.19	30.89	0.05	0.59	111.37	-1.37

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 21.15 : 43.24 : 35.10 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 17.94 : *****

Q:OR:AB = 74.28 : 1.34 : 24.39 Q:OR:(AB+AN) = 29.17 : 0.53 : 70.31 OR:AB:AN = 0.74 : 13.52 : 85.74

CIPW NORM FOR SAMPLE NO. 3641 Loc. No. 61ABa1823

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	47.80	15.20	1.10	9.80	5.90	9.00	3.20	0.58	2.80	2.50	0.34	0.318
MOL. AMTS.	0.7955	0.1491	0.0069	0.1364	0.1464	0.1605	0.0516	0.0062	0.1554	0.0313	0.0024	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.29	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.66	8.909
MOL. AMTS.	0.0041	0.0000	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	48.45	15.41	1.11	9.93	5.98	9.12	3.24	0.59	2.84	2.53	0.34	0.318
MOL. AMTS.	0.8063	0.1511	0.0070	0.1383	0.1483	0.1627	0.0523	0.0062	0.1575	0.0317	0.0024	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.29	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	8.909
MOL. AMTS.	0.0041	0.0000	0.0035	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0062	0.0523	0.0925	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	3.474	27.445	25.742	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0586	0.1003	0.0701	0.0240	0.0168	0.0000	0.0070	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	6.806	10.074	9.254	3.378	3.419	0.000	1.617	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0317	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0035	0.0000			
PERCENTAGES	4.813	0.000	0.000	0.000	0.816	0.000	0.000	0.346	0.000	97.184	56.662	40.522

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0586	0.0586	0.0345	0.0241	0.1119	0.0659	0.0460	0.0408	0.0240	0.0168	0.0000
PERCENTAGES	13.448	6.806	3.462	3.180	12.685	6.612	6.074	6.797	3.378	3.419	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	39.37	14.75	0.68	6.75	7.24	7.94	5.11	0.61	15.38	1.55	0.24	0.20

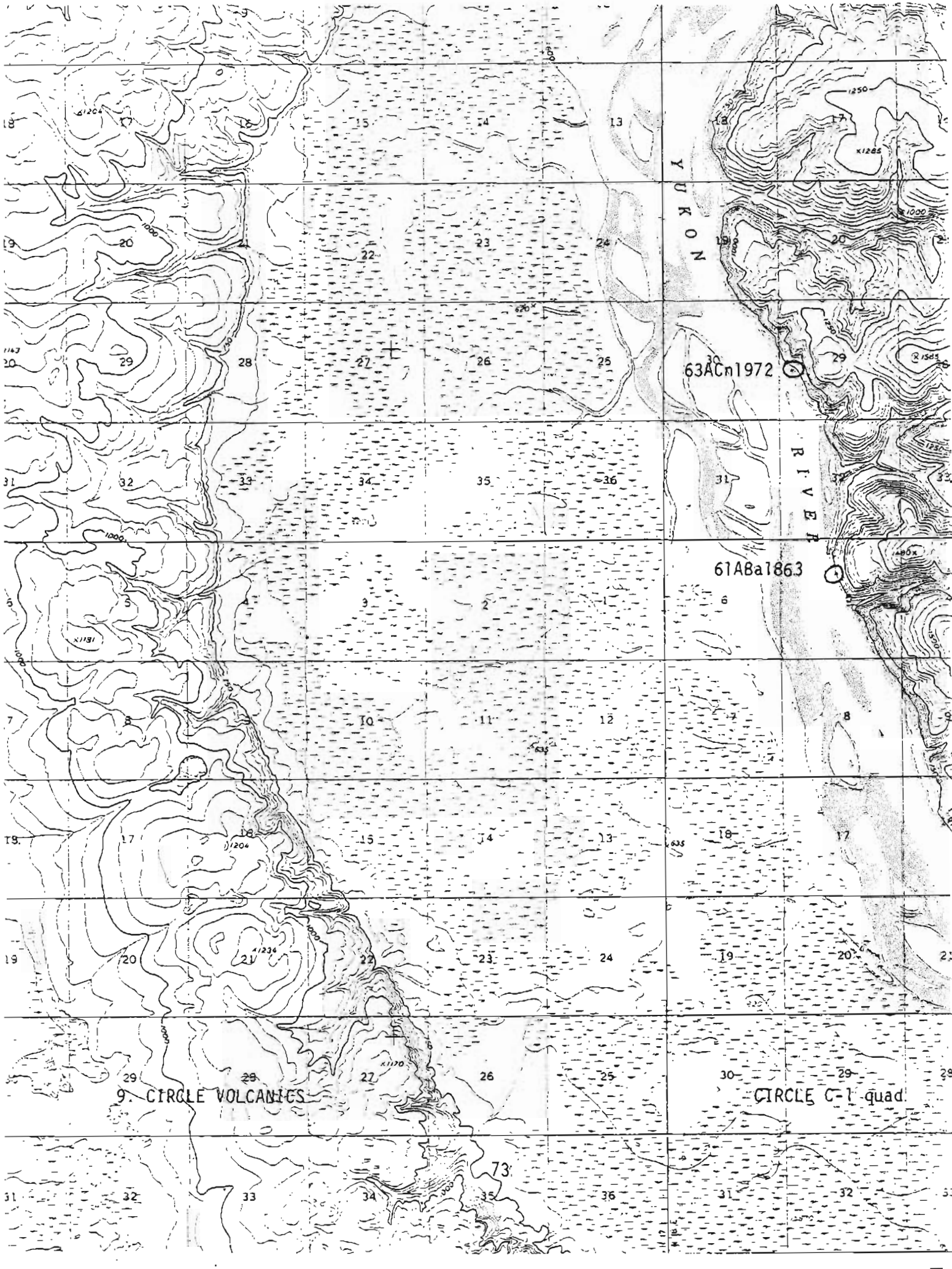
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00

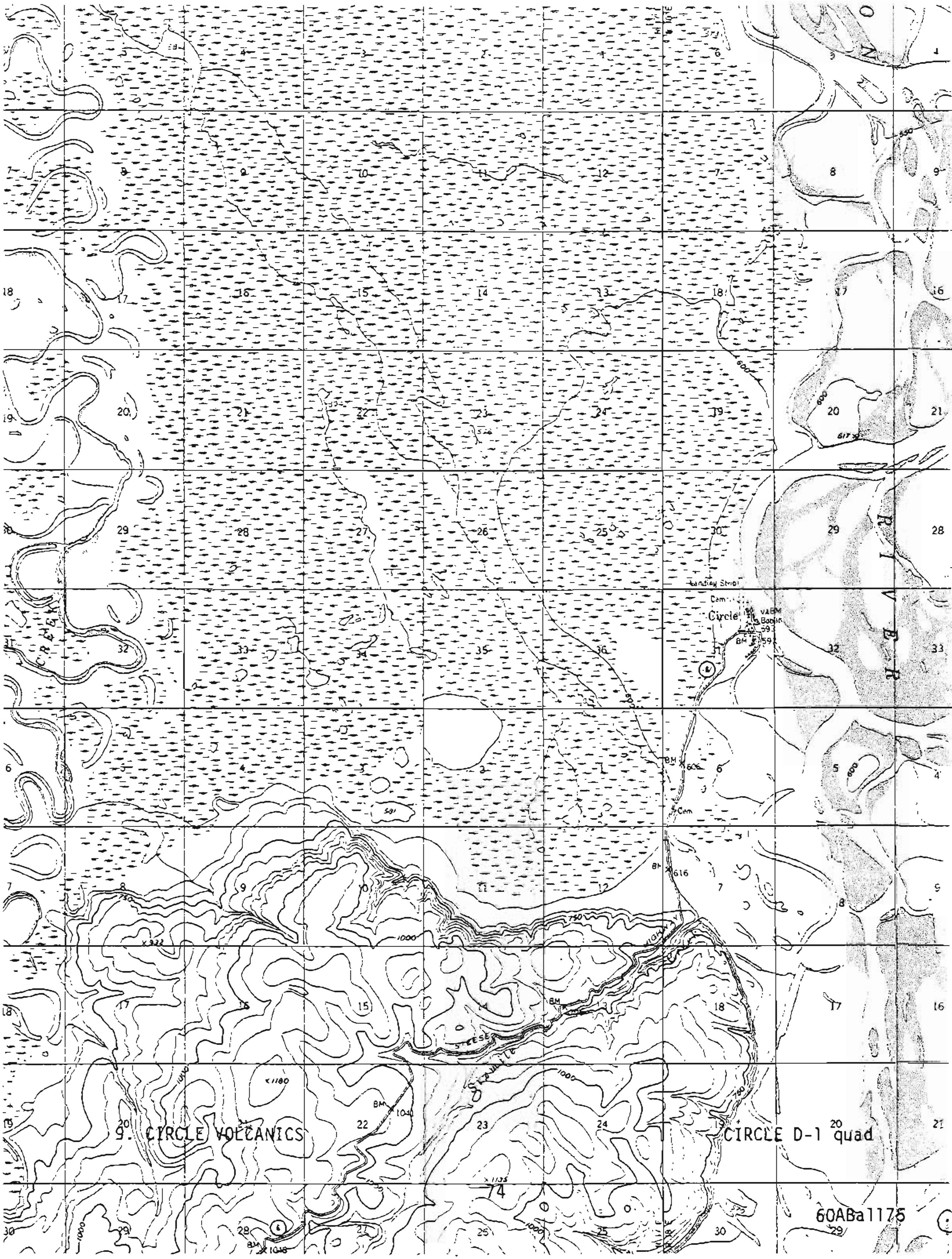
NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	22.32	45.01	24.03	8.65	119.10	4.68	0.36	23.27	0.11	0.49	134.60	-15.51

RATIOS FOR TRIANGULAR DIAGRAMS

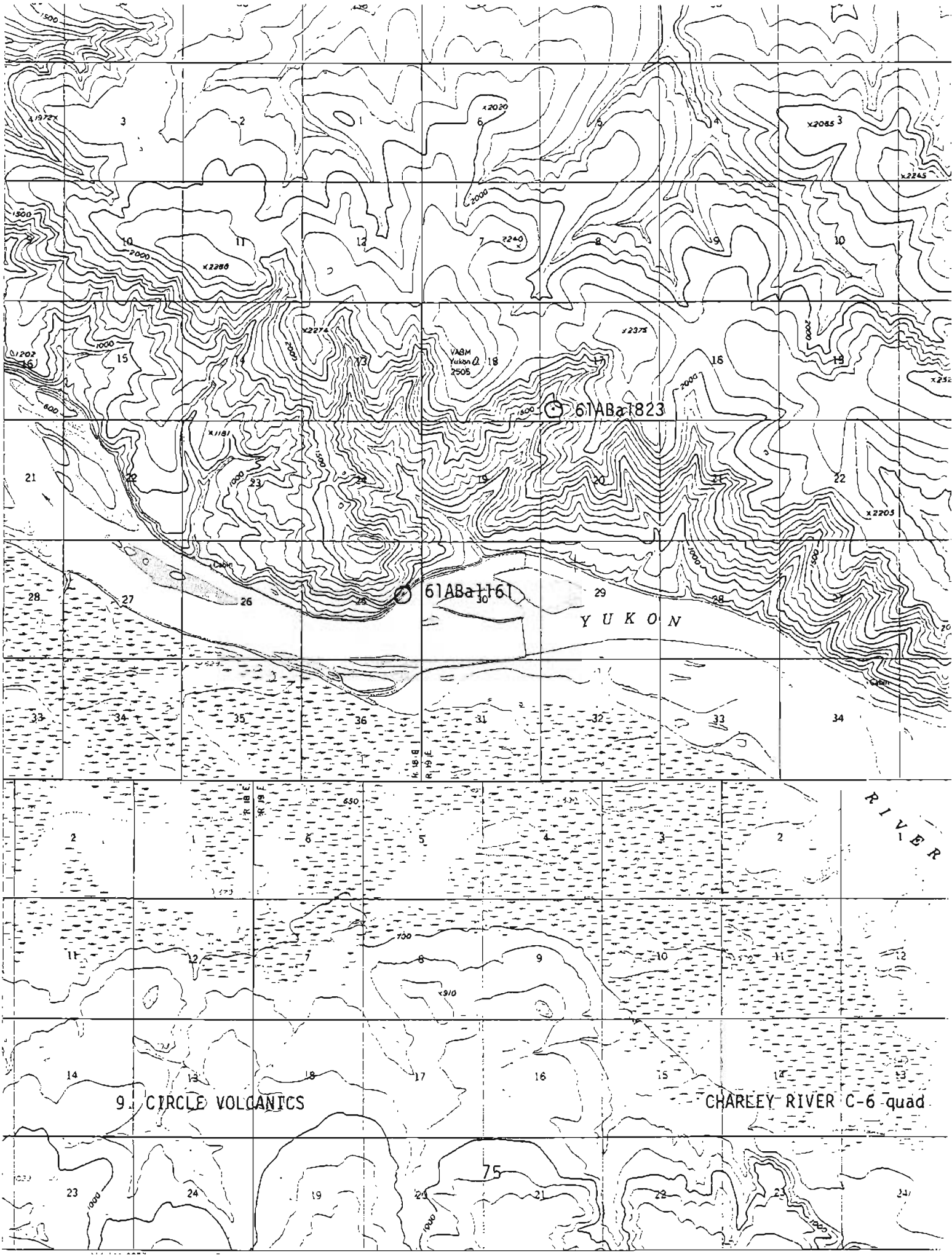
A:C:F = 18.35 : 28.02 : 52.10 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 18.00 : 97.18

Q:OR:AB = 0.00 : 10.65 : 89.35 Q:OR:(AB+AN) = 0.00 : 4.13 : 95.87 OR:AB:AN = 4.13 : 34.63 : 61.24


YUKON
RIVER
63ACn1972
61ABa1863
9. CIRCLE VOLCANICS
CIRCLE C-1 quad



9. CIRCLE VOLCANICS
CIRCLE D-1 quad
60ABa1175
Circle
Landing Strip
STEESE
HIGHWAY
CREEK
R I V E R


61ABa 1823
61ABa 1161
YUKON
RIVER
9. CIRCLE VOLCANICS
CHARLEY RIVER C-6 quad

10. LIMESTONES OF PERMIAN AND TRIASSIC AGE; TAHKANDIT LIMESTONE AND LIMESTONE WITHIN GLENN SHALE

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
60ABa1212E	164332	64M-2403	bioclastic limestone	Charley River A-2
60ABa672J	164333	64M-2404	bioclastic limestone	Charley River A-2
60ABa1212C	164335	64M-2406	limestone, Tahkandit	Charley River A-2
60ABa732	164331	64M-2402	limestone, Glenn Shale	Charley River A-2

RAPID ROCK ANALYSIS

Lab No.	164332	164333	164335	164331
SiO_2	1.6	1.4	.78	4.8
Al_2O_3	.18	.18	.08	.79
Fe_2O_3	.15	.08	.20	.22
FeO	.18	.12	.08	.12
MgO	.7	.7	.9	.8
CaO	53.3	53.4	53.4	50.9
Na_2O	$<$.05	$<$.05	$<$.05	$<$.05
K_2O	.25	.25	.25	.28
H_2O^-	.17	.13	.08	.19
H_2O^+	.43	.39	.47	.57
TiO_2	.00	.00	.00	.00
P_2O_5	.06	.02	.11	.07
MnO	.00	.00	.00	.00
CO_2	42.9	43.2	42.9	40.7
Sum	100	100	99	99
Powder Density by Air Pycnometer	2.76	2.74	2.76	2.70

10. LIMESTONES OF PERMIAN AND TRIASSIC AGE; TAHKANDIT LIMESTONE AND LIMESTONE WITHIN GLENN SHALE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2403	64M-2404	64M-2406	64M-2402
Si	.7	.7	.3	1.5
Al	.15	.2	.07	.5
Fe	.3	.15	.2	.15
Mg	.15	.2	.1	.5
Ca	M.	M.	M.	M.
Na	.02	.02	.02	.05
K	0	0	0	0
Ti	.007	.007	.005	.01
P	0	0	0	0
Mn	.02	.01	.01	.01
Ag	0	0	0	0
As	0	0	0	0
Au	0	0	0	0
B	0	0	0	0
Ba	.015	.01	.007	.03
Be	0	0	0	0
Bi	0	0	0	0
Cd	0	0	0	0
Ce	*	*	*	*
Co	0	0	0	0
Cr	.001	.001	.001	.0007
Cu	.00015	.0001	.00015	.0002
Ga	0	0	0	0
Ge	0	0	0	0
Hf	0	0	0	0
Hg	0	0	0	0
In	0	0	0	0
La	0	0	0	0
Li	0	0	0	0
Mo	0	.0005	0	0

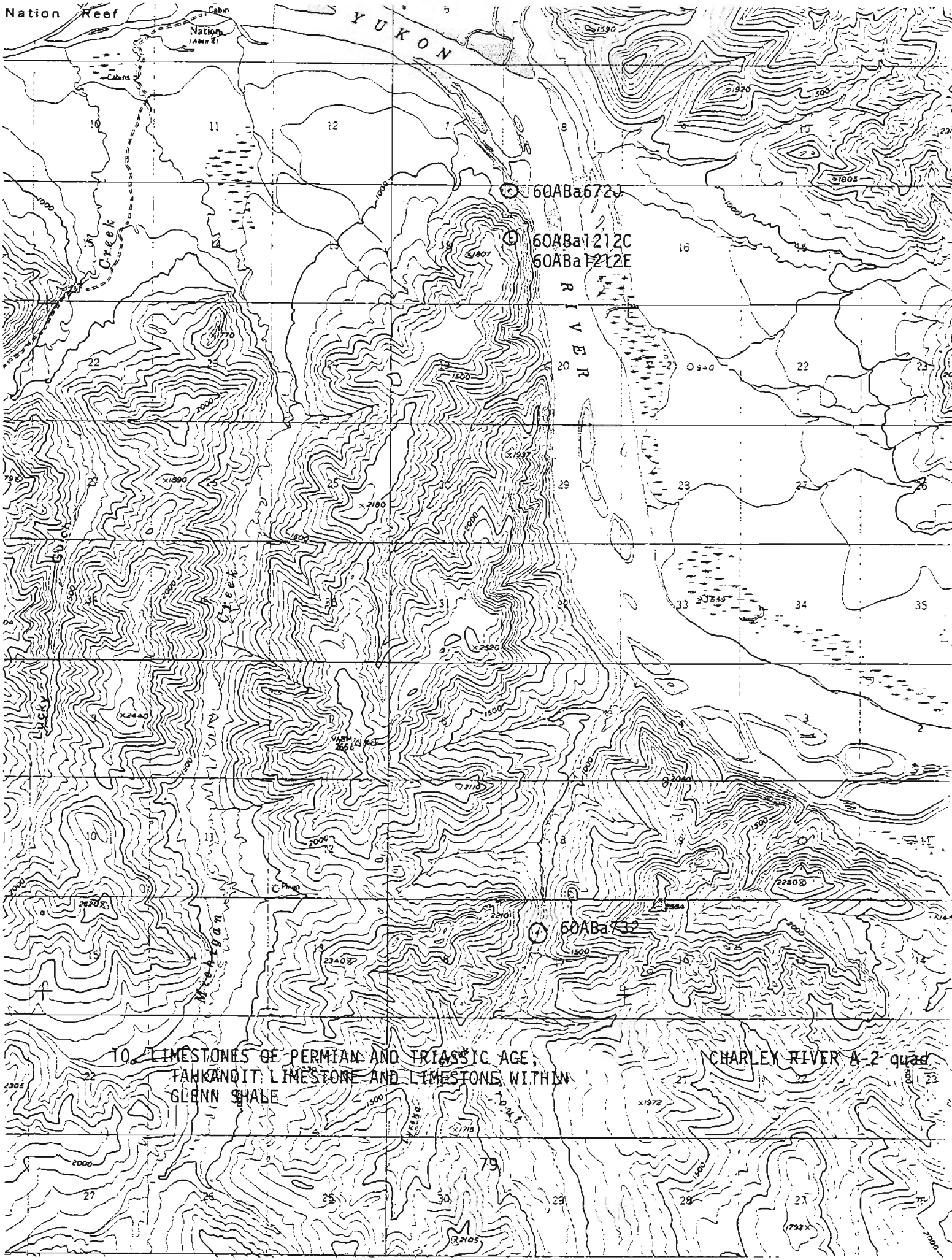
* High Ca interferes with the most sensitive Ce and Nd line. Ce and Nd, if present, would be $< .02\%$ and $< .07\%$, respectively.

10. LIMESTONES OF PERMIAN AND TRIASSIC AGE; TAHKANDIT LIMESTONE AND LIMESTONE WITHIN GLENN SHALE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2403	64M-2404	64M-2406	64M-2402
Nb	0	0	0	0
Ni	.0005	.0005	.0005	.0005
Pb	.01	0	0	0
Pd	0	0	0	0
Pt	0	0	0	0
Re	0	0	0	0
Sb	0	0	0	0
Sc	0	0	0	0
Sn	0	0	0	0
Sr	.02	.02	.015	.1
Ta	0	0	0	0
Te	0	0	0	0
Th	0	0	0	0
Tl	0	0	0	0
U	0	0	0	0
V	.0015	.002	.001	.0015
W	0	0	0	0
Y	.001	.001	.001	0
Yb	0	0	0	0
Zn	0	0	0	0
Zr	0	0	0	.002
Looked for only when La or Ce found:				
Pr	0	0	0	0
Nd	*	*	*	*
Sm	0	0	0	0
Eu	0	0	0	0

* High Ca interferes with the most sensitive Ce and Nd lines. Ce and Nd, if present, would be $<.02\%$ and $<.07\%$, respectively.



10. LIMESTONES OF PERMIAN AND TRIASSIC AGE; TAHKANDIT LIMESTONE AND LIMESTONE WITHIN GLENN SHALE

CHARLEY RIVER A-2 quad

11. ROCKS OF CRETACEOUS AGE; BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ACn2861	164328	64M-2399	argillite, Biederman	Charley River B-4
63ABa4101	164329	64M-2400	siltstone, Biederman	Charley River B-1
63ABa3995	164325	64M-2396	graywacke, Kathul Mtn.	Charley River C-1
63ABa3975	164326	64M-2397	graywacke, Kathul Mtn.	Charley River D-1
62ABa2693	164327	64M-2398	argillite, Kathul Mtn.	Charley River C-1

RAPID ROCK ANALYSIS

Lab No.	164328	164329	164325	164326	164327
SiO_2	63.5	73.3	67.1	63.0	56.0
Al_2O_3	15.6	8.6	13.2	12.7	15.2
Fe_2O_3	1.5	1.7	2.0	1.4	2.5
FeO	4.7	5.0	3.4	5.7	6.8
MgO	3.5	3.0	2.6	3.8	5.0
CaO	.95	1.5	2.1	3.5	2.3
Na_2O	1.1	1.0	3.1	2.8	1.9
K_2O	2.8	.77	1.7	1.0	2.0
H_2O^-	.68	.43	.73	.48	1.1
H_2O^+	3.9	2.8	2.7	3.2	4.8
TiO_2	.85	.62	.79	1.3	1.3
P_2O_5	.32	.37	.30	.27	.37
MnO	.07	.07	.18	.17	.34
CO_2	.49	.90	.11	.62	.28
Sum	100	100	100	100	100
Powder Density by Air Pycnometer	2.82	2.74	2.72	2.76	2.78

11. ROCKS OF CRETACEOUS AGE; BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE

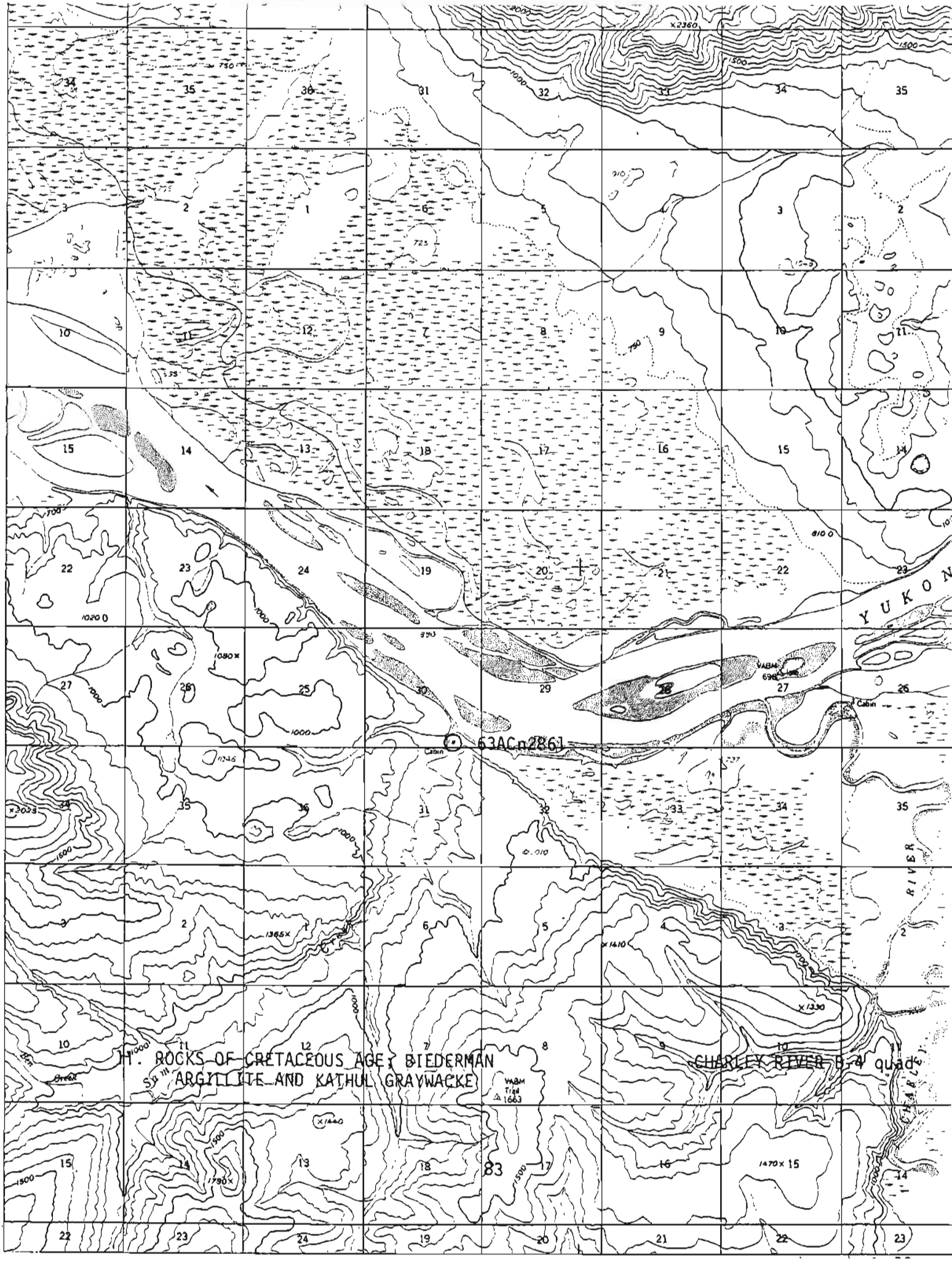
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2399	64M-2400	64M-2396	64M-2397	64M-2398
Si	M.	M.	M.	M.	M.
Al	7.	5.	7.	7.	7.
Fe	5.	5.	3.	5.	7.
Mg	1.5	1.5	1.5	2.	2.
Ca	1.	1.5	1.5	2.	2.
Na	1.	1.	1.5	1.5	1.5
K	3.	1.	1.5	1.	2.
Ti	.5	.3	.7	1.	1.
P	0	0	0	0	0
Mn	.05	.05	.1	.1	.15
Ag	0	0	0	0	0
As	0	0	0	0	0
Au	0	0	0	0	0
B	.007	.002	.001	.001	.002
Ba	.1	.03	.15	.07	.1
Be	.00015	0	0	0	0
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	0	0	0	0
Co	.002	.0015	.001	.002	.003
Cr	.02	.015	.01	.03	.03
Cu	.005	.003	.003	.005	.007
Ga	.0015	.001	.001	.0015	.0015
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	0	0	0	0	0
Li	0	0	0	0	0
Mo	0	0	0	0	0

11. ROCKS OF CRETACEOUS AGE; BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE

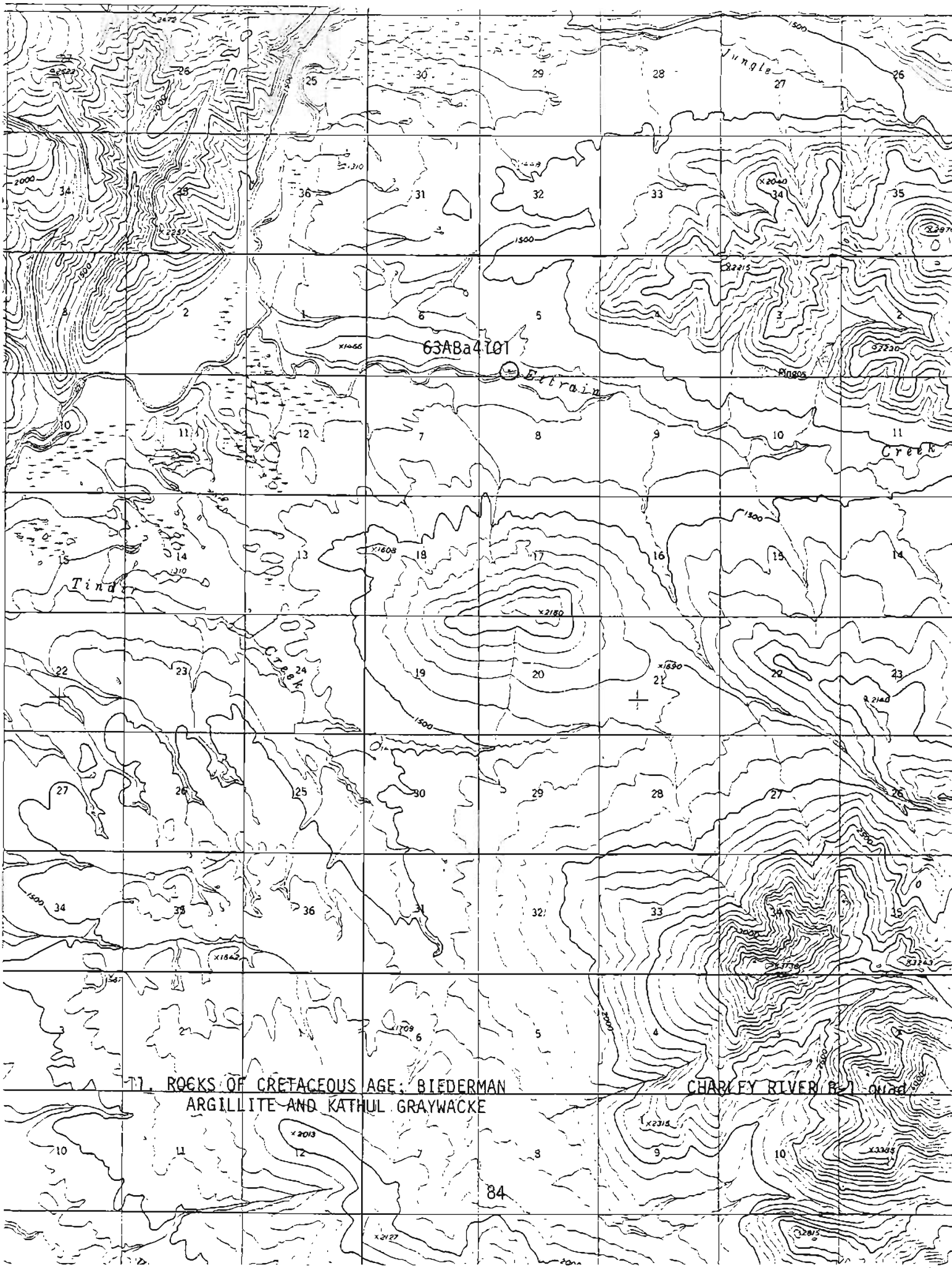
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-2399	64M-2400	64M-2396	64M-2397	64M-2398
Nb	.0015	.0015	0	.0015	.0015
Ni	.01	.007	.005	.015	.015
Pb	.005	.001	0	.001	.001
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	0	0	0
Sc	.0015	.001	.0015	.002	.002
Sn	0	0	0	0	0
Sr	.01	.007	.015	.015	.015
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.02	.01	.015	.02	.03
W	0	0	0	0	0
Y	.002	.002	.002	.002	.003
Yb	.0003	.0003	.0002	.0003	.0003
Zn	0	0	0	0	0
Zr	.01	.02	.007	.01	.01
Looked for only when La or Ce found:					
Pr					
Nd					
Sm					
Eu	0	0	0	0	0



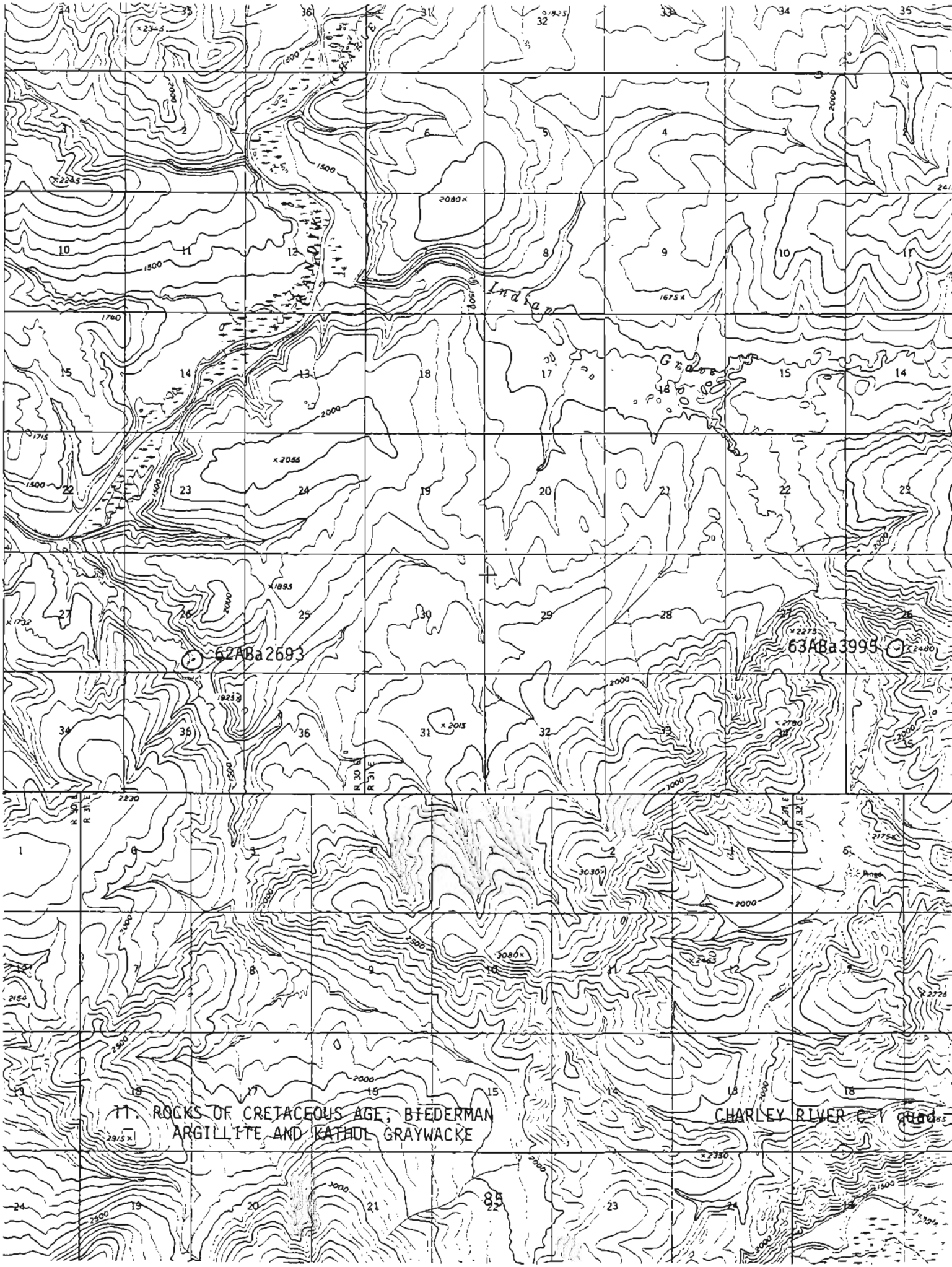
H. ROCKS OF CRETACEOUS AGE; BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE

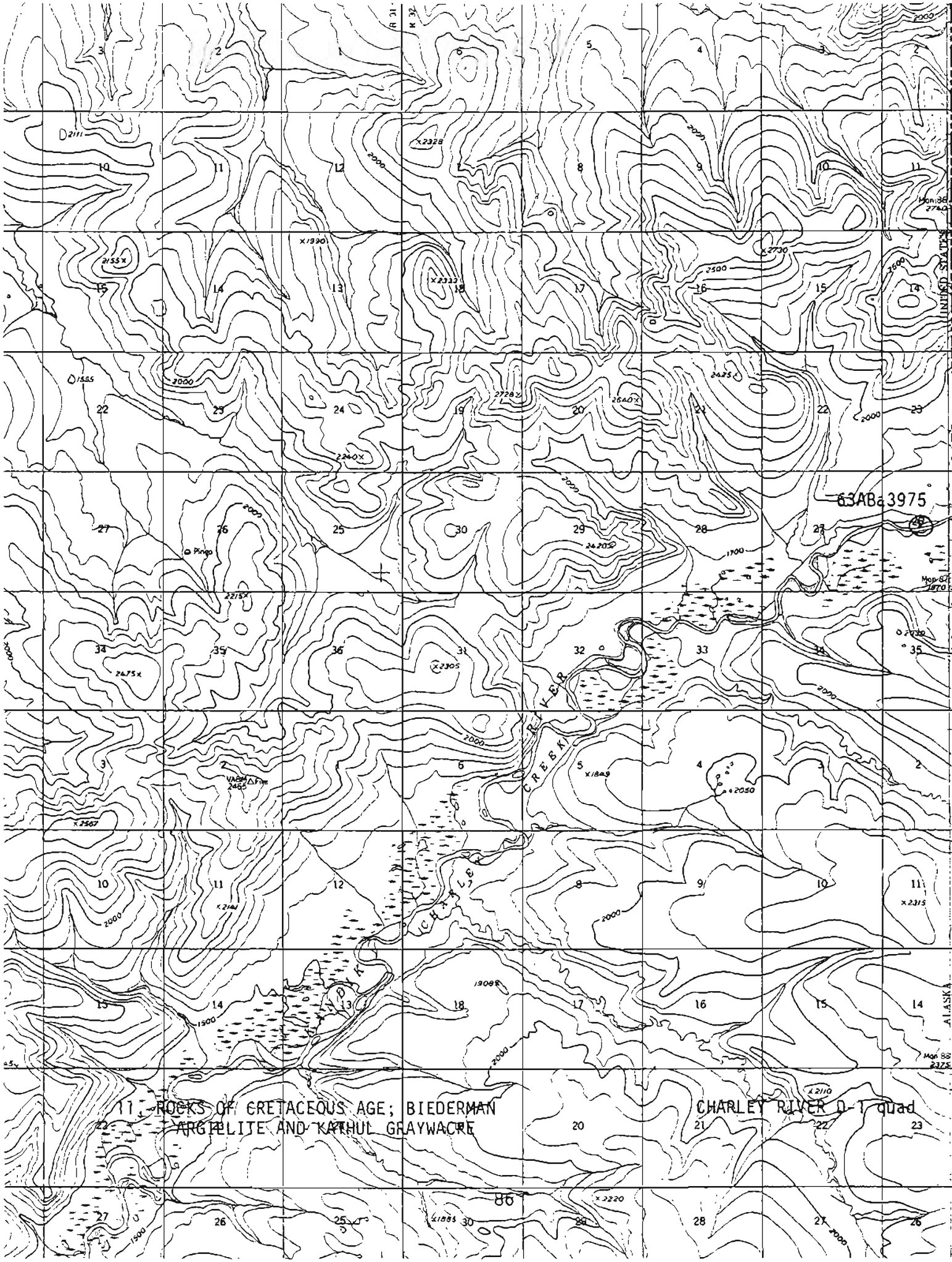
CHARLEY RIVER B-4 quad.



T1. ROCKS OF CRETACEOUS AGE: BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE

CHARLEY RIVER (B-1) quad.


62ABa2693
63ABa3995
11. ROCKS OF CRETACEOUS AGE; BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE
CHARLEY RIVER C-V QUAD.


63ABa3975
CREEK
RIVER
11 ROCKS OF CRETACEOUS AGE; BIEDERMAN ARGILLITE AND KATHUL GRAYWACKE
CHARLEY RIVER D-1 quad

12. ROCKS OF TERTIARY AGE

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
62ABa2502	164330	64M-2401	wacke, Tertiary	Charley River B-5
62ABa2501	164360	64M-2431	claystone, Tertiary	Charley River B-5
61ABa1591	163636	64M-1400	basalt, Cenozoic	Black River C-5

RAPID ROCK ANALYSIS

Lab No.	164330	164360	163636
SiO_2	29.0	66.5	45.8
Al_2O_3	10.6	18.2	13.1
Fe_2O_3	.00	1.2	1.4
FeO	30.1	2.3	10.3
MgO	2.0	1.5	9.6
CaO	2.1	.17	8.4
Na_2O	< .05	.56	4.3
K_2O	1.0	2.7	2.0
H_2O^-	.32	.68	.11
H_2O^+	2.2	4.7	.70
TiO_2	.39	1.1	2.5
P_2O_5	1.0	.14	1.0
MnO	.76	.03	.15
CO_2	20.4	.11	.05
Sum	100	100	99
Powder Density by Air Pycnometer	3.25	2.78	

12. ROCKS OF TERTIARY AGE

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-2401	64M-2431	64M-1400
Si	7.	M.	M.
Al	3.	10.	10.
Fe	M.	3.	7.
Mg	.7	.7	7.
Ca	2.	.1	5.
Na	.3	.5	2.
K	1.5	2.	2.
Ti	.2	.3	1.5
P	0	0	.5
Mn	.3	.02	.15
Ag	0	< .00007	0
As	0	0	0
Au	0	0	0
B	.001	.01	0
Ba	.5	.07	.03
Be	.00015	.0002	.0003
Bi	0	0	0
Cd	0	0	0
Ce	0	0	.015
Co	.001	.0015	.01
Cr	.007	.02	.02
Cu	.003	.01	.007
Ga	*	.003	.003
Ge	0	0	0
Hf	0	0	0
Hg	0	0	0
In	0	0	0
La	0	0	.01
Li	0	0	0
Mo	0	0	.001

*High Fe interferes with the most sensitive Ga and Yb lines. Ga, if present, would be < .002%.

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-2401	64M-2431	64M-1400
Nb	.001	.0015	.007
Ni	.003	.007	.02
P	0	.003	0
Pd	0	0	0
Pt	0	0	0
Re	0	0	0
Sb	0	0	0
Sc	.001	.002	.002
Sn	0	0	0
Sr	.03	.003	.2
Ta	0	0	0
Te	0	0	0
Th	0	0	0
Tl	0	0	0
U	0	0	0
V	.007	.02	.05
W	0	0	0
Y	.002	.003	.005
Yb	*	.0003	.0005
Zn	0	0	0
Zr	.005	.01	.02
Looked for only when La or Ce found:			
Pr			0
Nd			.01
Sm			0
Eu	0	0	0

*High Fe interferes with the most sensitive Ga and Yb lines. Ga, if present, would be <.002%.

CIPW NORM FOR SAMPLE NO. 3636 Loc. No. 61ABa1591

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	45.80	13.10	1.40	10.30	9.60	8.40	4.30	2.00	0.70	2.50	1.00	0.286
MOL. AMTS.	0.7623	0.1285	0.0088	0.1434	0.2381	0.1498	0.0694	0.0212	0.0389	0.0313	0.0070	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.25	7.357
MOL. AMTS.	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	46.15	13.20	1.41	10.38	9.67	8.46	4.33	2.02	0.71	2.52	1.01	0.286
MOL. AMTS.	0.7680	0.1295	0.0088	0.1444	0.2399	0.1509	0.0699	0.0214	0.0391	0.0315	0.0071	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	7.357
MOL. AMTS.	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0214	0.0292	0.0382	0.0000	0.0407	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	11.908	15.316	10.616	0.000	11.563	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0891	0.0618	0.0273	0.0891	0.0394	0.0000	0.0088	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	10.350	6.201	3.607	12.536	8.037	0.000	2.045	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0315	0.0000	0.0000	0.0000	0.0071	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	4.784	0.000	0.000	0.000	2.386	0.000	0.000	0.000	0.000	99.349	49.403	49.946

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	NOL
MOL. AMTS.	0.0891	0.0891	0.0618	0.0273	0.0000	0.0000	0.0000	0.1285	0.0891	0.0394	0.0000
PERCENTAGES	20.158	10.350	6.201	3.607	0.000	0.000	0.000	20.573	12.536	8.037	0.000

RANTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	40.67	13.71	0.94	7.65	12.70	7.99	7.40	2.27	4.15	1.67	0.75	0.11

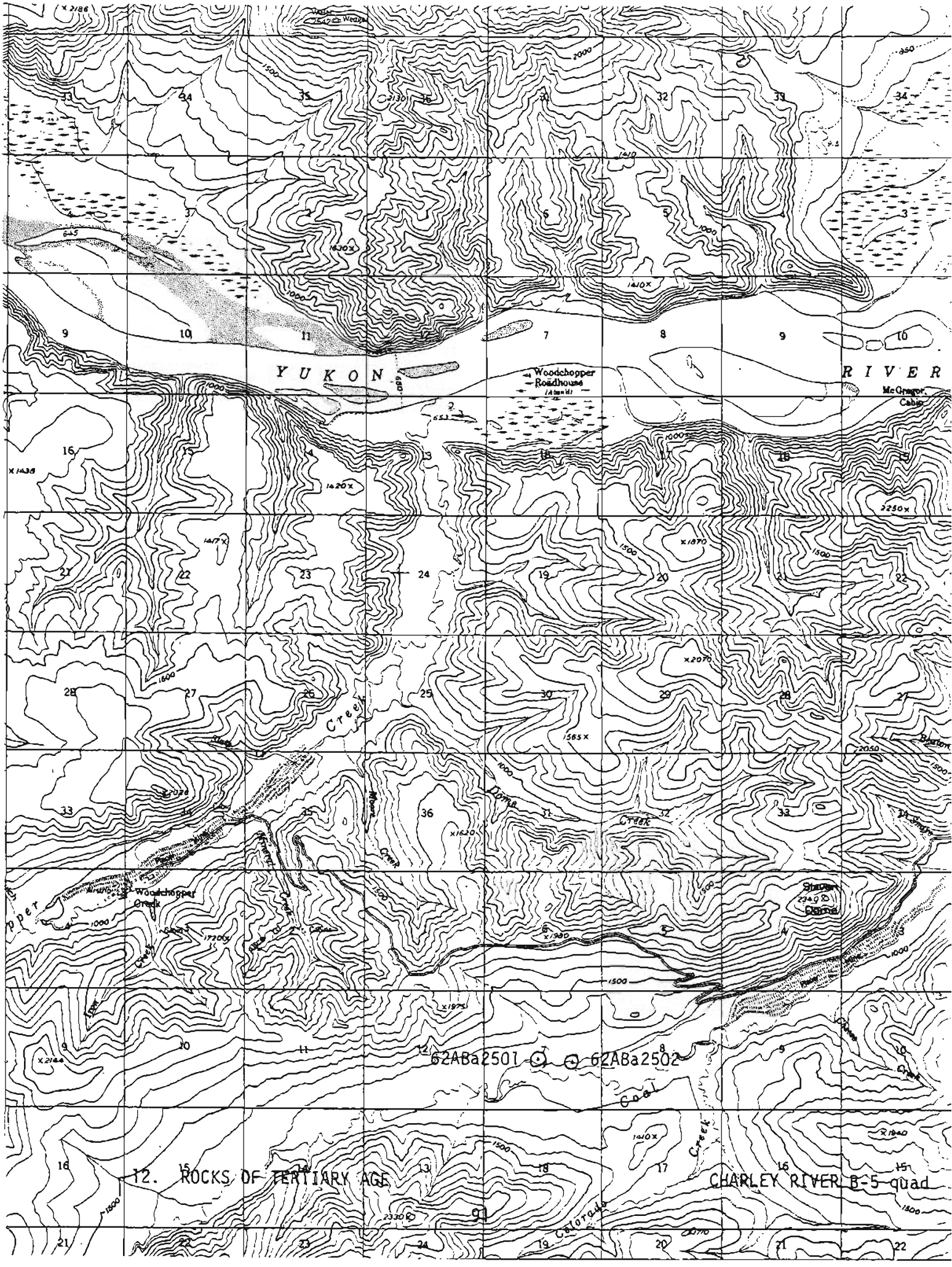
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	16.69	52.10	19.45	11.77	98.99	4.06	0.91	5.05	0.23	0.59	147.07	-48.08

RATIOS FOR TRIANGULAR DIAGRAMS

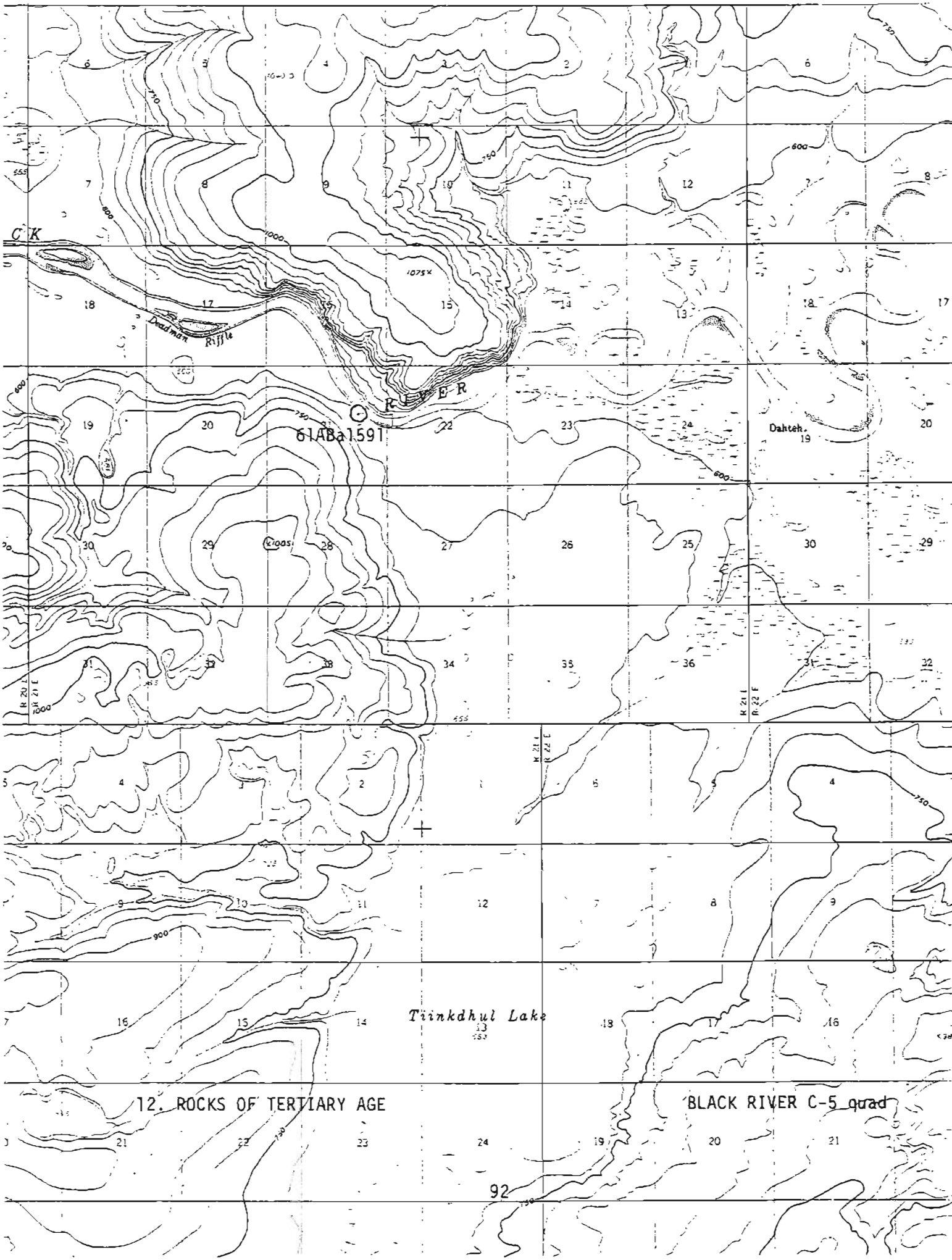
A:C:F = 8.34 : 23.02 : 67.88 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 18.70 : *****

Q:OR:AB = 0.00 : 42.28 : 57.72 Q:OR:(AB+AN) = 0.00 : 24.10 : 75.90 OR:AB:AN = 24.10 : 32.91 : 42.99



12. ROCKS OF TERTIARY AGE

CHARLEY RIVER B-5 quad



12. ROCKS OF TERTIARY AGE

BLACK RIVER C-5 quad

13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GNEISS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ABa3003	163816	64M-1473	augen gneiss	Tanacross A-2
63ACn1242	163819	64M-1476	augen gneiss	Eagle C-1
63AE7	164359	64M-2430	augen gneiss	Tanacross D-2
62ACn604	163837	64M-1494	quartz biotite gneiss	Charley River A-5
62ACn606	163838	64M-1495	quartz biotite gneiss	Charley River A-5
62ABa2424	163843	64M-1500	quartz biotite gneiss	Charley River A-5

RAPID ROCK ANALYSIS

Lab No.	163816	163819	164359	163837	163838	163843
SiO_2	72.0	46.1	72.0	71.9	80.0	67.8
Al_2O_3	14.1	19.8	14.5	13.6	9.6	13.8
Fe_2O_3	.66	.86	.59	1.2	1.3	2.6
FeO	1.4	4.4	2.0	3.3	2.7	3.7
MgO	.32	10.5	.6	2.1	1.0	2.1
CaO	1.2	12.3	1.2	.91	.27	2.0
Na_2O	3.6	2.3	2.3	1.0	.49	1.6
K_2O	4.4	.22	5.0	3.1	2.1	3.4
H_2O^-	.15	.10	.17	.09	.06	.22
H_2O^+	.71	2.8	.68	1.6	1.3	1.6
TiO_2	.27	.12	.39	.42	.50	.74
P_2O_5	.26	.14	.31	.65	.43	.09
MnO	.03	.10	.05	.07	.08	.08
CO_2	< .05	<.05	.10	.05	.08	.08
Sum	99	100	100	100	100	100
Powder Density by Air Pycnometer			2.68			

13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GNEISS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1473	64M-1476	64M-2430	64M-1494	64M-1495	64M-1500
Si	M.	M.	M.	M.	M.	M.
Al	5.	10	7.	7.	3.	7.
Fe	1.5	5.	2.	3.	2.	5.
Mg	.2	7.	.3	.7	.7	1.
Ca	1.	7.	.7	.7	.2	2.
Na	2.	1.5	1.5	1.	.5	1.5
K	3.	0	3.	2.	1.5	2.
Ti	.15	.07	.15	.3	.2	.3
P	0	0	0	0	0	0
Mn	.03	.07	.03	.07	.05	.05
Ag	0	0	0	0	0	0
As	0	0	0	0	0	0
Au	0	0	0	0	0	0
B	0	0	0	.002	.0015	0
Ba	.1	.005	.07	.1	.05	.1
Be	.0003	0	.0002	.0001	0	0
Bi	0	0	0	0	0	0
Cd	0	0	0	0	0	0
Ce	.02	0	0	0	0	0
Co	.0003	.005	0	.0007	.0005	.001
Cr	.0015	.07	.001	.01	.007	.015
Cu	.0003	.0005	.0005	.0015	.001	.005
Ga	.002	.0015	.0015	.002	.0015	.003
Ge	0	0	0	0	0	0
Hf	0	0	0	0	0	0
Hg	0	0	0	0	0	0
In	0	0	0	0	0	0
La	.01	0	.005	.005	0	.007
Li	0	0	0	0	0	0
Mo	0	0	0	0	0	0

13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GNEISS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1473	64M-1476	64M-2430	64M-1494	64M-1495	64M-1500
Nb	.002	0	.001	.002	.001	.0015
Ni	.001	.05	.0007	.002	.0015	.003
Pb	.002	0	.007	.0015	.0015	.002
Pd	0	0	0	0	0	0
Pt	0	0	0	0	0	0
Re	0	0	0	0	0	0
Sb	0	0	0	0	0	0
Sc	.001	.003	.0007	.0015	.001	.0015
Sn	0	0	0	0	0	0
Sr	.02	.03	.007	.02	.007	.03
Ta	0	0	0	0	0	0
Te	0	0	0	0	0	0
Th	0	0	0	0	0	0
Tl	0	0	0	0	0	0
U	0	0	0	0	0	0
V	.003	.015	.003	.01	.007	.015
W	0	0	0	0	0	0
Y	.003	.001	.003	.002	.002	.007
Yb	.0003	.0001	.0003	.0002	.0003	.0007
Zn	0	0	0	0	0	0
Zr	.02	.0007	.015	.03	.05	.03
Looked for only when La or Ce found:						
Pr	0		0	0	0	0
Nd	0		0	0	0	0
Sm	0		0	0	0	0.
Eu	0		0	0	0	0
Looked for only when Y is found above .005%:						
Gd						0
Tb						0
Dy						0
Ho						0
Er						0
Tm						0
Lu						0

CIPW NORM FOR SAMPLE NO. 3816 Loc. No. 63ABa3003

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	72.00	14.10	0.66	1.40	0.32	1.20	3.60	4.40	0.71	0.27	0.26	0.196
MOL. AMTS.	1.1983	0.1383	0.0041	0.0195	0.0079	0.0214	0.0581	0.0467	0.0394	0.0034	0.0018	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.03	0.00	0.00	0.00	0.00	C.00	0.00	0.00	0.00	0.00	98.95	2.121
MOL. AMTS.	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	72.76	14.25	0.67	1.41	0.32	1.21	3.64	4.45	0.72	0.27	0.26	0.196
MOL. AMTS.	1.2110	0.1398	0.0042	0.0197	0.0080	0.0216	0.0587	0.0472	0.0398	0.0034	0.0019	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.121
MOL. AMTS.	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.5241	0.0184	0.0000	0.0472	0.0587	0.0155	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	31.493	1.876	0.000	26.277	30.785	4.300	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0080	0.0125	0.0000	0.0000	0.0000	0.0042	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	0.805	1.653	0.000	0.000	0.000	0.967	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0034	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	0.518	0.000	0.000	0.000	0.622	0.000	0.000	0.000	0.000	99.296	94.730	4.566

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0206	0.0080	0.0125	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	2.458	0.805	1.653	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	65.56	15.13	0.45	1.07	0.43	1.17	6.36	5.11	4.31	0.18	0.20	0.02
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	46.01	12.01	7.12	34.86	398.65	1.12	0.61	13.11	0.45	0.22	239.45	159.20

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 46.24 : 19.54 : 33.18 A:K:F = 22.57 : 48.51 : 28.92 A:N:F = 20.18 : 53.95 : 25.08

Q:OR:AB = 83.19 : 7.49 : 9.32 Q:OR:(AB+AN) = 81.20 : 7.31 : 11.49 OR:AB:AN = 38.90 : 48.37 : 12.73

Based [illegible] Q:OR:AB molec. equiv.

CIPW NORM FOR SAMPLE NO. 3837 Loc. No. 62ACn604

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	71.90	13.60	1.20	3.30	2.10	0.91	1.00	3.10	1.60	0.42	0.65	0.189
MOL. AMTS.	1.1966	0.1334	0.0075	0.0459	0.0521	0.0162	0.0161	0.0329	0.0888	0.0053	0.0046	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.85	2.750
MOL. AMTS.	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	72.01	13.62	1.20	3.30	2.10	0.91	1.00	3.10	1.60	0.42	0.65	0.189
MOL. AMTS.	1.1984	0.1336	0.0075	0.0460	0.0522	0.0163	0.0162	0.0330	0.0889	0.0053	0.0046	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.750
MOL. AMTS.	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.8154	0.0835	0.0000	0.0330	0.0162	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	48.996	8.514	0.000	18.346	8.474	0.268	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0522	0.0342	0.0000	0.0000	0.0000	0.0075	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	5.238	4.512	0.000	0.000	0.000	1.742	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0053	0.0000	0.0000	0.0000	0.0046	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	0.799	0.000	0.000	0.000	1.542	0.000	0.000	0.000	0.000	98.432	84.599	13.833

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0864	0.0522	0.0342	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	9.750	5.238	4.512	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	63.52	14.16	0.80	2.44	2.77	0.86	1.71	3.49	9.43	0.28	0.49	0.05

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	42.66	36.47	5.19	15.68	382.69	1.68	1.46	28.40	0.67	0.46	162.73	219.95

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 47.51 : 1.29 : 50.19 A:K:F = 40.39 : 14.87 : 44.74 A:N:F = 43.70 : 7.89 : 47.45

Q:OR:AB = 94.32 : 3.81 : 1.87 Q:OR:(AB+AN) = 94.21 : 3.81 : 1.98 OR:AB:AN = 65.81 : 32.27 : 1.93

CIPW NORM FOR SAMPLE NO. 3838 Loc. No. 62ACn606

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	80.00	9.60	1.30	2.70	1.00	0.27	0.49	2.10	1.30	0.50	0.43	0.120
MOL. AMTS.	1.3315	0.0942	0.0081	0.0376	0.0248	0.0048	0.0079	0.0223	0.0722	0.0063	0.0030	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.77	2.077
MOL. AMTS.	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	80.18	9.62	1.30	2.71	1.00	0.27	0.49	2.10	1.30	0.50	0.43	0.120
MOL. AMTS.	1.3345	0.0944	0.0082	0.0377	0.0249	0.0048	0.0079	0.0223	0.0723	0.0063	0.0030	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.077
MOL. AMTS.	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

NORM NOT COMPUTABLE, SEE STEP NO. 2 OF PROGRAM WRITE-UP

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	73.10	10.34	0.89	2.06	1.36	0.26	0.87	2.45	7.92	0.34	0.33	0.06

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	45.06	38.19	2.30	14.45	637.17	2.99	1.45	34.53	0.74	0.31	157.81	479.37

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 53.16 : 0.00 : 45.17 A:K:F = 45.66 : 14.12 : 40.22 A:N:F = 50.24 : 5.51 : 42.68

Q:OR:AB = 0.00 : 0.00 : 0.00 Q:OR:(AB+AN) = 0.00 : 0.00 : 0.00 OR:AB:AN = 0.00 : 0.00 : 0.00

CIPW NORM FOR SAMPLE NO. 3843 Loc. No. 62ABa2424

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	67.80	13.80	2.60	3.70	2.10	2.00	1.60	3.40	1.60	0.74	0.09	0.204
MOL. AMTS.	1.1284	0.1353	0.0163	0.0515	0.0521	0.0357	0.0258	0.0361	0.0888	0.0093	0.0006	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.51	1.423
MOL. AMTS.	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	68.13	13.87	2.61	3.72	2.11	2.01	1.61	3.42	1.61	0.74	0.09	0.204
MOL. AMTS.	1.1340	0.1360	0.0164	0.0518	0.0524	0.0358	0.0259	0.0363	0.0893	0.0093	0.0006	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.423
MOL. AMTS.	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.6137	0.0401	0.0000	0.0363	0.0259	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	36.873	4.087	0.000	20.190	13.605	9.380	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0524	0.0272	0.0000	0.0000	0.0000	0.0164	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	5.256	3.591	0.000	0.000	0.000	3.788	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0093	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	1.412	0.000	0.000	0.000	0.214	0.000	0.000	0.000	0.000	98.398	84.136	14.261

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0796	0.0524	0.0272	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	8.847	5.256	3.591	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	59.89	14.37	1.73	2.73	2.77	1.89	2.74	3.83	9.43	0.49	0.07	0.06

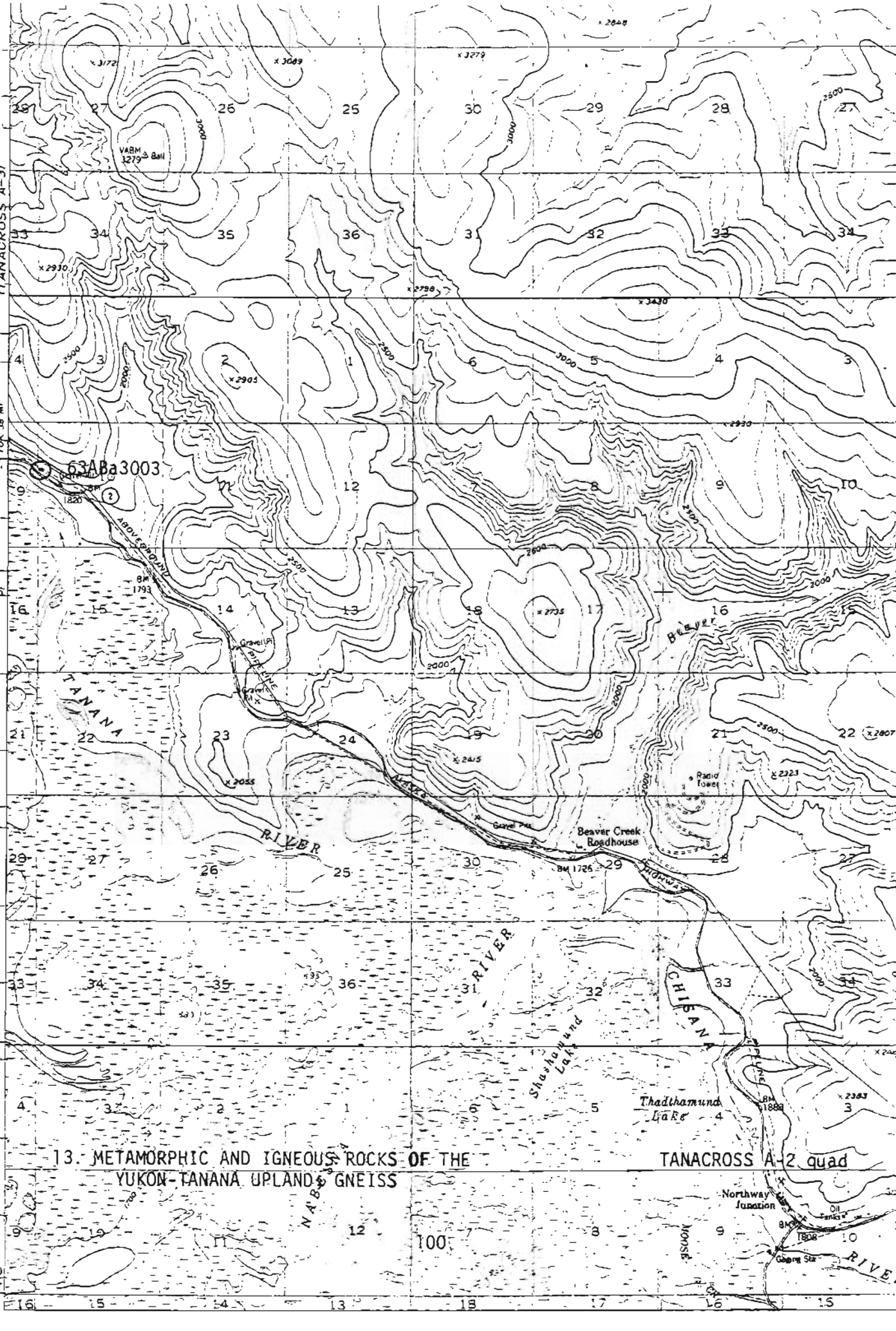
	ZR	C	S1	CL	F	S2	CR	NI	9A
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	36.56	37.08	9.63	16.72	304.81	2.50	0.17	23.99	0.58	0.38	166.89	137.92

RATIOS FOR TRIANGULAR DIAGRAMS

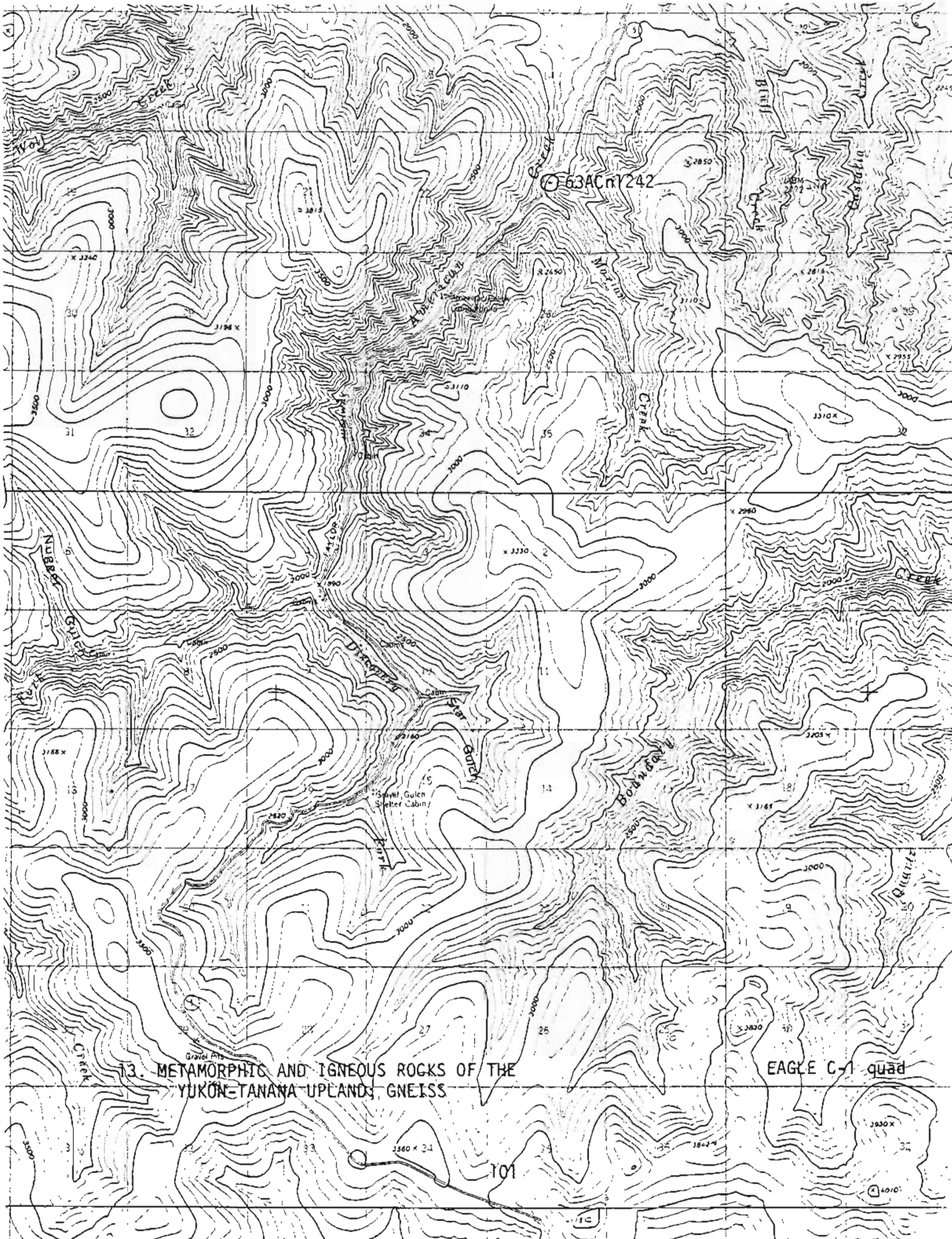
A:C:F = 39.32 : 14.79 : 44.90 A:K:F = 28.44 : 18.34 : 53.22 A:N:F = 30.01 : 13.84 : 54.94

Q:OR:AB = 90.80 : 5.37 : 3.84 Q:OR:(AB+AN) = 86.48 : 5.11 : 8.41 OR:AB:AN = 37.81 : 27.04 : 35.15



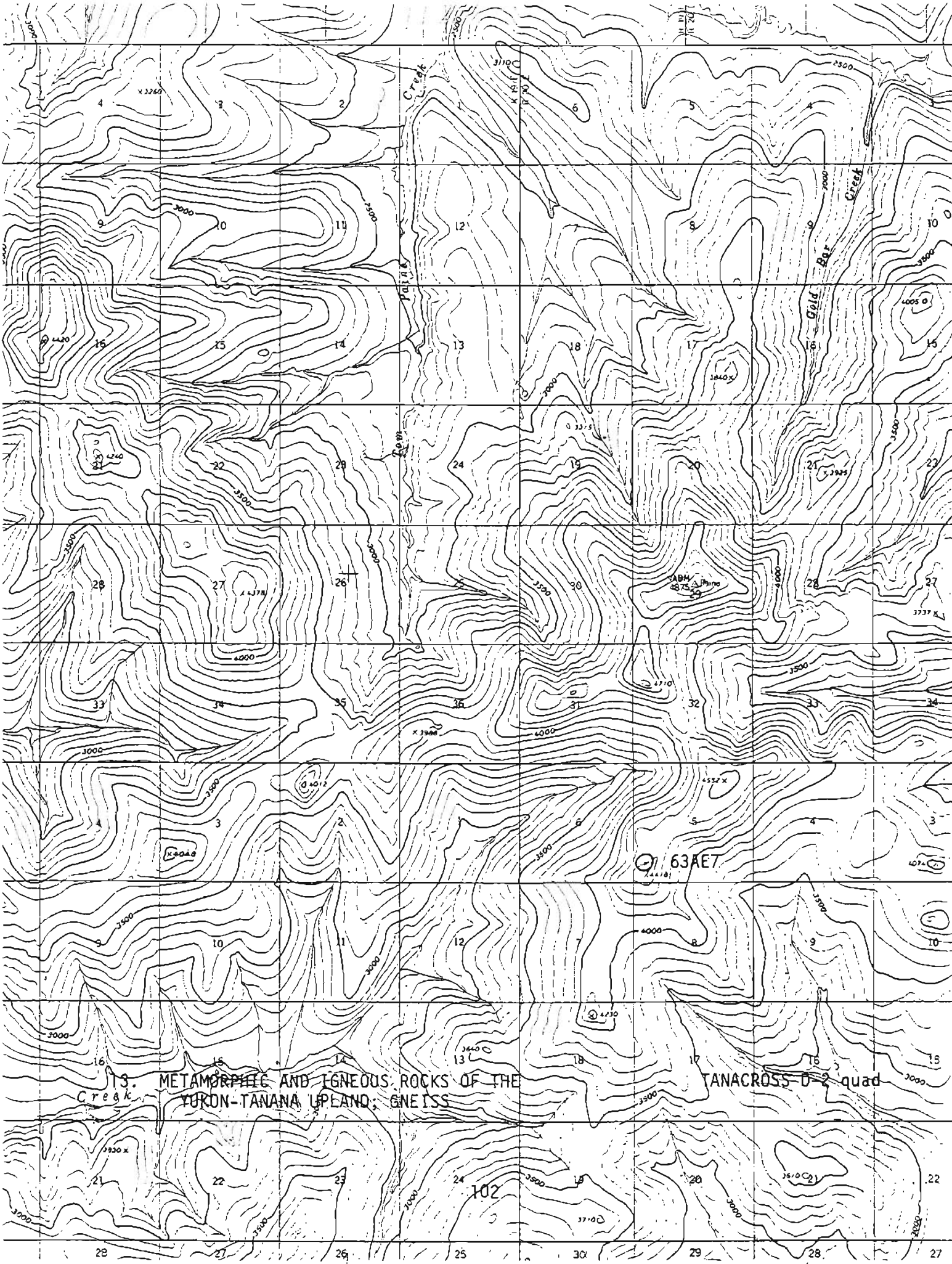
13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND: GNEISS

TANACROSS A-2 quad

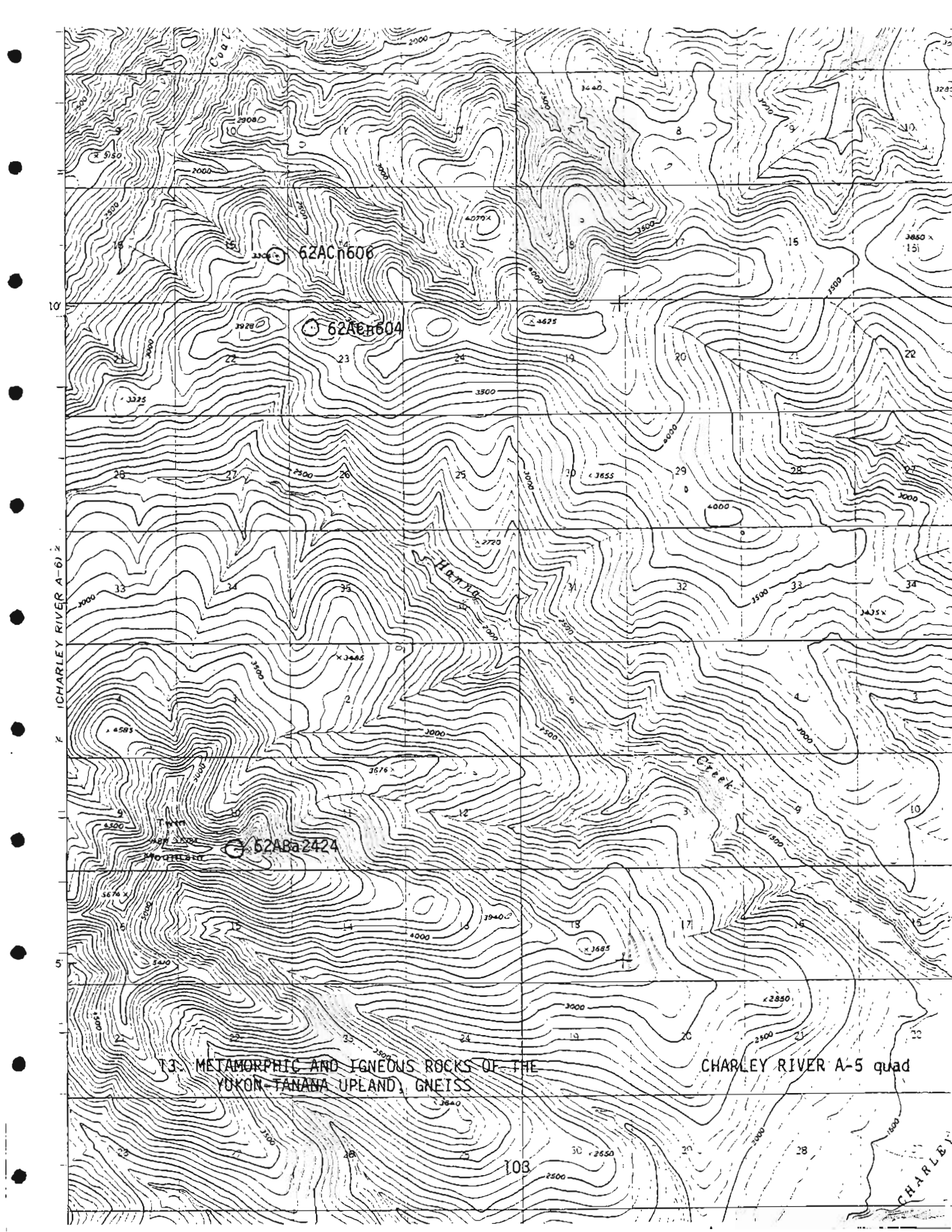


13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLANDS; GNEISS

EAGLE C-1 quad



13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GNEISS



13. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND, GNEISS

14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ABa3001	163815	64M-1472	quartz monzonite	Tanacross A-3
62ACn544	163832	64M-1489	biotite quartz monzonite	Charley River A-6
62ABa2421	163833	64M-1490	biotite quartz monzonite	Charley River B-6
62ABa2415	163834	64M-1491	muscovite qtz. monzonite	Charley River A-6
62ABa2424A	163835	64M-1492	quartz monzonite	Charley River A-5
61ABa1634	163836	64M-1493	muscovite qtz. monzonite	Charley River A-4

RAPID ROCK ANALYSIS

Lab No.	163815	163832	163833	163834	163835	163836
SiO_2	70.5	67.5	74.1	73.9	75.9	73.9
Al_2O_3	14.5	15.5	12.4	15.1	13.4	14.5
Fe_2O_3	1.1	1.0	.92	.22	.10	.07
FeO	1.8	3.0	1.8	.48	.80	.36
MgO	1.0	1.8	.56	.80	.75	.65
CaO	1.9	3.2	.35	.82	1.7	1.1
Na_2O	3.0	2.2	2.4	2.9	1.7	3.7
K_2O	4.1	3.8	4.9	4.4	4.3	4.0
H_2O^-	.30	.15	.10	.12	.07	.04
H_2O^+	.90	.95	1.1	.81	.76	.61
TiO_2	.31	.53	.16	.06	.11	.03
P_2O_5	.26	.16	.20	.27	.24	.25
MnO	.08	.07	.10	.04	.14	.03
CO_2	.05	.11	.10	< .05	.06	.09
Sum	100	100	99	100	100	99

14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1472	64M-1489	64M-1490	64M-1491	64M-1492	64M-1493
Si	M.	M.	M.	M.	M.	M.
Al	5.	7.	7.	7.	7.	7.
Fe	2.	3.	3.	.7	1.	.5
Mg	.5	.7	.1	.1	.2	.1
Ca	1.5	2.	.2	.7	1.5	.7
Na	2.	2.	2.	2.	1.5	2.
K	3.	3.	3.	3.	3.	3.
Ti	.15	.3	.1	.05	.07	.03
P	0	0	0	0	0	0
Mn	.05	.05	.07	.015	.01	.015
Ag	0	0	0	0	0	0
As	0	0	0	0	0	0
Au	0	0	0	0	0	0
B	0	.001	.001	.002	.003	.0015
Ba	.2	.15	.02	.07	.15	.07
Be	.0002	.0002	.0001	.0007	0	.0005
Bi	0	0	0	0	0	0
Cd	0	0	0	0	0	0
Ce	0	0	0	0	0	0
Co	.0003	.0007	0	0	.0003	0
Cr	.0007	.002	.001	.001	.0015	.0007
Cu	.0003	<.0003	<.0003	<.0003	.0005	.0005
Ga	.0015	.002	.002	.003	.002	.002
Ge	0	0	0	0	0	0
Hf	0	0	0	0	0	0
Hg	0	0	0	0	0	0
In	0	0	0	0	0	0
La	.005	.005	.02	0	0	0
Li	0	0	0	.02	0	0
Mo	0	0	0	0	0	0

14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1472	64M-1489	64M-1490	64M-1491	64M-1492	64M-1493
Nb	.002	0	.002	.0015	0	.001
Ni	.0005	.001	.0007	.0007	.002	.0005
Pb	.003	.002	.003	.007	.005	.003
Pd	0	0	0	0	0	0
Pt	0	0	0	0	0	0
Re	0	0	0	0	0	0
Sb	0	0	0	0	0	0
Sc	.0005	.001	.0005	0	.0003	0
Sn	0	0	0	.0015	0	.001
Sr	.07	.07	.005	.02	.03	.05
Ta	0	0	0	0	0	0
Te	0	0	0	0	0	0
Th	0	0	0	0	0	0
Tl	0	0	0	0	0	0
U	0	0	0	0	0	0
V	.005	.007	0	0	.002	0
W	0	0	0	0	0	0
Y	.002	.0015	.001	.0015	0	.0007
Yb	.0002	.00015	.0001	.0001	0	0
Zn	0	0	0	0	0	0
Zr	.015	.015	.05	.003	.01	.002
Looked for only when La or Ce found:						
Pr	0	0	0			
Nd	0	0	.015			
Sm	0	0	0			
Eu	0	0	0			

CIPW NORM FOR SAMPLE NO. 3815 Loc. No. 63ABa3001

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	70.50	14.50	1.10	1.80	1.00	1.90	3.00	4.10	0.90	0.31	0.26	0.206
MOL. AMTS.	1.1733	0.1422	0.0069	0.0251	0.0248	0.0339	0.0484	0.0435	0.0500	0.0039	0.0018	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.45	1.636
MOL. AMTS.	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	70.89	14.58	1.11	1.81	1.01	1.91	3.02	4.12	0.90	0.31	0.26	0.206
MOL. AMTS.	1.1798	0.1430	0.0069	0.0252	0.0249	0.0341	0.0487	0.0438	0.0502	0.0039	0.0018	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.636
MOL. AMTS.	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.5289	0.0226	0.0000	0.0438	0.0487	0.0279	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	31.780	2.308	0.000	24.362	25.526	7.770	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0249	0.0155	0.0000	0.0000	0.0000	0.0069	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	2.504	2.045	0.000	0.000	0.000	1.604	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0039	0.0000	0.0000	0.0000	0.0018	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	0.592	0.000	0.000	0.000	0.619	0.000	0.000	0.000	0.000	99.110	91.746	7.364

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0404	0.0249	0.0155	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	4.549	2.504	2.045	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	63.50	15.39	0.75	1.36	1.34	1.83	5.24	4.71	5.41	0.21	0.20	0.06

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	42.73	19.46	10.18	27.62	352.59	1.17	0.55	15.01	0.47	0.38	210.49	142.09

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 41.87 : 20.79 : 35.69 A:K:F = 23.35 : 35.30 : 41.35 A:N:F = 22.46 : 37.76 : 38.02

Q:OR:AB = 85.12 : 7.04 : 7.83 Q:OR:(AB+AN) = 81.46 : 6.74 : 11.80 OR:AB:AN = 36.36 : 40.44 : 23.20

mol. amts A:C:F
Q:OR:AB

CIPW NORM FOR SAMPLE NO. 3832 Loc. No. 62ACn544

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	67.50	15.50	1.00	3.00	1.80	3.20	2.20	3.80	0.95	0.53	0.16	0.230
MOL. AMTS.	1.1234	0.1520	0.0063	0.0418	0.0447	0.0571	0.0355	0.0403	0.0527	0.0066	0.0011	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.07	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.82	3.000
MOL. AMTS.	0.0010	0.0000	0.0025	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	67.62	15.53	1.00	3.01	1.80	3.21	2.20	3.81	0.95	0.53	0.16	0.230
MOL. AMTS.	1.1254	0.1523	0.0063	0.0418	0.0447	0.0572	0.0356	0.0404	0.0528	0.0066	0.0011	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.07	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	3.000
MOL. AMTS.	0.0010	0.0000	0.0025	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.4932	0.0254	0.0000	0.0404	0.0356	0.0509	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	29.633	2.592	0.000	23.496	18.649	14.160	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0447	0.0299	0.0000	0.0000	0.0000	0.0063	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	4.491	3.945	0.000	0.000	0.000	1.453	0.000	0.000

MINERALS	IL	FN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0066	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0025	0.0000			
PERCENTAGES	1.008	0.000	0.000	0.000	0.380	0.000	0.000	0.251	0.000	99.057	87.530	11.527

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-FN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0746	0.0447	0.0299	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	8.436	4.491	3.945	0.000	0.000	0.000	0.000

NARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	60.63	16.41	0.68	2.25	2.41	3.08	3.83	4.35	5.69	0.36	0.12	0.05

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	ALA	FMA	C*	ALK*	SI	TI	P	H	K	MG	SIM	QZ
	39.50	25.96	14.83	19.71	291.92	1.72	0.29	13.70	0.53	0.45	178.82	113.10

RATIOS FOR TRIANGULAR DIAGRAMS

AICIF = 37.30 : 23.16 : 38.65 AIKIF = 19.66 : 25.37 : 54.97 AINIF = 20.28 : 23.03 : 55.41

QIQHIAB = 86.65 : 7.10 : 6.25 QIORI(AB+AN) = 79.54 : 6.52 : 13.94 ORIABIAN = 31.85 : 28.03 : 40.12

CIPW NORM FOR SAMPLE NO. 3833 Loc. No. 63ABa2421

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	74.10	12.40	0.92	1.60	0.56	0.35	2.40	4.90	1.10	0.16	0.20	0.167
MOL. AMTS.	1.2333	0.1216	0.0058	0.0251	0.0139	0.0062	0.0387	0.0520	0.0611	0.0020	0.0014	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR203	NIO2	BAO	TOTAL	FEO/FE203
PERCENTAGES	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.09	1.957
MOL. AMTS.	0.0014	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	74.78	12.51	0.93	1.82	0.57	0.35	2.42	4.94	1.11	0.16	0.20	0.167
MOL. AMTS.	1.2446	0.1227	0.0058	0.0253	0.0140	0.0063	0.0391	0.0525	0.0616	0.0020	0.0014	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR203	NIO2	BAO	TOTAL	FEO/FE203
PERCENTAGES	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.957
MOL. AMTS.	0.0014	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.6630	0.0312	0.0000	0.0525	0.0391	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	39.836	3.177	0.000	29.221	20.495	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0133	0.0189	0.0000	0.0000	0.0000	0.0058	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	1.334	2.490	0.000	0.000	0.000	1.346	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0020	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	0.0016	0.0007			
PERCENTAGES	0.307	0.000	0.000	0.000	0.478	0.000	0.000	0.156	0.062	98.902	92.729	6.172

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0322	0.0133	0.0189	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	3.823	1.334	2.490	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	66.83	13.18	0.62	1.36	0.75	0.34	4.20	5.64	6.62	0.11	0.15	0.08

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	44.96	19.18	2.31	33.55	455.97	0.74	0.52	22.58	0.57	0.27	234.19	221.77

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 47.59 : 0.00 : 48.75 A:K:F = 28.40 : 40.32 : 31.28 A:N:F = 31.66 : 33.46 : 32.44

Q:OR:AB = 87.86 : 6.96 : 5.18 Q:OR:(AB+AN) = 87.86 : 6.96 : 5.18 OR:AB:AN = 57.32 : 42.68 : 0.00

CIPW NORM FOR SAMPLE NO. 3834 Loc. No. 62ABa2415

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	73.90	15.10	0.22	0.48	0.80	0.82	2.90	4.40	0.81	0.00	0.27	0.204
MOL. AMTS.	1.2299	0.1481	0.0014	0.0067	0.0198	0.0146	0.0468	0.0467	0.0450	0.0000	0.0019	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.74	2.182
MOL. AMTS.	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	74.09	15.14	0.22	0.48	0.80	0.82	2.91	4.41	0.81	0.00	0.27	0.204
MOL. AMTS.	1.2331	0.1485	0.0014	0.0067	0.0199	0.0147	0.0469	0.0468	0.0451	0.0000	0.0019	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.182
MOL. AMTS.	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.6283	0.0464	0.0000	0.0468	0.0469	0.0083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	37.751	4.735	0.000	26.069	24.603	2.310	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0199	0.0059	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	1.998	0.776	0.000	0.000	0.000	0.320	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	0.000	0.000	0.000	0.000	0.641	0.000	0.000	0.000	0.000	99.202	95.468	3.735

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0258	0.0199	0.0059	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	2.774	1.998	0.776	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	66.44	16.00	0.15	0.36	1.07	0.79	5.05	5.05	4.86	0.00	0.21	0.03

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	51.77	10.43	5.11	32.68	429.95	0.00	0.66	15.72	0.50	0.66	230.74	199.22

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 60.86 : 9.69 : 28.23 A:K:F = 38.94 : 38.65 : 22.42 A:N:F = 38.91 : 38.69 : 21.47

Q:OR:AB = 87.02 : 6.49 : 6.50 Q:OR:(AB+AN) = 86.03 : 6.41 : 7.56 OR:AB:AN = 45.89 : 45.97 : 8.14

CIPW NORM FOR SAMPLE NO. 3835 Loc. No. 62ABa2424A

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	75.90	13.40	0.10	0.80	0.75	1.70	1.70	4.30	0.76	0.11	0.24	0.177
MOL. AMTS.	1.2632	0.1314	0.0006	0.0111	0.0186	0.0303	0.0274	0.0456	0.0422	0.0014	0.0017	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.90	8.000
MOL. AMTS.	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	75.98	13.41	0.10	0.80	0.75	1.70	1.70	4.30	0.76	0.11	0.24	0.177
MOL. AMTS.	1.2645	0.1316	0.0006	0.0111	0.0186	0.0303	0.0275	0.0457	0.0422	0.0014	0.0017	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	8.000
MOL. AMTS.	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.7464	0.0337	0.0000	0.0457	0.0275	0.0247	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	44.850	3.436	0.000	25.435	14.399	6.873	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0186	0.0111	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	1.870	1.467	0.000	0.000	0.000	0.145	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0014	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	0.209	0.000	0.000	0.000	0.569	0.000	0.000	0.000	0.000	99.253	94.994	4.260

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0297	0.0186	0.0111	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	3.336	1.870	1.467	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	69.23	14.41	0.07	0.61	1.02	1.66	3.01	5.00	4.62	0.08	0.19	0.11

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	49.08	12.31	11.32	27.29	471.74	0.51	0.63	15.75	0.62	0.56	209.16	262.58

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 50.87 : 21.77 : 23.95 A:K:F = 30.36 : 41.09 : 28.55 A:N:F = 36.32 : 29.53 : 29.90

Q:OR:AB = 91.08 : 5.57 : 3.35 Q:OR:(AB+AN) = 88.41 : 5.41 : 6.18 OR:AB:AN = 46.70 : 28.06 : 25.25

CIPW NORM FOR SAMPLE NO. 3836 Loc. No. 61ABa1634

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	73.90	14.50	0.07	0.36	0.65	1.10	3.70	4.00	0.61	0.00	0.25	0.196
MOL. AMTS.	1.2299	0.1422	0.0004	0.0050	0.0161	0.0196	0.0597	0.0425	0.0339	0.0000	0.0018	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.17	5.143
MOL. AMTS.	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	74.52	14.62	0.07	0.36	0.66	1.11	3.73	4.03	0.62	0.00	0.25	0.196
MOL. AMTS.	1.2402	0.1434	0.0004	0.0051	0.0163	0.0198	0.0602	0.0428	0.0341	0.0000	0.0018	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	5.143
MOL. AMTS.	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.5731	0.0265	0.0000	0.0428	0.0602	0.0139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	34.436	2.705	0.000	23.835	31.570	3.856	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0163	0.0050	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	1.632	0.665	0.000	0.000	0.000	0.102	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0018	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	0.000	0.000	0.000	0.000	0.597	0.000	0.000	0.000	0.000	99.398	96.402	2.996

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0213	0.0163	0.0050	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	2.297	1.632	0.665	0.000	0.000	0.000	0.000

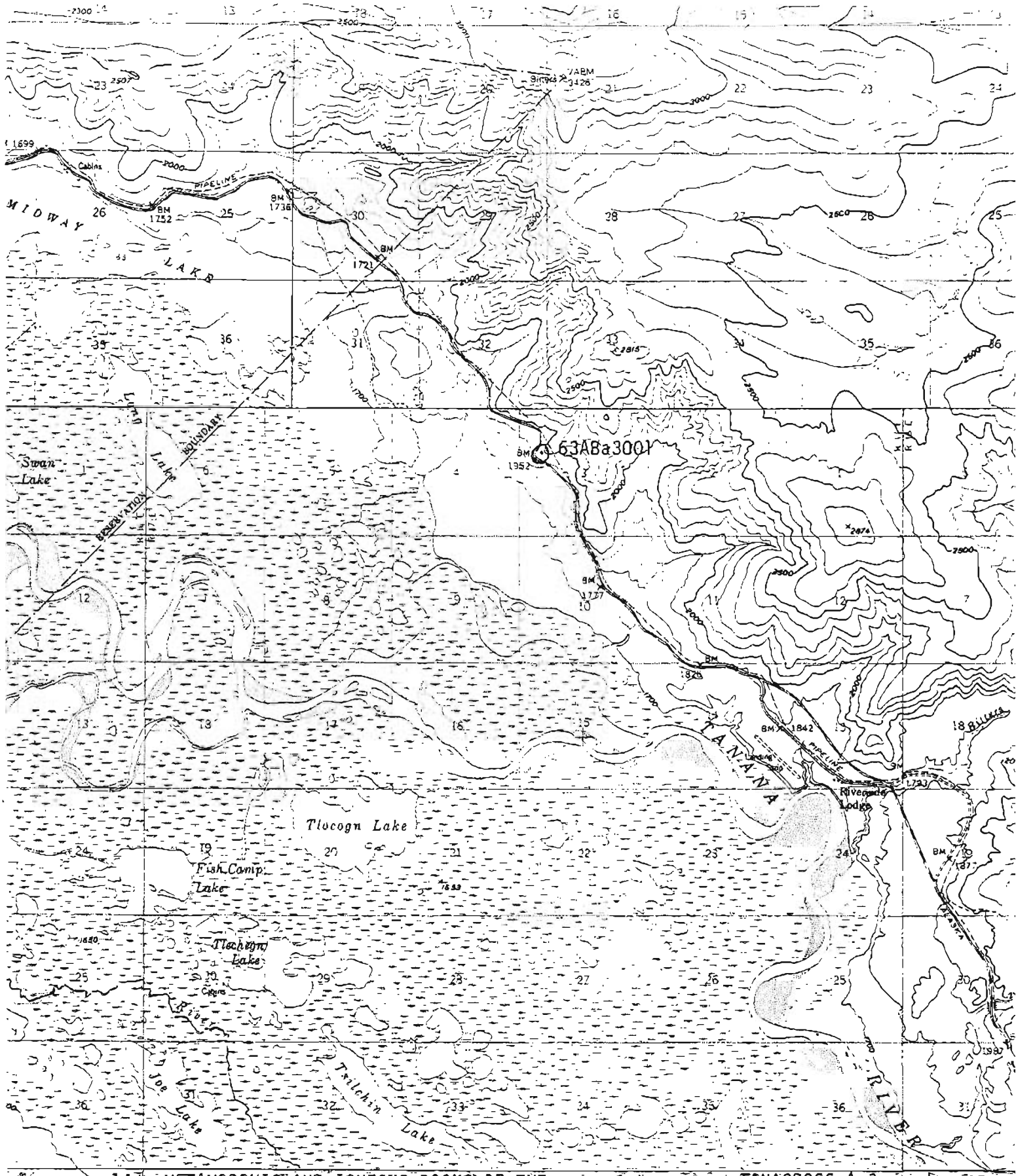
BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	67.14	15.53	0.05	0.27	0.88	1.07	6.52	4.64	3.70	0.00	0.19	0.02
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	ALA	FMA	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	49.65	7.83	6.85	35.67	429.41	0.00	0.61	11.82	0.42	0.72	242.67	186.74

RATIOS FOR TRIANGULAR DIAGRAMS

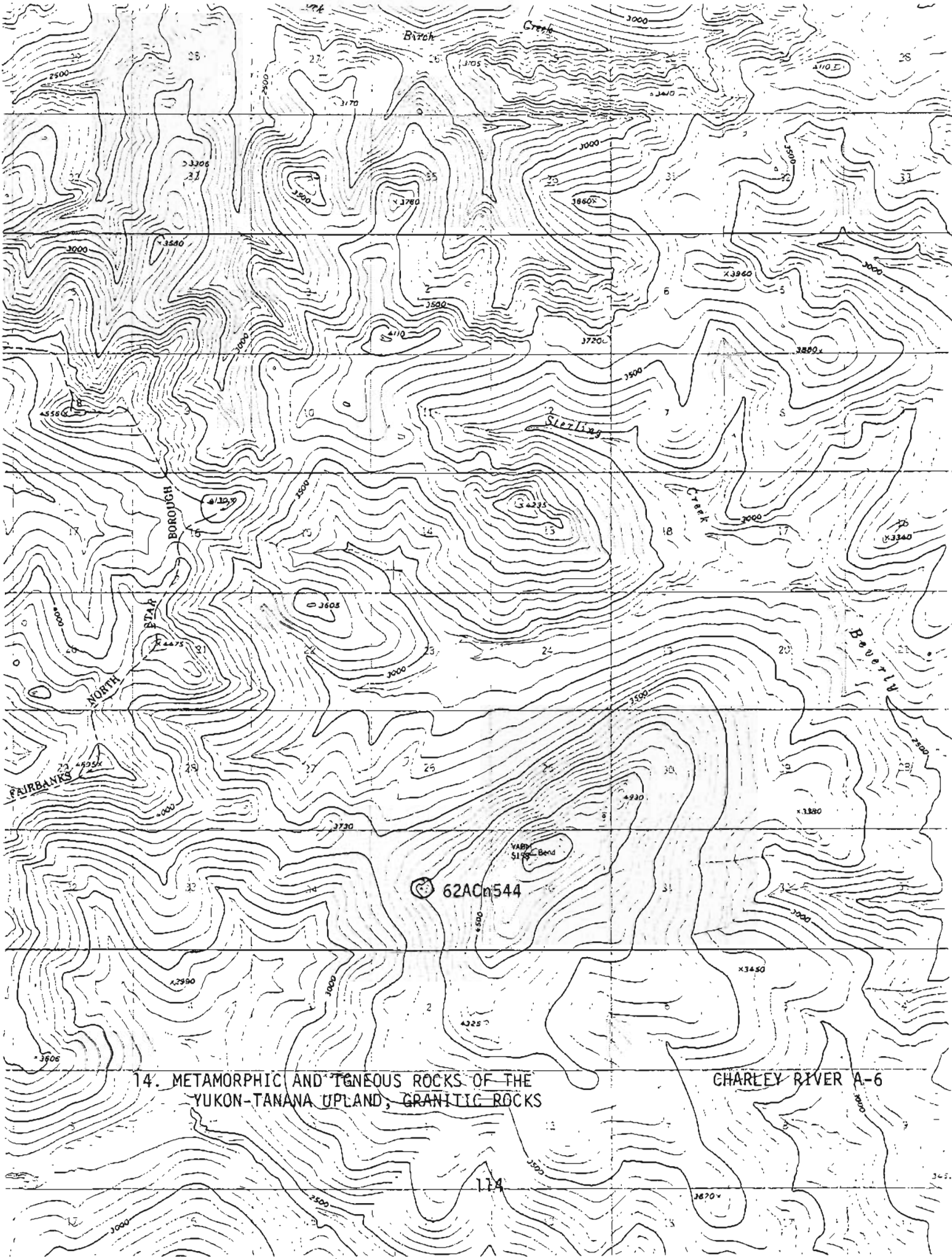
A:C:F = 53.01 : 18.76 : 27.12 A:K:F = 29.01 : 47.09 : 23.91 A:N:F = 24.35 : 55.58 : 19.28

Q:OR:AB = 24.76 : 6.33 : 8.90 Q:OR:(AB+AN) = 83.06 : 6.21 : 10.73 OR:AB:AN = 36.64 : 51.51 : 11.86



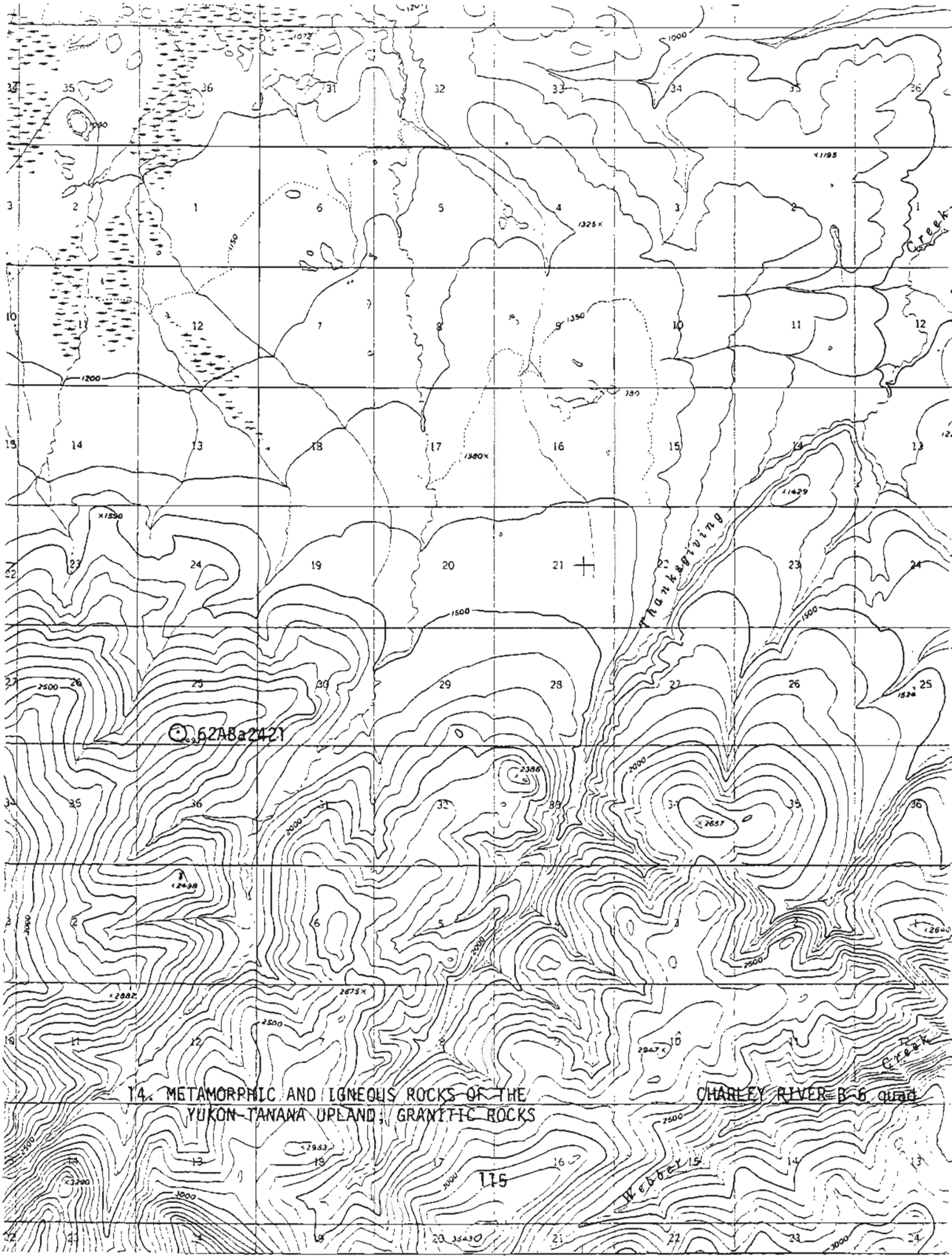
14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS

TANACROSS A-3 quad



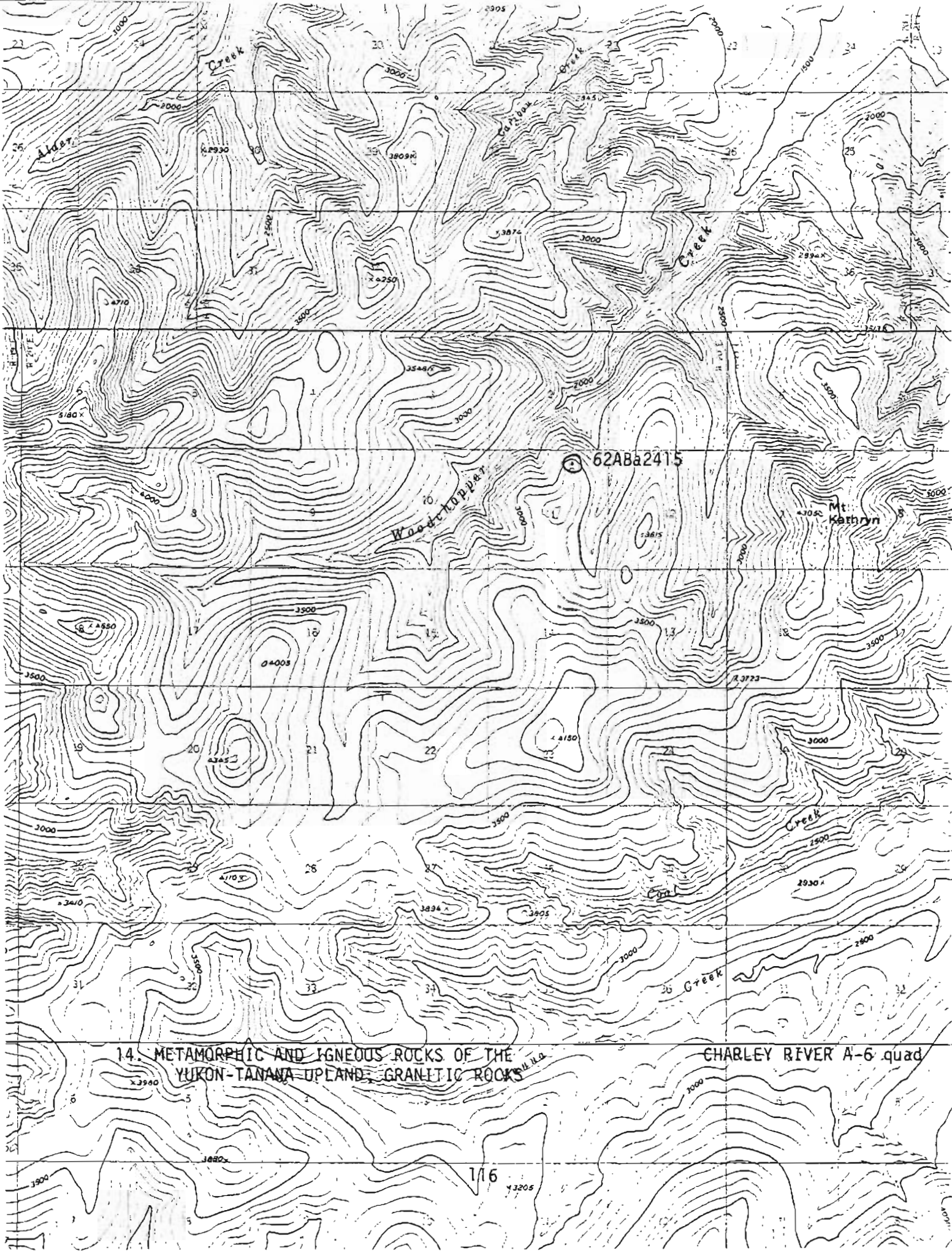
14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND, GRANITIC ROCKS

CHARLEY RIVER A-6



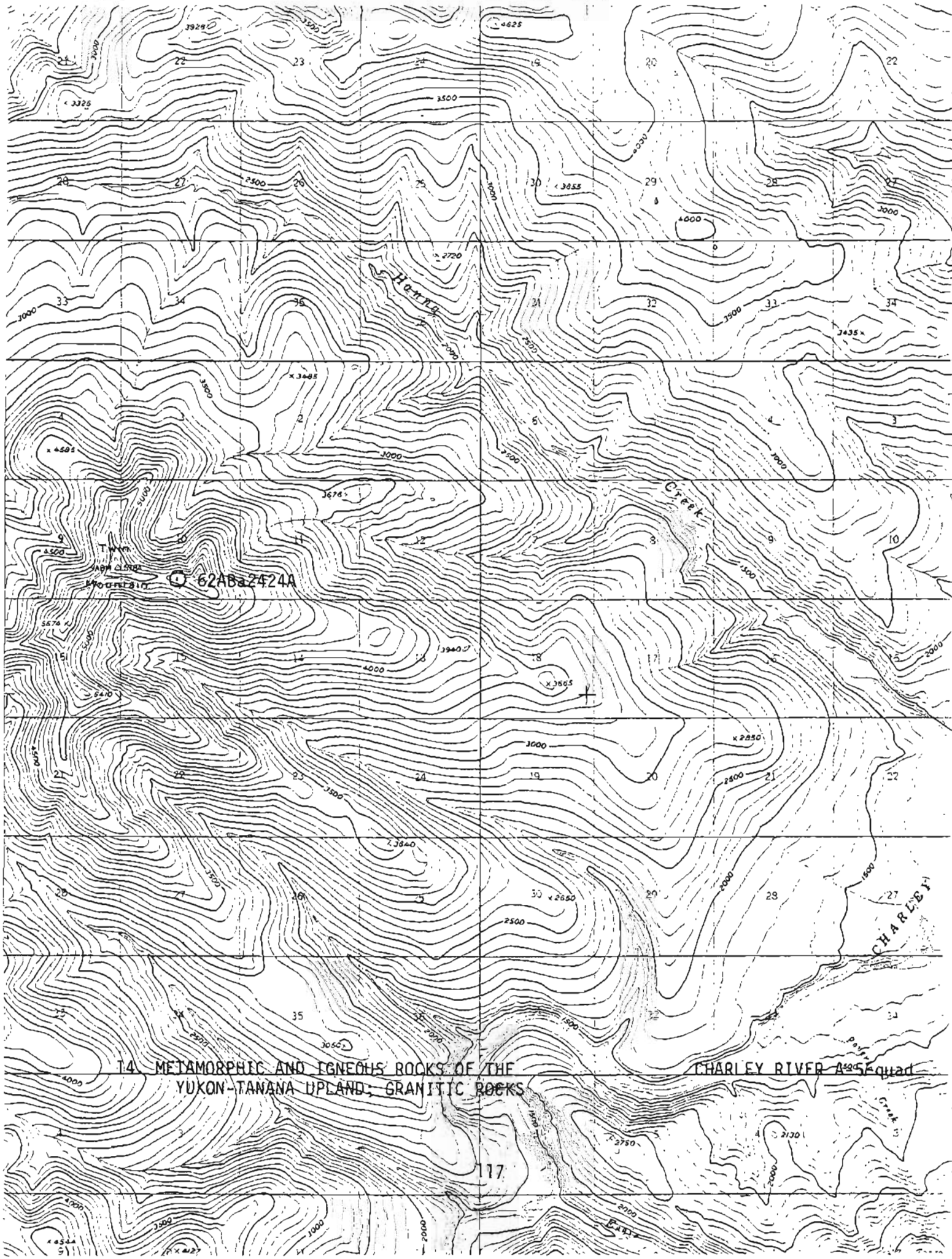
14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS

CHARLEY RIVER B-6 quad

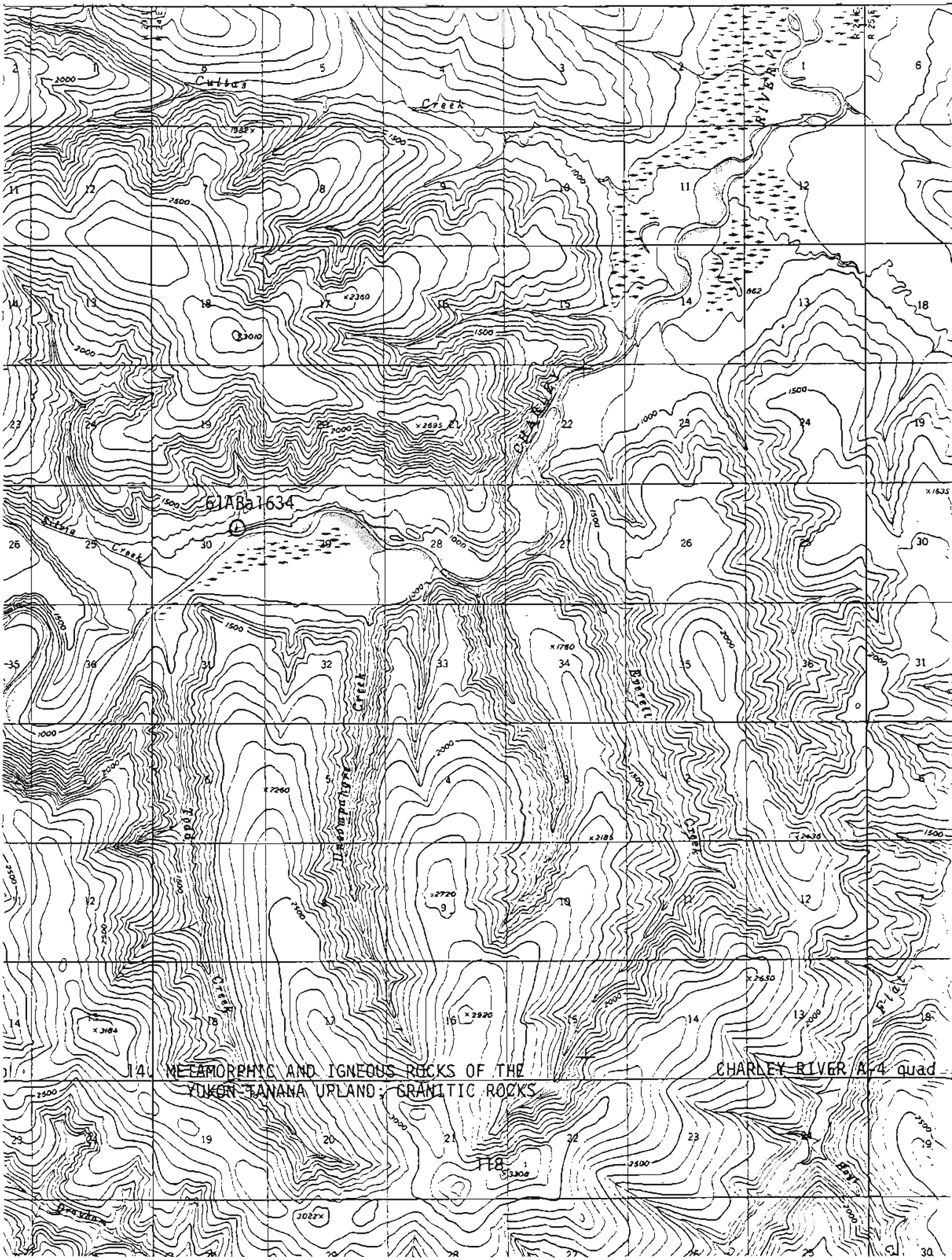


14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND: GRANITIC ROCKS

CHARLEY RIVER A-6 quad



14. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS — CHARLEY RIVER A-5 Quad



J14 METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GRANITIC ROCKS

CHARLEY RIVER A-4 quad

15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ABa3002	163817	64M-1474	quartz mica schist	Tanacross A-3
62ABa2423	163839	64M-1496	quartz mica schist	Charley River A-6
62ACn543	163840	64M-1497	quartz mica schist	Charley River A-6
62ACn564	163841	64M-1498	quartz mica schist	Charley River A-6
62ABa2451	163844	64M-1501	quartz biotite schist	Charley River A-5

RAPID ROCK ANALYSIS

Lab No.	163817	163839	163840	163841	163844
SiO_2	90.9	83.7	72.3	76.3	76.3
Al_2O_3	4.5	7.5	13.5	11.0	10.0
Fe_2O_3	.38	.40	.72	.75	3.7
FeO	.48	2.0	3.8	3.5	1.1
MgO	.78	1.4	2.1	1.2	2.4
CaO	.10	.75	.55	.65	.45
Na_2O	.08	1.0	1.1	1.0	.69
K_2O	1.1	1.2	3.0	2.8	2.2
H_2O^-	.16	.04	.14	.32	.08
H_2O^+	.82	.88	2.0	1.4	1.6
TiO_2	.18	.27	.65	.55	.62
P_2O_5	.44	.89	.16	.29	.61
MnO	.01	.04	.04	.03	.10
CO_2	<.05	<.05	.06	.09	.06
Sum	100	100	100	100	100

15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

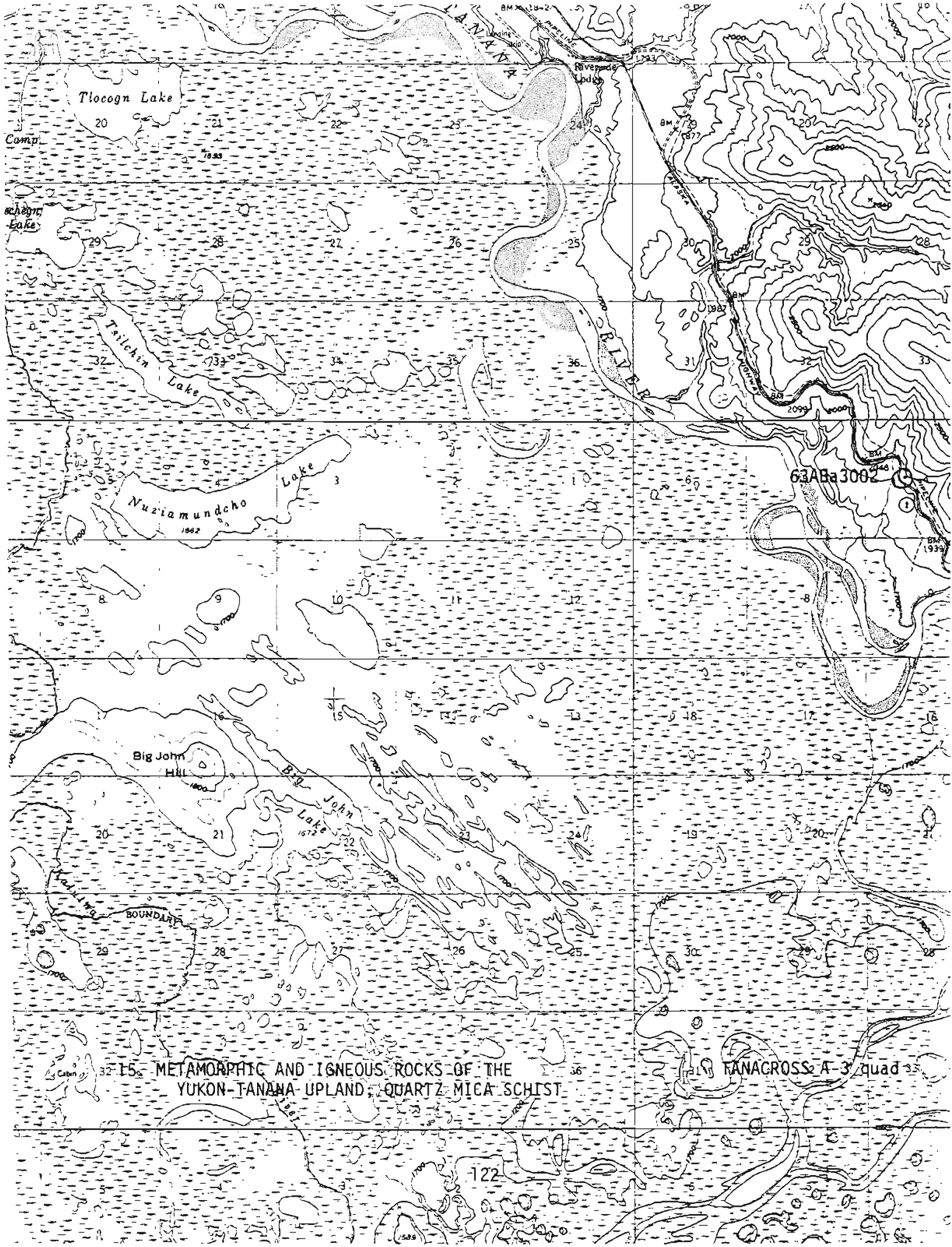
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1474	64M-1496	64M-1497	64M-1498	64M-1501
Si	M.	M.	M.	M.	M.
Al	1.5	2.	5.	5.	5.
Fe	1.	1.5	3.	3.	3.
Mg	.3	.5	1.	.7	1.
Ca	.5	.5	.3	.5	.5
Na	.05	.7	1.	1.	.7
K	1.	1.	2.	2.	2.
Ti	.1	.15	.3	.3	.3
P	0	0	0	0	0
Mn	.01	.02	.03	.03	.07
Ag	0	0	0	0	0
As	0	0	0	0	0
Au	0	0	0	0	0
B	.0015	.0015	.0015	.0015	0
Ba	.05	.05	.1	.07	.3
Be	.0001	.00015	.00015	0	0
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	0	0	0	0
Co	.0002	.0007	.0015	.001	.0007
Cr	.003	.005	.01	.007	.01
Cu	.0007	.002	.0015	.0007	.003
Ga	.0005	.001	.002	.002	.002
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	0	0	0	0	.005
Li	0	0	0	0	0
Mo	0	0	0	0	0

15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

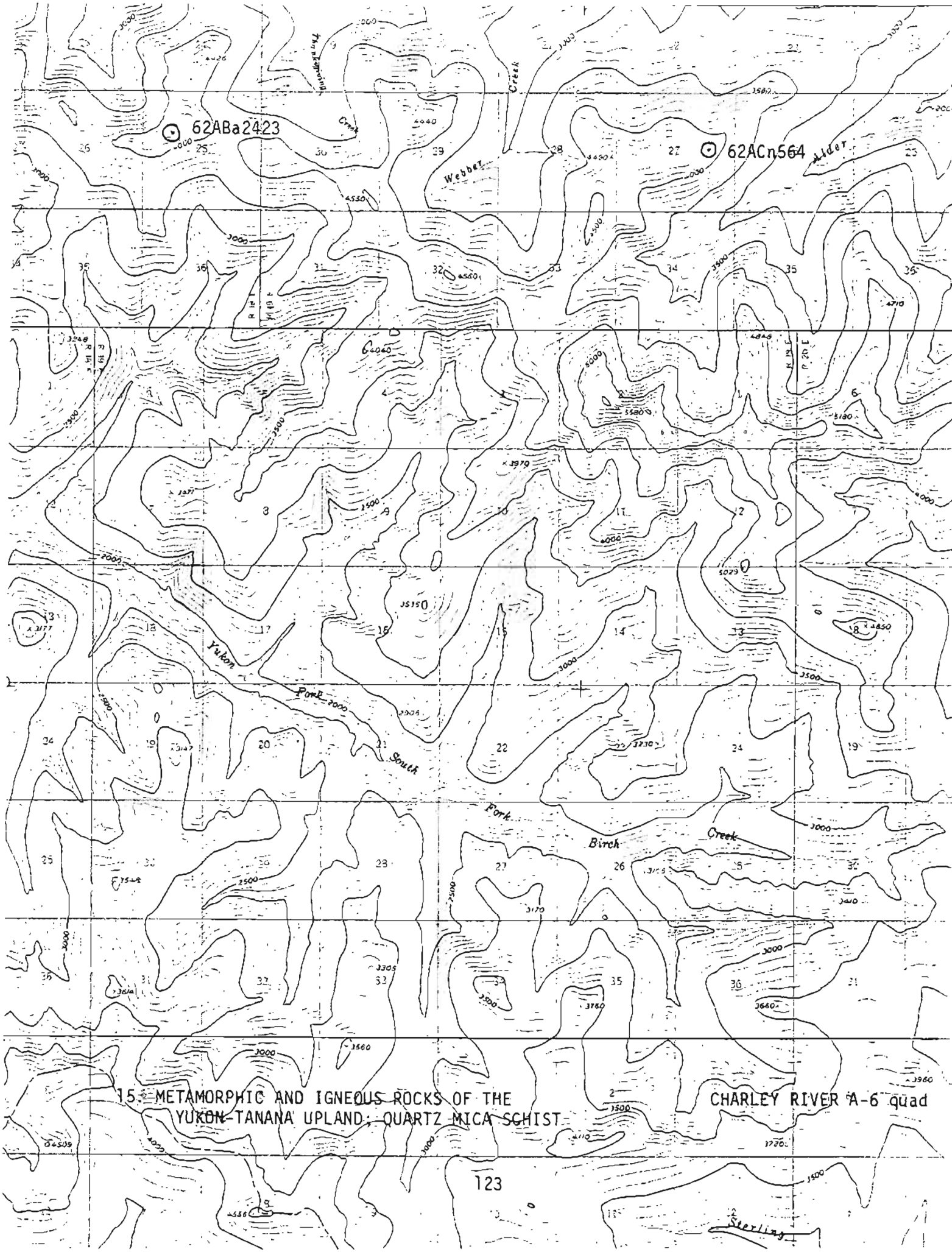
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1474	64M-1496	64M-1497	64M-1498	64M-1501
Nb	.001	.001	.0015	.002	.0015
Ni	.002	.003	.005	.003	.002
Pb	0	.001	.001	.003	.001
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	0	0	0
Sc	.0003	.0005	.001	.001	.002
Sn	0	0	0	0	0
Sr	.0007	.015	.01	.02	.015
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.002	.005	.01	.007	.02
W	0	0	0	0	0
Y	0	.0015	.0015	.003	.005
Yb	.00007	.00015	.0002	.0003	.0005
Zn	0	0	0	0	0
Zr	.015	.02	.03	.05	.015
Looked for only when La or Ce found:					
Pr					0
Nd					0
Sm					0
Eu					0



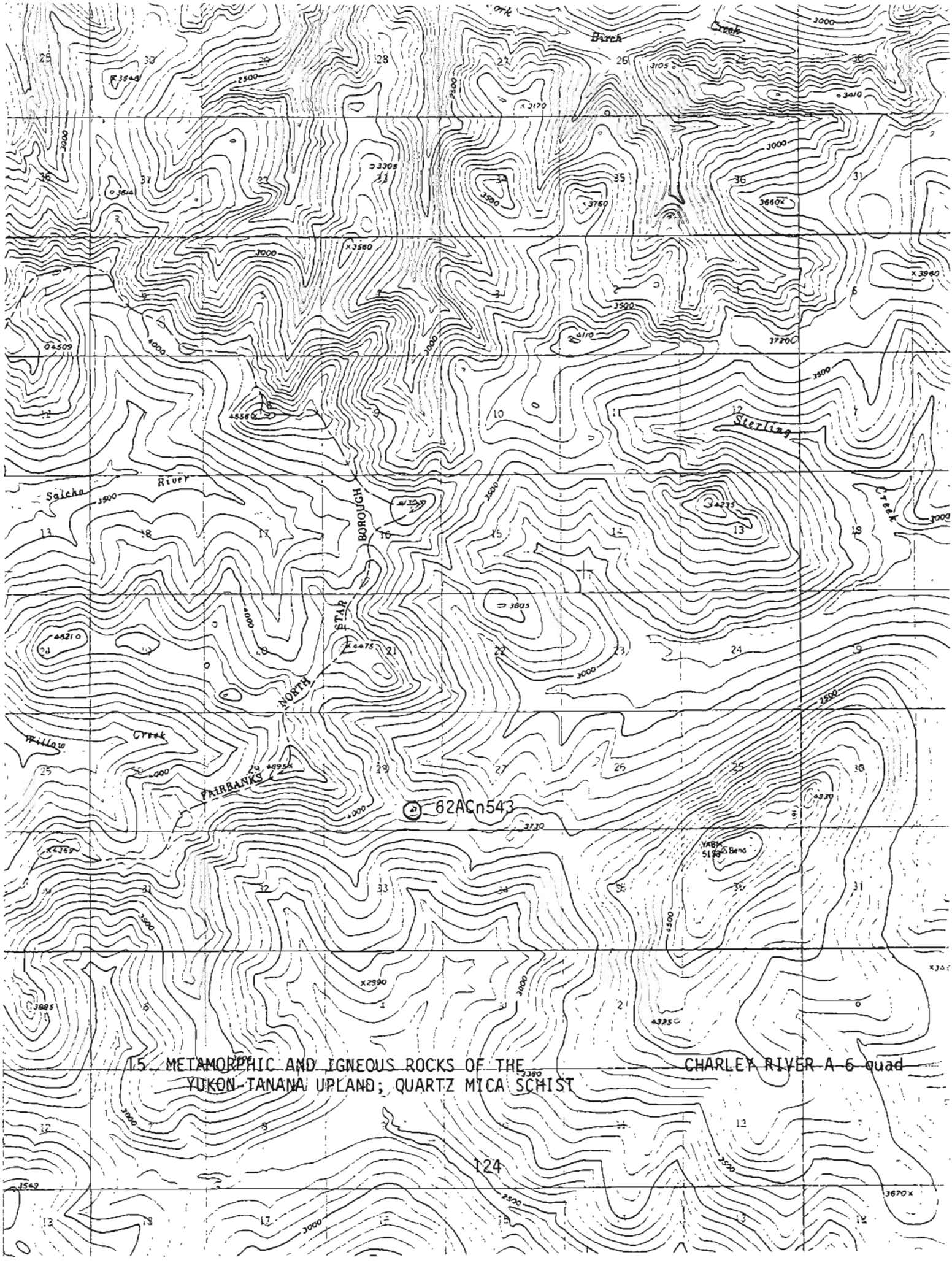
15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

TANACROSS A-3 quad



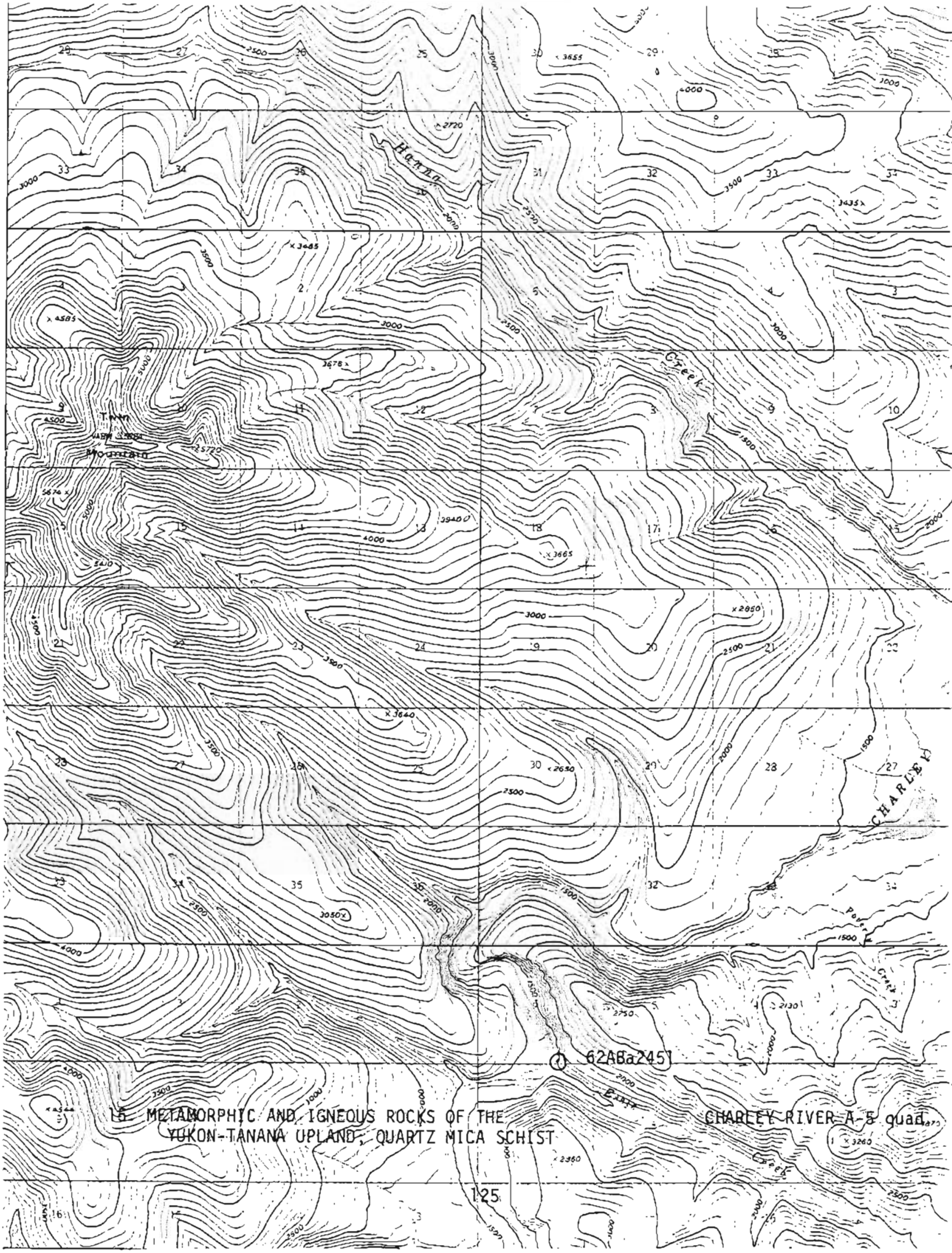
15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

CHARLEY RIVER A-6 quad



15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

CHARLEY RIVER A-6 quad



15. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST — CHARLEY RIVER A-5 quad.

16. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

(Cont'd.)

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
61ABa1632	163859	64M-1516	quartz biotite schist	Charley River A-4
61ABa1623	163847	64M-1504	quartz biotite schist	Charley River A-4
61ABa1612	163845	64M-1502	quartz mica garnet schist	Charley River A-4
61ABa1621	163846	64M-1503	qtz. biotite chlor. schist	Charley River A-4
61ABa1642	163848	64M-1505	greenschist	Charley River A-4

RAPID ROCK ANALYSIS

Lab No.	163859	163847	163845	163846	163848
SiO_2	61.4	44.3	66.5	27.9	45.7
Al_2O_3	18.9	35.0	15.8	7.7	15.2
Fe_2O_3	.59	2.9	1.2	.24	2.8
FeO	4.1	5.5	5.4	2.4	8.3
MgO	2.6	2.3	1.5	4.5	6.9
CaO	5.3	.57	2.3	28.8	13.1
Na_2O	2.4	1.8	3.1	.69	2.1
K_2O	1.8	2.6	.39	2.2	.45
H_2O^-	.18	.17	.03	.06	.02
H_2O^+	1.5	2.4	2.1	1.6	1.1
TiO_2	.59	1.8	.80	.25	2.0
P_2O_5	.18	.13	.35	.06	.29
Mno	.05	.14	.23	.03	.16
CO_2	.08	.05	.05	23.2	1.2
Sum	100	100	100	100	99

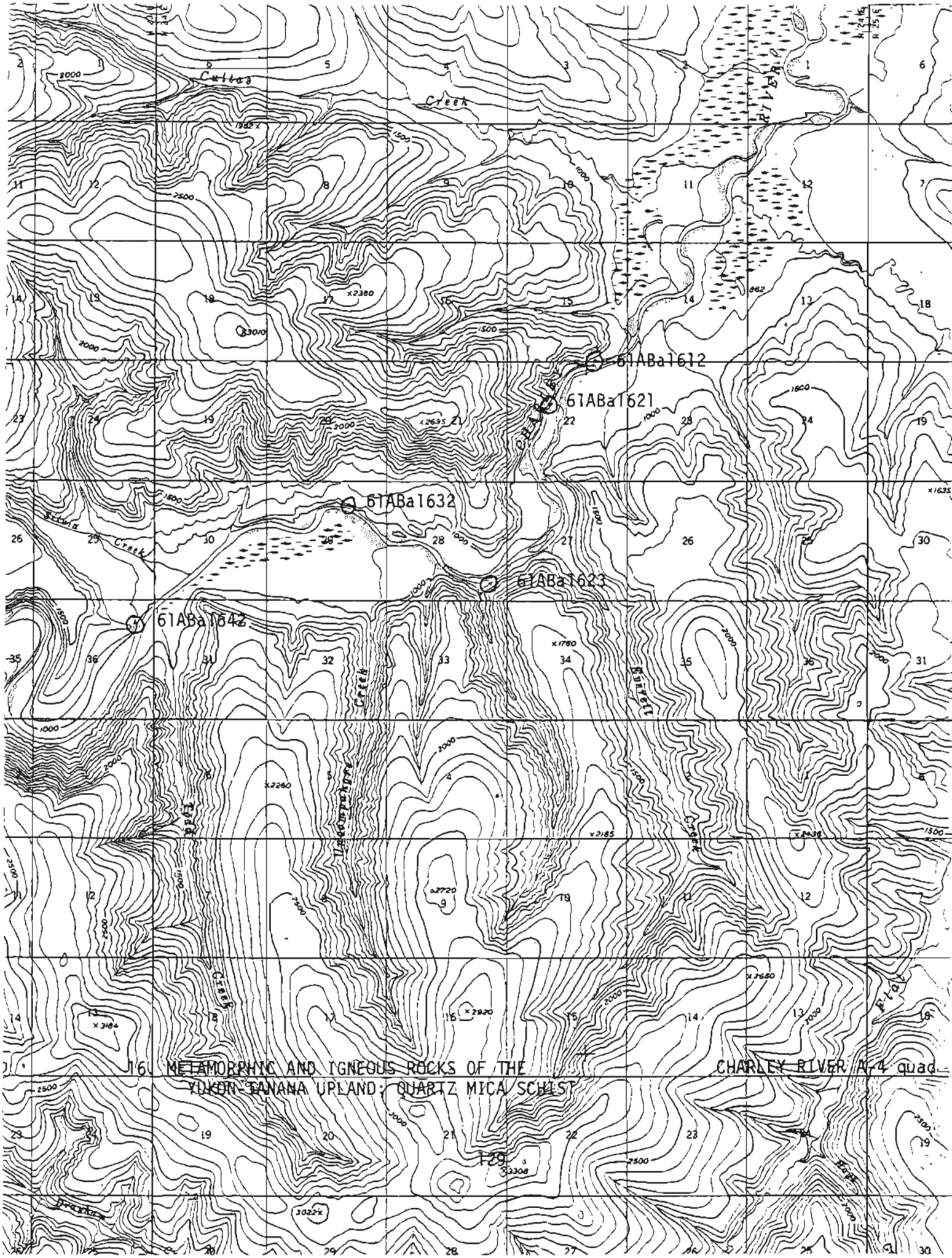
16. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1516	64M-1504	64M-1502	64M-1503	64M-1505
Nb	.0015	.003	.0015	0	.003
Ni	.005	.007	.005	.003	.02
Pb	.0015	.003	.005	0	0
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	0	0	0
Sc	.0015	.003	.002	.0015	.005
Sn	0	0	0	0	0
Sr	.07	.03	.07	.2	.1
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.015	.03	.015	.01	.07
W	0	0	0	0	0
Y	.003	.01	.003	.0015	.003
Yb	.0003	.001	.0003	.00015	.0003
Zn	0	0	0	0	0
Zr	.01	.03	.015	.007	.02
Looked for only when La or Ce found:					
Pr		0		0	
Nd		.01		0	
Sm		0		0	
Eu		0		0	
Looked for only when Y is found above .005%:					
Gd		0			
Tb		0			
Dy		0			
Ho		0			
Er		0			
Tm		0			
Lu		0			

16. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; QUARTZ MICA SCHIST
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1516	64M-1504	64M-1502	64M-1503	64M-1505
Si	M.	M.	M.	10.	M.
Al	10.	M.	7.	7.	10.
Fe	3.	7.	5.	2.	10.
Mg	1.5	1.	.7	1.5	3.
Ca	3.	.5	2.	M.	10.
Na	1.5	1.5	2.	.7	1.5
K	1.5	2.	0	2.	0
Ti	.3	1.	.5	.15	1.5
P	0	0	0	0	0
Mn	.03	.1	.2	.03	.1
Ag	0	0	0	0	.002
As	0	0	0	0	0
Au	0	0	0	0	0
B	0	.01	.005	.002	0
Ba	.03	.1	.05	.2	.02
Be	.0007	.0005	.0005	0	0
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	.02	0	0	0
Co	.0015	.002	.001	.0007	.007
Cr	.01	.03	.01	.01	.05
Cu	.003	.0015	< .0003	< .0003	.015
Ga	.003	.007	.003	.002	.003
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	0	.01	0	.005	0
Li	0	0	0	0	0
Mo	0	0	0	0	0



J16 METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND: QUARTZ MICA SCHIST

CHARLEY RIVER A-4 quad

17. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRA-MAFIC ROCKS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
62ABa2472	163854	64M-1511	ultrabasic serpentine	Charley River A-4
63ACn1244	163821	64M-1478	serpentine	Eagle C-1
63ABa3084	163831	64M-1488	gabbro	Eagle D-1
62ABa2490	163856	64M-1513	gabbro	Charley River A-5
62ABa2489	163858	64M-1515	meta-djabase	Charley River A-5
60ABa297	163829	64M-1486	basalt	Eagle D-1
60ABa298	163830	64M-1487	greenstone	Eagle D-1

RAPID ROCK ANALYSIS

Lab No.	163854	163821	163831	163856	163858	163829	163830
SiO_2	40.0	40.2	41.9	43.0	46.3	48.3	49.3
Al_2O_3	1.0	.90	14.7	12.8	13.8	11.3	8.9
Fe_2O_3	5.6	3.4	1.8	2.8	1.1	5.5	2.7
FeO	3.0	4.1	7.8	9.4	9.6	6.6	7.1
MgO	36.9	40.7	5.4	12.5	9.4	5.0	6.3
CaO	.01	.32	8.9	9.4	9.7	11.0	11.0
Na_2O	.00	.08	3.2	1.9	2.3	2.3	.95
K_2O	.00	.00	2.1	.65	.89	.85	.07
H_2O^-	.64	.48	.39	.23	.14	.19	.12
H_2O^+	12.4	9.3	3.2	3.6	3.9	.91	4.1
TiO_2	.00	.00	5.4	2.8	1.6	.88	.70
P_2O_5	.16	.12	.96	.43	.43	.29	.31
MnO	.14	.14	.17	.23	.18	.18	.17
CO_2	.05	.18	3.4	.08	.10	6.5	8.1
Sum	100	100	99	100	99	100	100

17. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRAMAFIC ROCKS (Cont'd.)

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1511	64M-1478	64M-1488	64M-1513	64M-1515	64M-1486	64M-1487
Si	M.	M.	M.	M.	M.	M.	M.
Al	.7	.5	7.	7.	7.	5.	5.
Fe	5.	7.	7.	7.	7.	7.	7.
Mg	M.	M.	2.	5.	5.	3.	3.
Ca	.05	.3	7.	5.	7.	7.	7.
Na	0	0	2.	1.5	1.5	1.5	.7
K	0	0	2.	1.	1.5	1.	0
Ti	.005	.005	2.	1.5	1.	.5	.3
P	0	0	0	0	0	0	0
Mn	.07	.07	.1	.15	.15	.15	.1
Ag	0	0	0	0	0	0	0
As	0	0	0	0	0	0	0
Au	0	0	0	0	0	0	0
B	.001	.0007	0	0	0	0	0
Ba	.0005	.0003	1.	.1	.15	.015	.0015
Be	0	0	.0005	0	0	0	0
Bi	0	0	0	0	0	0	0
Cd	0	0	0	0	0	0	0
Ce	0	0	.07	0	0	0	0
Co	.01	.015	.003	.007	.005	.005	.005
Cr	.5	.3	.0007	.1	.07	.01	.01
Cu	.0003	.0005	.015	.005	.007	.0007	.0003
Ga	0	0	.003	.002	.002	.0015	.002
Ge	0	0	0	0	0	0	0
Hf	0	0	0	0	0	0	0
Hg	0	0	0	0	0	0	0
In	0	0	0	0	0	0	0
La	0	0	.03	.007	0	0	0
Li	0	0	0	0	0	0	0
Mo	0	0	0	0	0	0	0

17. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRAMAFIC ROCKS (Cont'd.)

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1511	64M-1478	64M-1488	64M-1513	64M-1515	64M-1486	64M-1487
Nb	0	0	.03	.007	.005	0	.0015
Ni	.3	.3	.0015	.05	.03	.007	.005
Pb	0	0	0	0	0	0	0
Pd	0	0	0	0	0	0	0
Pt	0	0	0	0	0	0	0
Re	0	0	0	0	0	0	0
Sb	0	0	0	0	0	0	0
Sc	.0015	.001	.001	.007	.005	.005	.005
Sn	0	0	.0015	0	0	0	0
Sr	0	0	.3	.2	.2	.02	.005
Ta	0	0	0	0	0	0	0
Te	0	0	0	0	0	0	0
Th	0	0	0	0	0	0	0
Tl	0	0	0	0	0	0	0
U	0	0	0	0	0	0	0
V	.01	.007	.07	.07	.05	.05	.05
W	0	0	0	0	0	0	0
Y	0	0	.007	.005	.003	.005	.003
Yb	0	0	.0007	.0005	.0003	.0005	.0003
Zn	0	0	0	0	0	0	0
Zr	0	0	.15	.02	.015	.01	.007
Looked for only when La or Ce found:							
Pr			0	0			
Nd			.03	0			
Sm			.01	0			
Eu			0	0			
Looked for only when Y is found above .005%:							
Gd			0				
Tb			0				
Dy			0				
Ho			0				
Er			0				
Tm			0				
Lu			0				

CIPW NORM FOR SAMPLE NO. 3954 Loc. No. 62ABa2472

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	40.00	1.00	5.60	3.00	36.90	0.00	0.00	0.00	12.40	0.00	0.16	0.025
MOL. AMTS.	0.6657	0.0099	0.0351	0.0418	0.9154	0.0000	0.0000	0.0000	0.6883	0.0000	0.0011	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.20	0.536
MOL. AMTS.	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	40.32	1.01	5.65	3.02	37.20	0.00	0.00	0.00	12.50	0.00	0.16	0.025
MOL. AMTS.	0.6711	0.0099	0.0354	0.0421	0.9228	0.0000	0.0000	0.0000	0.6939	0.0000	0.0011	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.536
MOL. AMTS.	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

NORM NOT COMPUTABLE. SEE STEP NO. 2 OF PROGRAM WRITE-UP

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	21.52	0.63	2.27	1.35	29.59	0.00	0.00	0.00	44.50	0.00	0.07	0.06

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	0.94	99.06	0.00	0.00	64.07	0.00	0.11	66.24	0.00	0.89	100.00	-35.93

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 4.47 : 0.00 : 95.14 A:K:F = 4.47 : 0.00 : 95.53 A:N:F = 4.47 : 0.00 : 95.14

Q:OR:AB = 0.00 : 0.00 : 0.00 Q:OR:(AB+AN) = 0.00 : 0.00 : 0.00 OR:AB:AN = 0.00 : 0.00 : 0.00

CIPW NORM FOR SAMPLE NO. 3821 Loc. No. 63ACa1244

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	40.20	0.90	3.40	8.10	40.70	0.32	0.08	0.00	9.30	0.00	0.12	0.022
MOL. AMTS.	0.6691	0.0088	0.0213	0.0571	1.0096	0.0057	0.0013	0.0000	0.5162	0.0000	0.0008	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.44	1.206
MOL. AMTS.	0.0020	0.0000	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	40.43	0.91	3.42	8.12	40.93	0.32	0.08	0.00	9.35	0.00	0.12	0.022
MOL. AMTS.	0.6728	0.0089	0.0214	0.0574	1.0153	0.0057	0.0013	0.0000	0.5191	0.0000	0.0009	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.14	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.206
MOL. AMTS.	0.0020	0.0000	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0076	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.773	0.000	0.000	0.681	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	HT	CH	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2680	0.0100	0.3731	0.0140	0.0000	0.0214	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	26.902	1.323	52.495	2.846	0.000	4.957	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0029	0.0012			
PERCENTAGES	0.000	0.000	0.000	0.000	0.286	0.000	0.000	0.291	0.102	90.656	1.453	89.202

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2780	0.2680	0.0100	0.3870	0.3731	0.0140	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	28.225	26.902	1.323	55.341	52.495	2.846	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	23.52	0.62	1.50	2.01	35.49	0.20	0.09	0.00	36.30	0.00	0.06	0.07
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	0.78	98.60	0.51	0.11	59.36	0.00	0.08	45.80	0.00	0.91	100.46	-41.10

RATIOS FOR TRIANGULAR DIAGRAMS

AICIF = 2.63 : 0.00 : 97.01 AIKIF = 2.63 : 0.00 : 97.37 AINIF = 2.62 : 0.12 : 96.90

QIORIAB = 0.00 : 0.00 : ***** QIORI(AB+AN) = 0.00 : 0.00 : ***** ORIABIAN = 0.00 : ***** : 0.00

CIPW NORM FOR SAMPLE NO. 3831 Loc. No. 63ABa3084

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	41.90	14.70	1.80	7.80	5.40	8.90	3.20	2.10	3.20	5.40	0.96	0.351
MOL. AMTS.	0.6973	0.1442	0.0113	0.1086	0.1340	0.1587	0.0516	0.0223	0.1776	0.0676	0.0068	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR203	NIO2	BAO	TOTAL	FEO/FE203
PERCENTAGES	0.17	0.00	3.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.93	4.333
MOL. AMTS.	0.0024	0.0000	0.0773	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	42.35	14.86	1.82	7.88	5.46	9.00	3.23	2.12	3.23	5.46	0.97	0.351
MOL. AMTS.	0.7049	0.1457	0.0114	0.1097	0.1354	0.1604	0.0522	0.0225	0.1795	0.0683	0.0068	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR203	NIO2	BAO	TOTAL	FEO/FE203
PERCENTAGES	0.17	0.00	3.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	4.333
MOL. AMTS.	0.0024	0.0000	0.0781	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0115	0.0000	0.0225	0.0522	0.0595	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	1.169	0.000	12.544	27.370	16.565	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.0864	0.0207	0.0245	0.0059	0.0000	0.0114	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	8.673	2.731	3.449	1.197	0.000	2.638	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0683	0.0000	0.0000	0.0000	0.0068	0.0000	0.0000	0.0781	0.0000			
PERCENTAGES	10.367	0.000	0.000	0.000	2.298	0.000	0.000	7.816	0.000	96.818	57.648	39.169

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1071	0.0864	0.0207	0.0304	0.0245	0.0059	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	11.405	8.673	2.731	4.646	3.449	1.197	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	33.63	13.91	1.09	5.24	6.46	7.65	4.98	2.15	17.13	3.26	0.65	0.12

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	3.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	22.38	41.51	24.63	11.47	108.24	10.49	1.05	27.57	0.30	0.50	145.90	-37.66

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 21.03 : 15.78 : 61.95 A:K:F = 7.08 : 7.75 : 85.17 A:N:F = 6.43 : 16.29 : 75.77

Q:OR:AB = 0.00 : 30.16 : 69.84 Q:OR:(AB+AN) = 0.00 : 16.78 : 83.22 OR:AB:AN = 16.78 : 38.87 : 44.35

CIPW NORM FOR SAMPLE NO. 3856 Loc. No. 62ABa2490

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	43.00	12.80	2.80	9.40	12.50	9.40	1.90	0.65	3.60	2.80	0.43	0.298
MOL. AMTS.	0.7157	0.1255	0.0175	0.1308	0.3101	0.1676	0.0307	0.0069	0.1998	0.0350	0.0030	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.51	3.357
MOL. AMTS.	0.0032	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	43.21	12.86	2.81	9.45	12.56	9.45	1.91	0.65	3.62	2.81	0.43	0.298
MOL. AMTS.	0.7192	0.1262	0.0176	0.1315	0.3116	0.1684	0.0308	0.0069	0.2008	0.0352	0.0030	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	3.357
MOL. AMTS.	0.0033	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0069	0.0308	0.0884	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	1.860	16.156	24.598	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0699	0.0780	0.0205	0.1168	0.0307	0.0000	0.0176	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	8.118	7.834	2.706	16.434	6.255	0.000	4.080	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	AG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0352	0.0000	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	5.344	0.000	0.000	0.000	1.024	0.000	0.000	0.000	0.000	96.408	44.615	51.793

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0699	0.0699	0.0553	0.0145	0.0287	0.0227	0.0060	0.1475	0.1168	0.0307	0.0000
PERCENTAGES	15.592	8.118	5.556	1.919	3.065	2.278	0.787	22.689	16.434	6.255	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	33.61	11.79	1.65	6.14	14.56	7.87	2.88	0.65	18.77	1.65	0.28	0.15

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	15.50	59.17	20.70	4.64	88.36	4.33	0.37	24.67	0.18	0.65	118.55	-30.19

RATIOS FOR TRIANGULAR DIAGRAMS

AICIF = 14.90 : 29.38 : 61.80 AIKIF = 0.00 : 0.00 : 0.00 AIKIF = ***** : 7.27 : *****

QIORIAB = 0.00 : 19.37 : 81.63 QIOR:(AB+AN) = 0.00 : 5.50 : 94.50 ORIABIAN = 5.50 : 24.42 : 70.08

CIPW NORM FOR SAMPLE NO. 3858 Loc. No. 62ABa2489

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	46.30	13.80	1.10	9.60	9.40	9.70	2.30	0.89	3.90	1.60	0.43	0.298
MOL. AMTS.	0.7706	0.1353	0.0069	0.1336	0.2332	0.1730	0.0371	0.0094	0.2165	0.0200	0.0030	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.30	8.727
MOL. AMTS.	0.0025	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	46.63	13.90	1.11	9.67	9.47	9.77	2.32	0.90	3.93	1.61	0.43	0.298
MOL. AMTS.	0.7760	0.1363	0.0069	0.1346	0.2348	0.1742	0.0374	0.0095	0.2180	0.0202	0.0031	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	8.727
MOL. AMTS.	0.0026	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0095	0.0374	0.0894	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	5.296	19.599	24.876	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0723	0.0969	0.0454	0.0690	0.0323	0.0000	0.0069	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	8.401	9.726	5.988	9.705	6.585	0.000	1.606	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	PG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0202	0.0000	0.0000	0.0000	0.0031	0.0000	0.0000	0.0023	0.0000			
PERCENTAGES	3.060	0.000	0.000	0.000	1.026	0.000	0.000	0.229	0.000	96.097	49.772	46.326

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0723	0.0723	0.0492	0.0231	0.0699	0.0476	0.0223	0.1013	0.0690	0.0323	0.0000
PERCENTAGES	16.388	8.401	4.944	3.044	7.726	4.782	2.944	16.290	9.705	6.585	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	35.81	12.58	0.64	6.21	10.84	8.04	3.45	0.88	20.12	0.93	0.28	0.12

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	18.34	51.91	23.44	6.31	104.42	2.71	0.41	29.33	0.20	0.61	125.23	-20.82

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 15.27 : 25.79 : 58.13 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 10.90 : *****

Q:OR:AB = 0.00 : 20.29 : 79.71 Q:OR:(AB+AN) = 0.00 : 6.98 : 93.02 OR:AB:AN = 6.98 : 27.42 : 65.60

CIPW NORM FOR SAMPLE NO. 3829 Loc. No. 60ABa297

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	48.30	11.30	5.50	6.60	5.00	11.00	2.30	0.85	0.91	0.88	0.29	0.234
MOL. AMTS.	0.8039	0.1108	0.0344	0.0919	0.1240	0.1962	0.0371	0.0090	0.0505	0.0110	0.0020	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.61	1.200
MOL. AMTS.	0.0025	0.0000	0.1477	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	48.49	11.34	5.52	6.63	5.02	11.04	2.31	0.85	0.91	0.88	0.29	0.234
MOL. AMTS.	0.8070	0.1113	0.0346	0.0922	0.1245	0.1969	0.0373	0.0091	0.0507	0.0111	0.0021	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	6.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.200
MOL. AMTS.	0.0025	0.0000	0.1483	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.2719	0.0231	0.0000	0.0091	0.0373	0.0418	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	16.335	2.359	0.000	5.043	19.538	11.632	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1245	0.0491	0.0000	0.0000	0.0000	0.0346	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	12.501	6.483	0.000	0.000	0.000	8.006	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0111	0.0000	0.0000	0.0000	0.0021	0.0000	0.0000	0.1483	0.0000			
PERCENTAGES	1.678	0.000	0.000	0.000	0.690	0.000	0.000	14.840	0.000	99.104	54.906	44.198

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1737	0.1245	0.0491	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	18.984	12.501	6.483	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	43.10	11.88	3.69	4.93	6.65	10.52	3.98	0.97	5.42	0.59	0.22	0.14

	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	7.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	17.31	44.86	30.63	7.20	125.52	1.72	0.32	7.89	0.20	0.43	128.81	-3.29

RATIOS FOR TRIANGULAR DIAGRAMS

A:C:F = 27.55 : 11.76 : 59.28 A:K:F = 19.98 : 3.17 : 76.84 A:N:F = 18.19 : 11.88 : 68.31

Q:OR:AB = 85.44 : 2.85 : 11.71 Q:OR:(AB+AN) = 75.52 : 2.52 : 21.96 OR:AB:AN = 10.28 : 42.28 : 47.44

CIPW NORM FOR SAMPLE NO. 3830 Loc. No. 60ABa298

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.30	8.90	2.70	7.10	6.30	11.00	0.95	0.07	4.10	0.70	0.31	0.181
MOL. AMTS.	0.8205	0.0873	0.0169	0.0988	0.1563	0.1962	0.0153	0.0007	0.2276	0.0088	0.0022	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.17	0.00	8.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.70	2.630
MOL. AMTS.	0.0024	0.0000	0.1840	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.45	8.93	2.71	7.12	6.32	11.03	0.95	0.07	4.11	0.70	0.31	0.181
MOL. AMTS.	0.8230	0.0876	0.0170	0.0991	0.1568	0.1967	0.0154	0.0007	0.2283	0.0088	0.0022	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.17	0.00	8.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.630
MOL. AMTS.	0.0024	0.0000	0.1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.4841	0.0666	0.0000	0.0007	0.0154	0.0048	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	29.085	6.790	0.000	0.415	8.063	1.345	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1568	0.0758	0.0000	0.0000	0.0000	0.0170	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	15.737	9.997	0.000	0.000	0.000	3.927	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0068	0.0000	0.0000	0.0000	0.0022	0.0000	0.0000	0.1846	0.0000			
PERCENTAGES	1.333	0.000	0.000	0.000	0.736	0.000	0.000	18.477	0.000	95.906	45.698	50.208

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2325	0.1568	0.0758	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	25.735	15.737	9.997	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	37.86	8.06	1.56	4.56	7.21	9.05	1.41	0.07	21.00	0.40	0.20	0.11

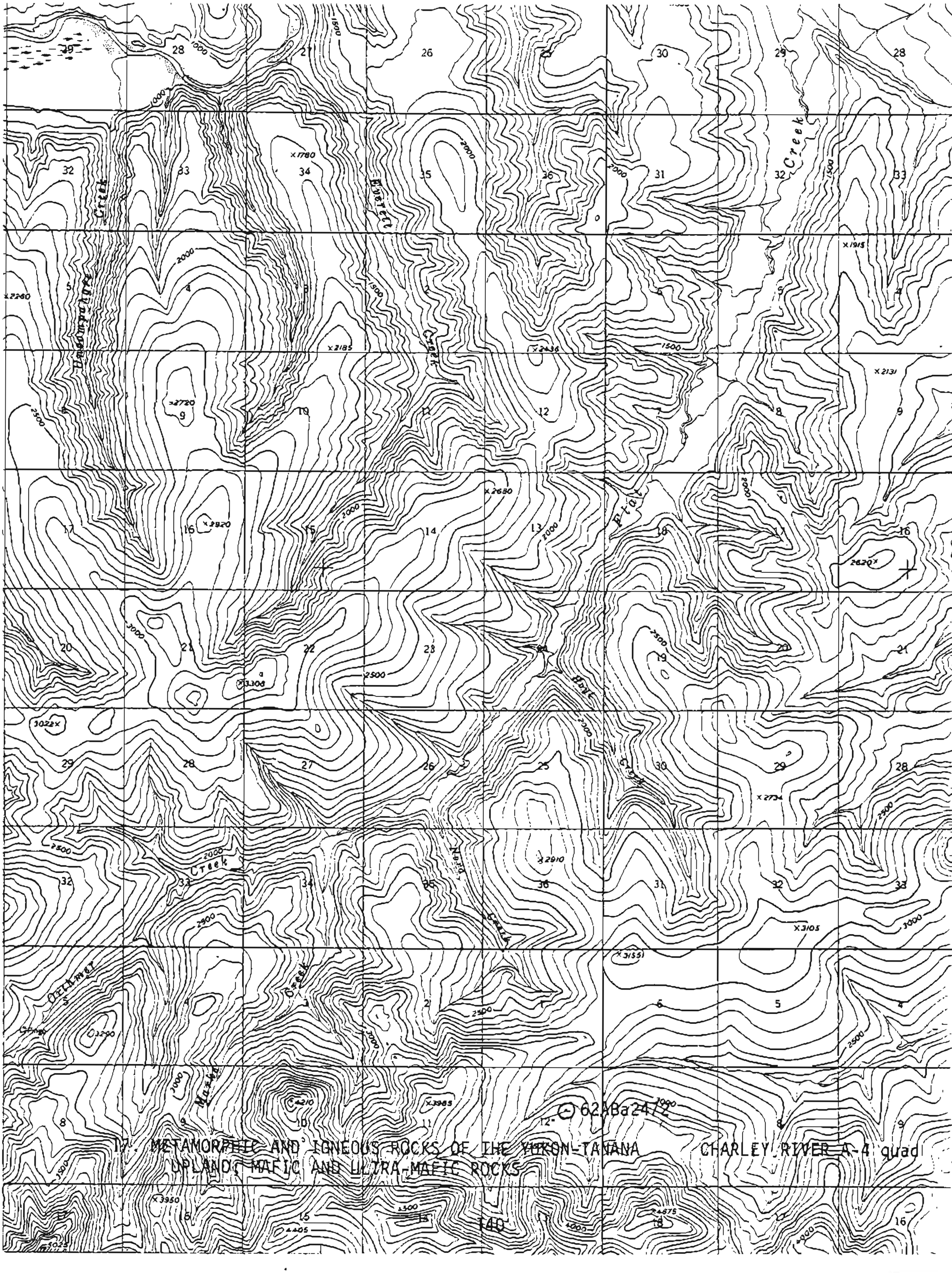
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	8.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	14.77	49.31	33.20	2.72	138.87	1.48	0.37	38.52	0.05	0.54	110.88	27.99

RATIOS FOR TRIANGULAR DIAGRAMS

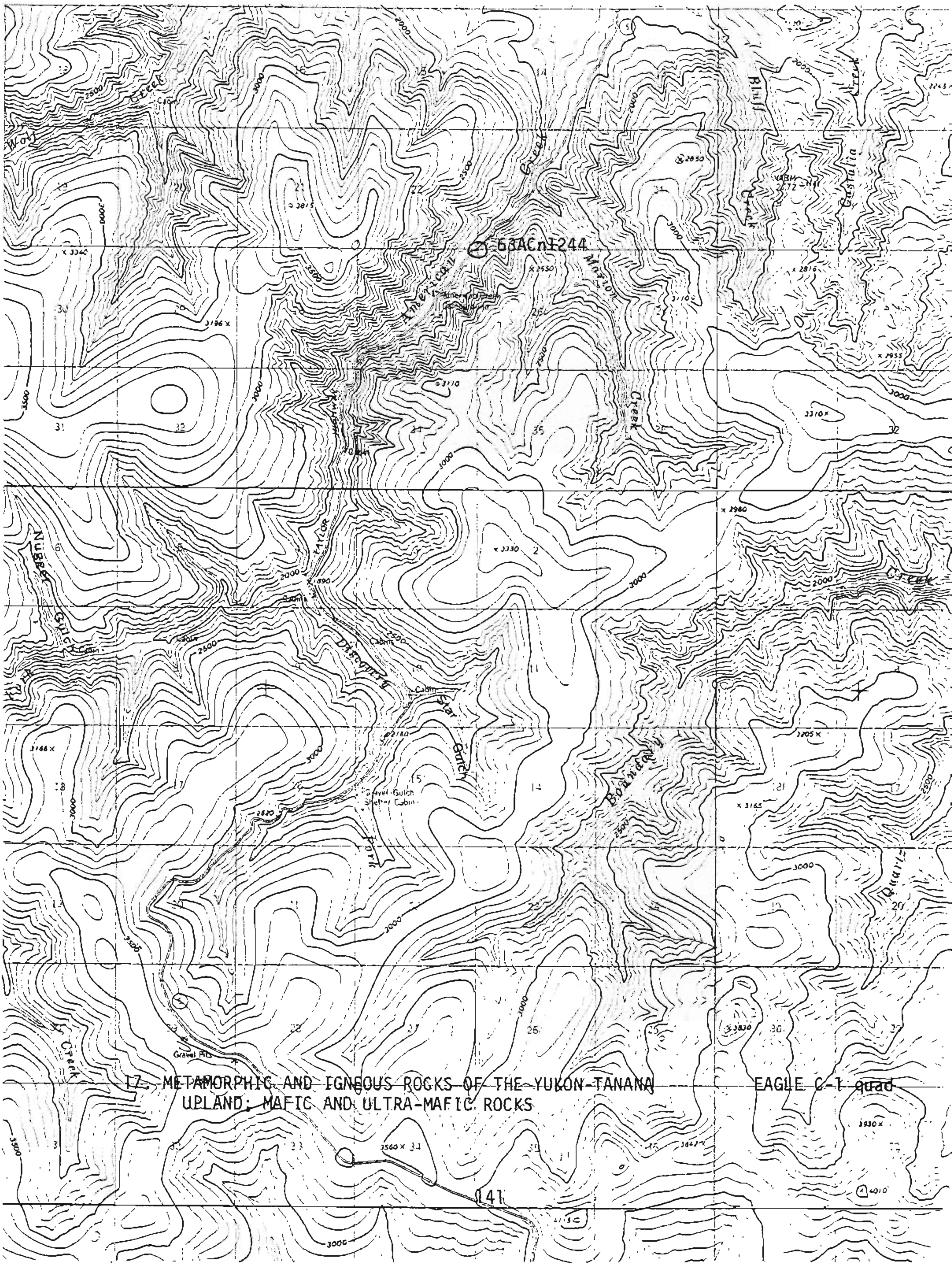
A:C:F = 25.09 : 1.58 : 71.96 A:K:F = 24.23 : 0.22 : 75.55 A:N:F = 23.23 : 4.31 : 71.10

Q:OR:AB = 96.78 : 0.15 : 3.07 Q:OR:(AB+AN) = 95.85 : 0.15 : 4.00 OR:AB:AN = 3.56 : 73.37 : 23.08



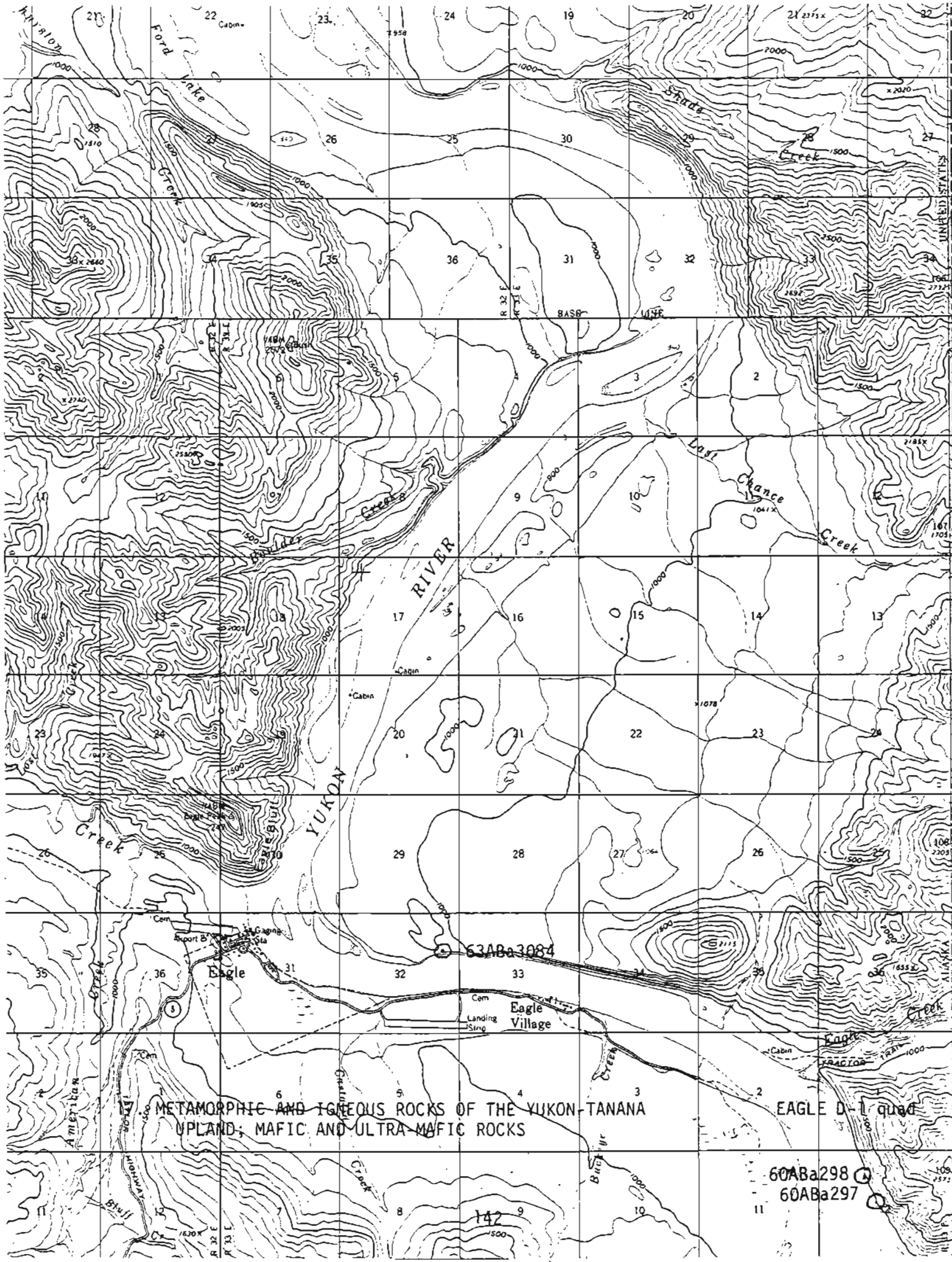
17. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRA-MAFIC ROCKS

CHARLEY RIVER A-4 quad



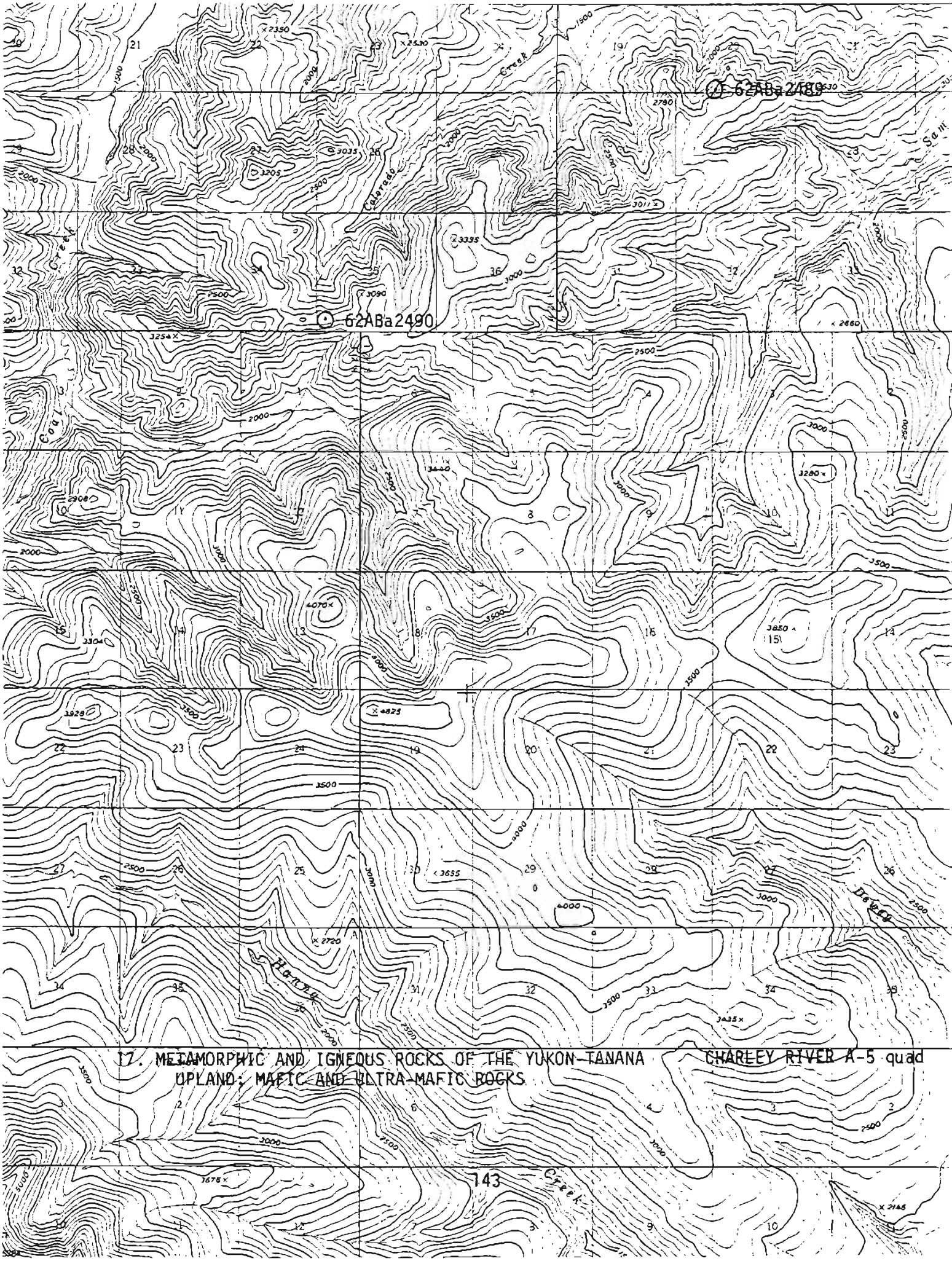
17. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRA-MAFIC ROCKS

EAGLE C-1 quad



METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRA-MAFIC ROCKS

EAGLE D-1 quad



17. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MAFIC AND ULTRA-MAFIC ROCKS

CHARLEY RIVER A-5 quad

18. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
62ABa2485	163852	64M-1509	greenschist	Charley River A-4
62ABa2434	163853	64M-1510	metavolcanic	Charley River A-5
62ABa2435	163855	64M-1512	greenschist	Charley River A-5
62ABa2464	163857	64M-1514	greenstone	Charley River A-4
63ABa3004	163818	64M-1475	greenstone	Tanacross A-2

RAPID ROCK ANALYSIS

Lab No.	163852	163853	163855	163857	163818
SiO_2	46.5	48.1	45.9	46.5	49.7
Al_2O_3	16.3	15.9	14.2	9.9	16.2
Fe_2O_3	2.7	7.3	7.3	6.0	3.4
FeO	9.2	6.5	6.3	4.3	7.4
MgO	7.3	5.3	6.9	6.2	7.0
CaO	9.4	8.7	10.0	11.8	9.1
Na_2O	2.6	2.6	2.5	3.3	3.4
K_2O	.42	.97	.53	1.0	.07
H_2O^-	.10	.09	.26	.06	.23
H_2O^+	1.5	1.0	2.8	2.1	1.5
TiO_2	2.6	2.0	1.8	2.5	1.4
P_2O_5	.43	.40	.31	.61	.22
MnO	.14	.20	.18	.11	.21
CO_2	< .05	.10	.65	.10	< .05
Volatiles Other Than H_2O and CO_2				5.0	
Sum	99	99	100	99	100

18. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1509	64M-1510	64M-1512	64M-1514	64M-1475
Si	M.	M.	M.	M.	M.
Al	10.	10.	10.	7.	10.
Fe	7.	7.	7.	7.	7.
Mg	3.	2.	3.	3.	5.
Ca	7.	5.	7.	7.	5.
Na	2.	2.	2.	2.	2.
K	1.	1.5	1.	1.5	0
Ti	1.5	1.	1.	1.5	.7
P	0	0	0	0	0
Mn	.1	.15	.15	.07	.15
Ag	0	0	0	0	0
As	0	0	0	0	0
Au	0	0	0	0	0
B	0	0	0	0	0
Ba	.02	.03	.03	.1	.005
Be	0	0	0	0	0
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	0	0	.02	0
Co	.007	.007	.007	.005	.005
Cr	.05	.05	.03	.1	.05
Cu	.01	.01	.015	.01	.015
Ga	.003	.003	.003	.002	.002
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	.007	0	0	.01	0
Li	0	0	0	0	0
Mo	0	0	0	0	0

18. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1509	64M-1510	64M-1512	64M-1514	64M-1475
Nb	.005	.002	.0015	.005	0
Ni	.03	.02	.01	.05	.015
Pb	0	0	0	0	0
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	0	0	0
Sc	.007	.007	.007	.005	.005
Sn	0	0	0	0	0
Sr	.1	.02	.02	.1	.05
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.07	.1	.1	.05	.05
W	0	0	0	0	0
Y	.005	.007	.007	.005	.005
Yb	.0005	.0007	.0007	.0005	.0005
Zn	0	0	0	0	0
Zr	.02	.02	.015	.03	.01
Looked for only when La or Ce found:					
Pr	0			0	
Nd	0			.01	
Sm	0			0	
Eu	0			0	
Looked for only when Y is found above .005%:					
Gd		0	0		
Tb		0	0		
Dy		0	0		
Ho		0	0		
Er		0	0		
Tm		0	0		
Lu		0	0		

CIPW NORM FOR SAMPLE NO. 3953 Loc. No. 62ABa2434

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	48.10	15.90	7.30	4.50	5.30	8.70	2.60	0.97	1.00	2.00	0.40	0.331
MOL. AMTS.	0.8006	0.1559	0.0457	0.0625	0.1315	0.1551	0.0419	0.0103	0.0555	0.0250	0.0028	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.20	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.07	0.890
MOL. AMTS.	0.0028	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL203	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL203/SIO2
PERCENTAGES	48.55	16.05	7.37	6.56	5.35	8.78	2.62	0.98	1.01	2.02	0.40	0.331
MOL. AMTS.	0.8081	0.1574	0.0461	0.0913	0.1327	0.1566	0.0423	0.0104	0.0560	0.0253	0.0028	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.20	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.890
MOL. AMTS.	0.0028	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0867	0.0000	0.0000	0.0104	0.0423	0.1047	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	5.208	0.000	0.000	5.786	22.207	29.120	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0401	0.1327	0.0228	0.0000	0.0000	0.0000	0.0461	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	4.664	13.324	3.002	0.000	0.000	0.000	10.684	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0253	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0023	0.0000			
PERCENTAGES	3.834	0.000	0.000	0.000	0.956	0.000	0.000	0.230	0.000	99.014	62.320	36.694

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0401	0.0401	0.0343	0.0059	0.1153	0.0984	0.0169	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	8.880	4.664	3.441	0.775	12.110	9.883	2.227	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	93.69	17.02	4.99	4.94	7.18	8.47	4.58	1.12	6.06	1.37	0.31	0.15
		ZR	C	S1	CL	F	S2	CR	NI	BA		
		0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI*	QZ
	22.95	46.53	22.83	7.69	117.81	3.68	0.41	8.17	0.20	0.42	130.76	-12.95

RATIOS FOR TRIANGULAR DIAGRAMS

AICIF = 28.81 : 27.85 : 42.25 FIKIF = 2.08 : 4.29 : 93.63 AINIF = 1.84 : 15.49 : 80.65

QIOR:AB = 62.17 : 7.46 : 30.37 QIORI(AB+AN) = 35.51 : 4.26 : 60.23 ORIABIAN = 6.60 : 26.90 : 66.50

CIPW NORM FOR SAMPLE NO. 3818 Loc. No. 63ABa3004

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.70	16.20	3.40	7.40	7.00	9.10	3.40	0.07	1.50	1.40	0.22	0.326
MOL. AMTS.	0.8272	0.1589	0.0213	0.1030	0.1736	0.1623	0.0549	0.0007	0.0833	0.0175	0.0015	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.60	2.176
MOL. AMTS.	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	49.90	16.27	3.41	7.43	7.03	9.14	3.41	0.07	1.51	1.41	0.22	0.326
MOL. AMTS.	0.8305	0.1595	0.0214	0.1034	0.1743	0.1629	0.0551	0.0007	0.0836	0.0176	0.0016	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	2.176
MOL. AMTS.	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.0000	0.0000	0.0000	0.0007	0.0551	0.1037	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.415	28.885	28.850	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0540	0.1633	0.0631	0.0055	0.0021	0.0000	0.0214	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	6.277	16.396	8.331	0.776	0.435	0.000	4.949	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	MG	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0176	0.0000	0.0000	0.0000	0.0016	0.0000	0.0000	0.0000	0.0000			
PERCENTAGES	2.670	0.000	0.000	0.000	0.523	0.000	0.000	0.000	0.000	98.508	58.151	40.357

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0540	0.0540	0.0390	0.0151	0.1724	0.1243	0.0481	0.0076	0.0055	0.0021	0.0000
PERCENTAGES	12.177	6.277	3.912	1.988	18.827	12.484	6.343	1.211	0.776	0.435	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	42.91	16.48	2.21	5.34	9.01	8.42	5.69	0.08	8.64	0.91	0.16	0.15

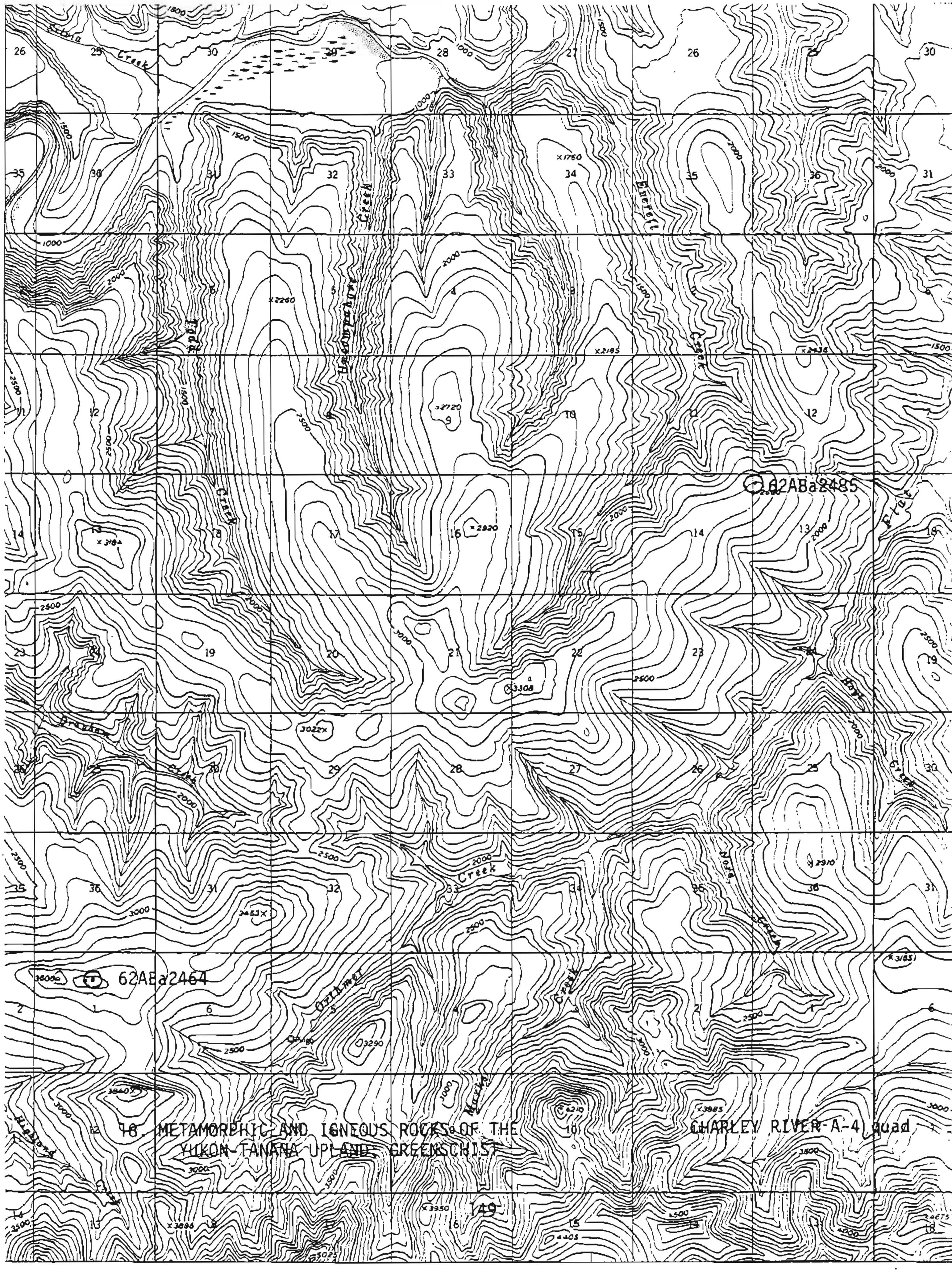
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SI"	QZ
	22.73	46.10	23.22	7.95	118.35	2.51	0.22	11.91	0.01	0.54	131.82	-13.47

RATIOS FOR TRIANGULAR DIAGRAMS

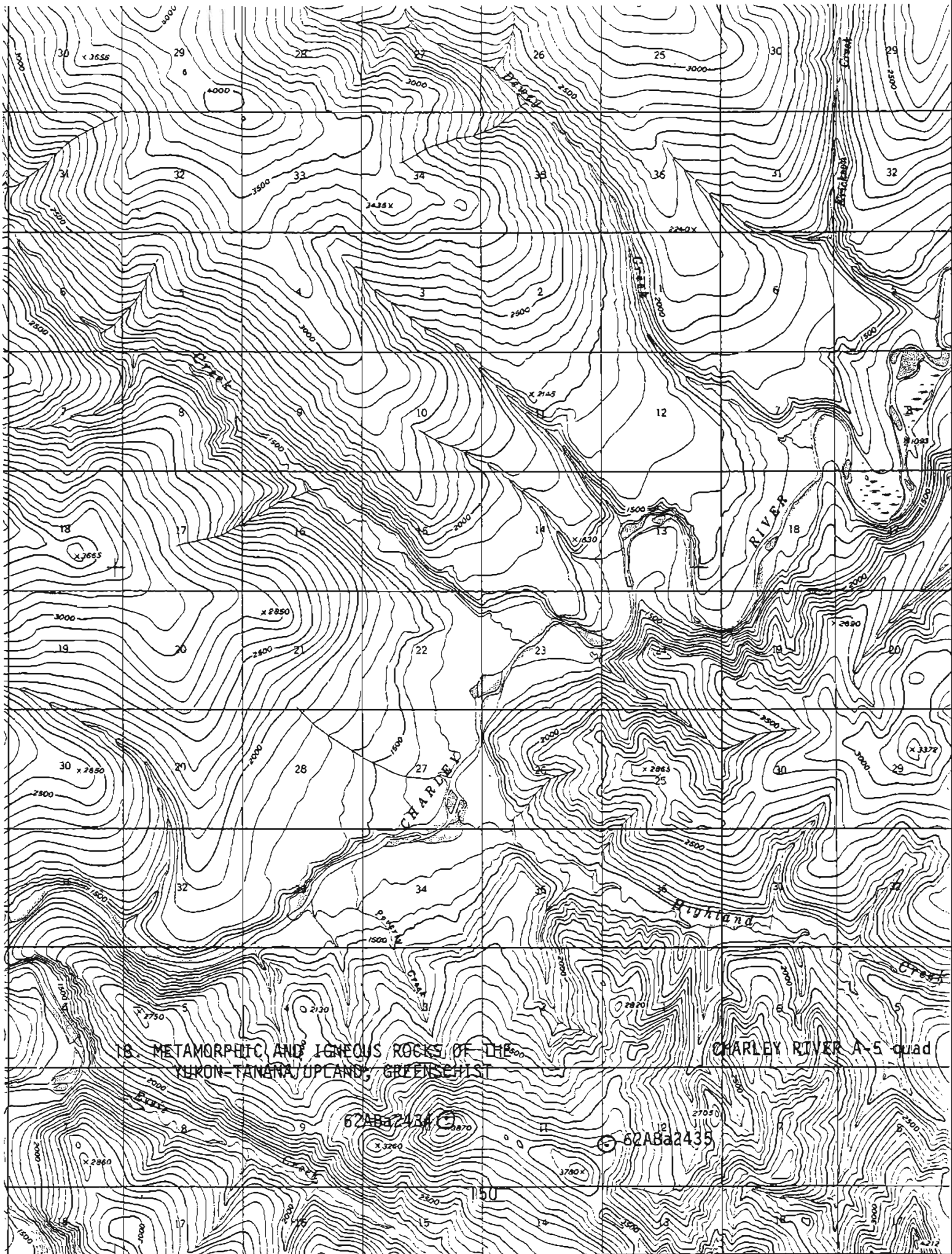
A:C:F = 22.17 : 28.06 : 48.72 A:K:F = 0.00 : 0.00 : 0.00 A:N:F = ***** : 18.20 : 90.80

Q:OR:AB = 0.00 : 1.34 : 98.66 Q:OR:(AB+AN) = 0.00 : 0.47 : 99.53 OR:AB:AN = 0.47 : 34.53 : 65.01



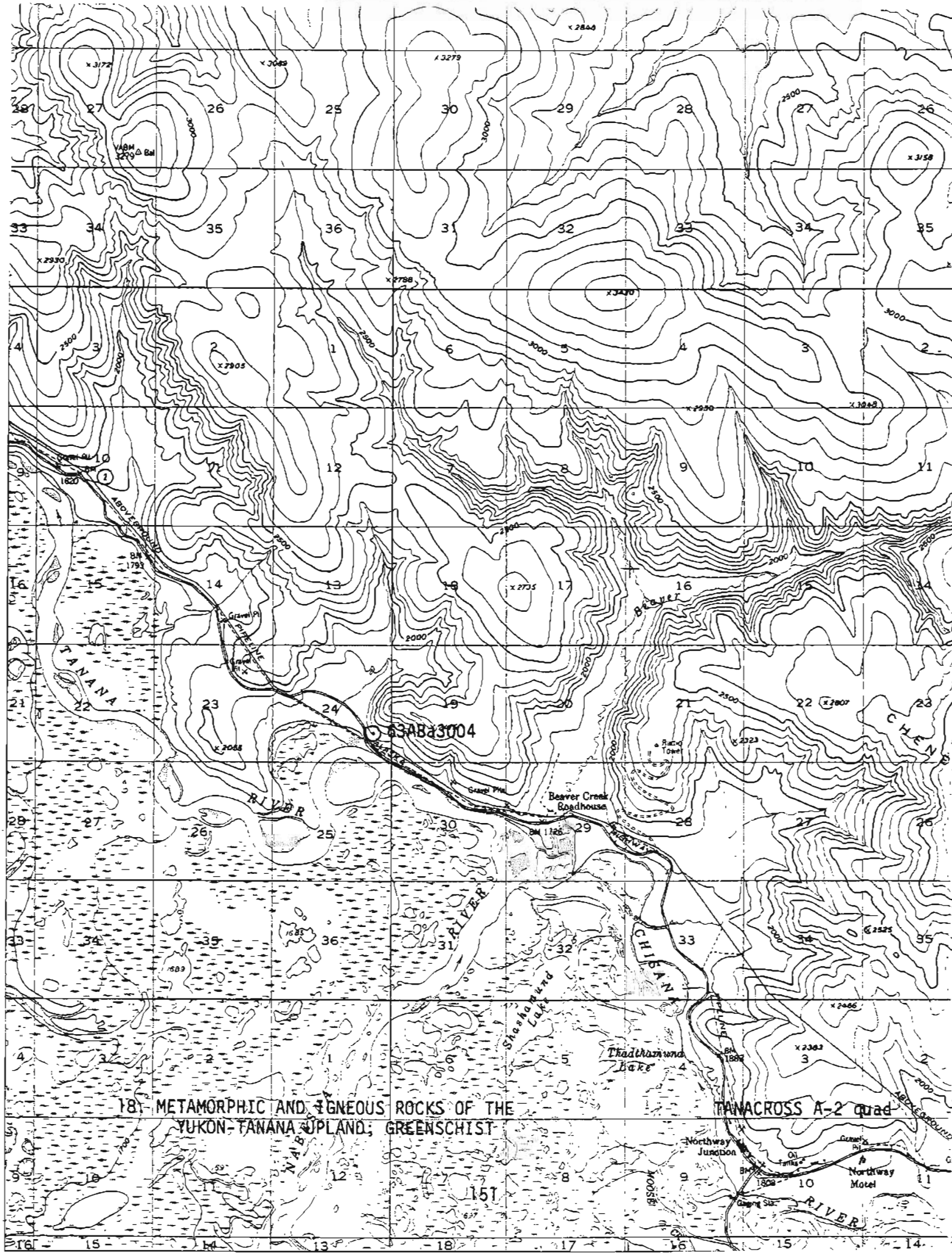
18. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND: GREENSCHIST

CHARLEY RIVER A-4 quad



18. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND, GREENSCHIST

CHARLEY RIVER A-5 quad



18. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

TANACROSS A-2 quad

19. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST (Cont'd.)

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
63ACn1261	163820	64M-1477	greenschist	Eagle C-1
63ACn1251A	163822	64M-1479	greenstone	Eagle C-1
63ACn1251	163823	64M-1480	sheared greenschist	Eagle C-1
63ACn1261A	163824	64M-1481	greenschist	Eagle C-1
61ABa1932	163825	64M-1482	chlorite schist	Eagle C-1
60ABa282	163827	64M-1484	chloritized sandstone(?)	Eagle C-1
61ABa1931B	163828	64M-1485	greenstone	Eagle C-1

RAPID ROCK ANALYSIS

Lab No.	163820	163822	163823	163824	163825	163827	163828
SiO_2	47.4	48.0	79.1	50.6	47.4	71.2	48.3
Al_2O_3	16.1	16.6	8.1	14.6	13.1	12.7	13.4
Fe_2O_3	6.7	.84	1.1	8.3	2.2	1.3	1.3
FeO	5.6	9.6	2.8	6.3	9.2	3.1	13.2
MgO	4.7	6.2	2.4	2.9	7.1	1.9	5.8
CaO	10.0	3.9	.85	4.6	8.6	1.2	8.9
Na_2O	2.3	4.3	.59	5.3	3.3	2.3	2.9
K_2O	.42	.08	1.3	1.7	1.4	2.5	.15
H_2O^-	.26	.07	.18	.15	.16	.03	.19
H_2O^+	3.1	4.7	2.1	1.3	2.0	2.1	1.9
TiO_2	1.5	2.4	.58	2.0	3.4	.62	2.9
P_2O_5	.36	.44	.69	.51	.47	.42	.56
Mno	.18	.18	.07	.20	.17	.07	.27
CO_2	1.3	2.7	.16	1.5	1.3	.42	.11
Sum	100	100	100	100	100	100	100

19. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1477	64M-1479	64M-1480	64M-1481	64M-1482	64M-1484	64M-1485
Si	M.	M.	M.	M.	M.	M.	M.
Al	7.	7.	3.	7.	7.	7.	7.
Fe	10.	10.	3.	10.	10.	3.	10.
Mg	2.	3.	1.5	1.5	3.	.7	3.
Ca	7.	3.	.7	3.	5.	1.	5.
Na	1.5	2.	.7	3.	2.	1.5	2.
K	.7	0	1.5	2.	1.5	2.	0
Ti	1.	1.	.3	1.	1.5	.3	1.5
P	0	0	0	0	0	0	0
Mn	.15	.1	.07	.15	.15	.05	.2
Ag	0	0	0	0	0	0	0
As	0	0	0	0	0	0	0
Au	0	0	0	0	0	0	0
B	.015	0	.005	.015	0	.003	0
Ba	.03	.02	.2	.1	.07	.07	.005
Be	0	0	0	0	.00015	.00015	0
Bi	0	0	0	0	0	0	0
Cd	0	0	0	0	0	0	0
Ce	0	0	0	0	0	0	0
Co	.005	.005	.001	.005	.007	.001	.007
Cr	.03	.02	.015	.015	.05	.007	.005
Cu	.015	.007	.005	.015	.01	.002	.01
Ga	.003	.003	.0015	.002	.002	.002	.002
Ge	0	0	0	0	0	0	0
Hf	0	0	0	0	0	0	0
Hg	0	0	0	0	0	0	0
In	0	0	0	0	0	0	0
La	0	.005	0	.003	.005	.003	0
Li	0	0	0	0	0	0	0
Mo	0	0	0	0	0	0	0

19. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1477	64M-1479	64M-1480	64M-1481	64M-1482	64M-1484	64M-1485
Nb	.001	.003	.0015	.002	.003	.002	0
Ni	.01	.01	.007	.015	.03	.003	.005
Pb	0	0	0	0	0	.0015	0
Pd	0	0	0	0	0	0	0
Pt	0	0	0	0	0	0	0
Re	0	0	0	0	0	0	0
Sb	0	0	0	0	0	0	0
Sc	.007	.003	.0015	.007	.005	.0015	.007
Sn	0	0	0	0	0	0	0
Sr	.05	.05	.005	.02	.1	.015	.02
Ta	0	0	0	0	0	0	0
Te	0	0	0	0	0	0	0
Th	0	0	0	0	0	0	0
Tl	0	0	0	0	0	0	0
U	0	0	0	0	0	0	0
V	.07	.05	.015	.05	.07	.01	.1
W	0	0	0	0	0	0	0
Y	.005	.003	.0015	.005	.007	.003	.01
Yb	.0005	.0003	.0002	.0005	.0005	.0003	.001
Zn	0	0	0	0	0	0	0
Zr	.01	.015	.007	.015	.03	.03	.02
Looked for only when La or Ce found:							
Pr		0		0	0	0	
Nd		0		0	0	0	
Sm		0		0	0	0	
Eu		0		0	0	0	
Looked for only when Y is found above .005%:							
Gd					0		0
Tb					0		0
Dy					0		0
Ho					0		0
Er					0		0
Tm					0		0
Lu					0		0

CIPW NORM FOR SAMPLE NO. 3822 Loc. No. 63ACn1251A

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	48.00	16.60	0.84	9.60	6.20	3.90	4.30	0.08	4.70	2.40	0.44	0.346
MOL. AMTS.	0.7989	0.1628	0.0053	0.1336	0.1538	0.0695	0.0694	0.0008	0.2609	0.0300	0.0031	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	2.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.98	11.429
MOL. AMTS.	0.0025	0.0000	0.0613	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

CONSTITUENTS NORMALIZED TO 100%

CONSTITUENTS	SIO2	AL2O3	FE2O3	FEO	MGO	CAO	NA2O	K2O	H2O	TIO2	P2O5	AL2O3/SIO2
PERCENTAGES	48.03	16.61	0.84	9.61	6.20	3.90	4.30	0.08	4.70	2.40	0.44	0.346
MOL. AMTS.	0.7994	0.1629	0.0053	0.1337	0.1539	0.0696	0.0694	0.0008	0.2610	0.0301	0.0031	

CONSTITUENTS	MNO	ZRO2	CO2	SO3	CL	F	S	CR2O3	NIO2	BAO	TOTAL	FEO/FE2O3
PERCENTAGES	0.18	0.00	2.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	11.429
MOL. AMTS.	0.0025	0.0000	0.0614	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

MINERALS	Q	C	Z	OR	AB	AN	LC	NE	KP	HL	TH	NC
MOL. AMTS.	0.1251	0.0926	0.0000	0.0008	0.0694	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	7.514	9.445	0.000	0.473	36.407	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MINERALS	AC	NS	KS	WO	EN	FS	FO	FA	CS	MT	CM	HM
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.1518	0.1009	0.0000	0.0000	0.0000	0.0053	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	15.236	13.314	0.000	0.000	0.000	1.219	0.000	0.000

MINERALS	IL	TN	PF	RU	AP	FR	PR	CC	WO.	TOTAL	SALIC	FEMIC
MOL. AMTS.	0.0301	0.0000	0.0000	0.0000	0.0031	0.0000	0.0000	0.0592	0.0021			
PERCENTAGES	4.561	0.000	0.000	0.000	1.043	0.000	0.000	5.930	0.180	95.322	53.840	41.483

MINERALS	DI	DI-WO	DI-EN	DI-FS	HY	HY-EN	HY-FS	OL	OL-FO	OL-FA	WOL
MOL. AMTS.	0.0000	0.0000	0.0000	0.0000	0.2527	0.1518	0.1009	0.0000	0.0000	0.0000	0.0000
PERCENTAGES	0.000	0.000	0.000	0.000	28.550	15.236	13.314	0.000	0.000	0.000	0.000

BARTHS CATIONS	SI	AL	FE+3	FE+2	MG	CA	NA	K	H	TI	P	MN
	35.44	14.44	0.47	5.93	6.82	3.08	6.16	0.08	23.15	1.33	0.28	0.11

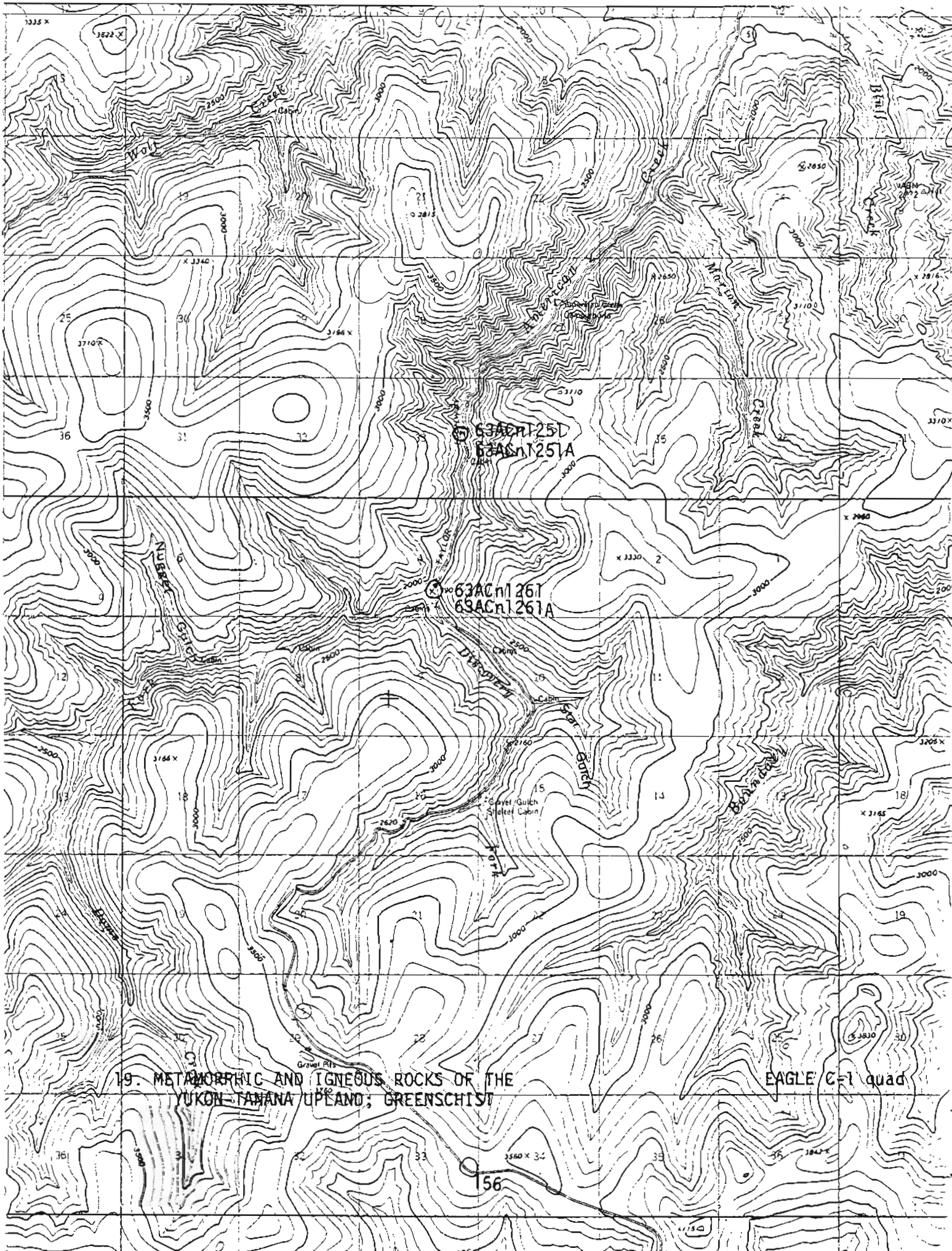
	ZR	C	S1	CL	F	S2	CR	NI	BA
	0.00	2.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NIGGLI VALUES	AL*	FM*	C*	ALK*	SI	TI	P	H	K	MG	SIM	QZ
	27.00	49.83	11.53	11.65	132.47	0.98	0.51	43.26	0.01	0.51	146.58	-14.11

RATIOS FOR TRIANGULAR DIAGRAMS

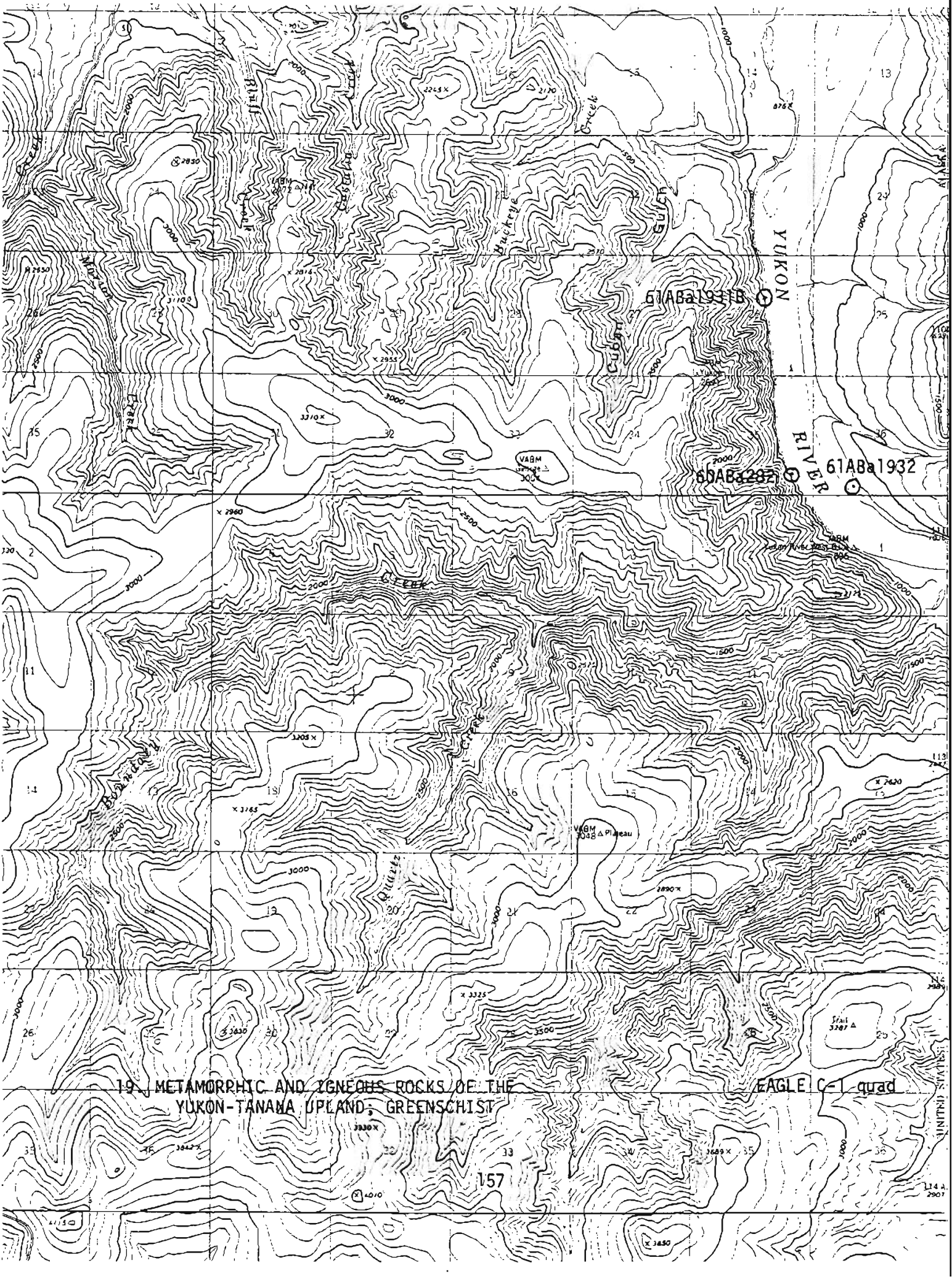
A:C:F = 25.23 : 0.00 : 73.46 A:K:F = 25.17 : 0.22 : 74.61 A:N:F = 21.40 : 15.18 : 62.31

Q:OR:AB = 64.02 : 0.44 : 35.54 Q:OR:(AB+AN) = 64.02 : 0.44 : 35.54 OR:AB:AN = 1.21 : 98.79 : 0.00



19. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; GREENSCHIST

EAGLE C-1 quad



19. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND: GREENSCHIST

EAGLE C-1 quad

20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MISCELLANEOUS ROCKS

Field No.	R.R. Lab No.	SQ. Lab No.	Description	Location
60ABa296	163826	64M-1483	sericite schist	Eagle C-1
62ABa2416	163842	64M-1499	staurolite schist	Charley River A-6
62ABa2393	163849	64M-1506	schist	Charley River B-6
62ABa2441	163850	64M-1507	metachert conglomerate	Charley River A-5
62ABa2442	163851	64M-1508	phyllite	Charley River A-5

RAPID ROCK ANALYSIS

Lab No.	163826	163842	163849	163850	163851
SiO_2	87.5	56.1	72.4	89.7	71.6
Al_2O_3	3.0	21.9	11.3	4.3	12.2
Fe_2O_3	.77	4.7	7.6	.58	1.4
FeO	1.3	6.3	.52	1.2	4.0
MgO	1.4	2.9	.65	.49	1.8
CaO	.25	.15	.31	.43	.97
Na_2O	3.4	.45	.15	.00	.00
K_2O	.55	3.2	2.7	.80	3.2
H_2O^-	.03	.12	.26	.07	.20
H_2O^+	1.2	2.1	2.6	.93	2.4
TiO_2	1.2	1.1	.52	.18	.55
P_2O_5	.37	.28	.25	.63	.49
MnO	.07	.12	.08	.01	.07
CO_2	.05	.08	.08	.08	.32
Sum	100	100	99	99	99

20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MISCELLANEOUS ROCKS

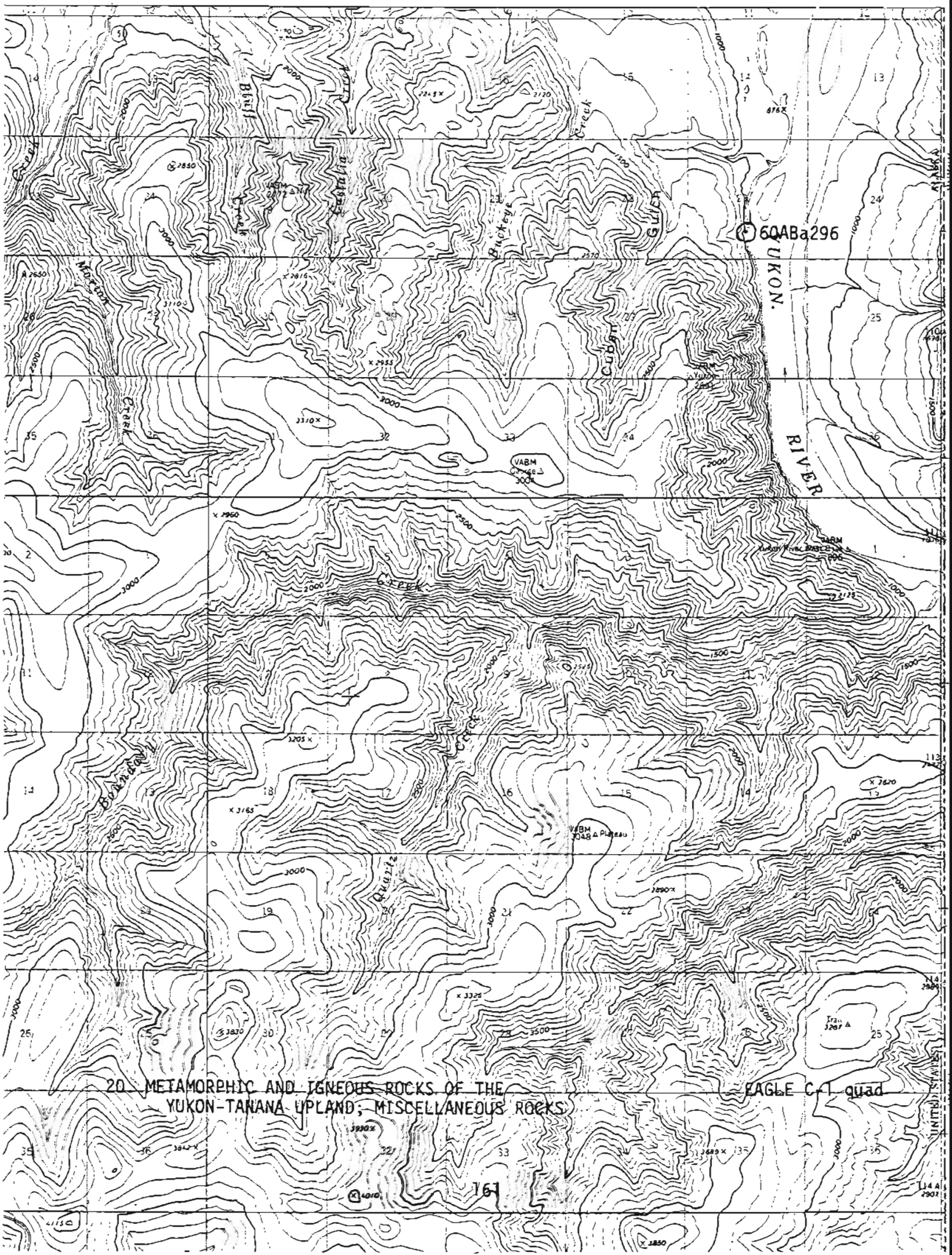
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Lab No.	64M-1483	64M-1499	64M-1506	64M-1507	64M-1508
Si	M.	M.	M.	M.	M.
Al	1.5	10.	5.	2.	5.
Fe	1.5	7.	5.	1.5	3.
Mg	.3	1.	.3	.3	1.
Ca	.05	.15	.05	.3	1.
Na	0	.7	.3	.05	.07
K	0	3.	2.	.7	2.
Ti	.07	.5	.3	.15	.3
P	0	0	0	0	0
Mn	.05	.07	.05	.01	.05
Ag	0	0	.00007	.0001	0
As	0	0	0	0	0
Au	0	0	0	0	0
B	.0015	.007	.01	.005	.015
Ba	.1	.15	.3	.1	.2
Be	0	.0005	.0003	0	.0002
Bi	0	0	0	0	0
Cd	0	0	0	0	0
Ce	0	0	0	0	0
Co	.0005	.002	.002	0	.001
Cr	.0015	.015	.02	.007	.01
Cu	.007	.0015	.05	.005	.007
Ga	.0005	.005	.002	.0007	.003
Ge	0	0	0	0	0
Hf	0	0	0	0	0
Hg	0	0	0	0	0
In	0	0	0	0	0
La	0	.007	.005	0	0
Li	0	0	0	0	0
Mo	0	0	0	0	0

20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MISCELLANEOUS ROCKS

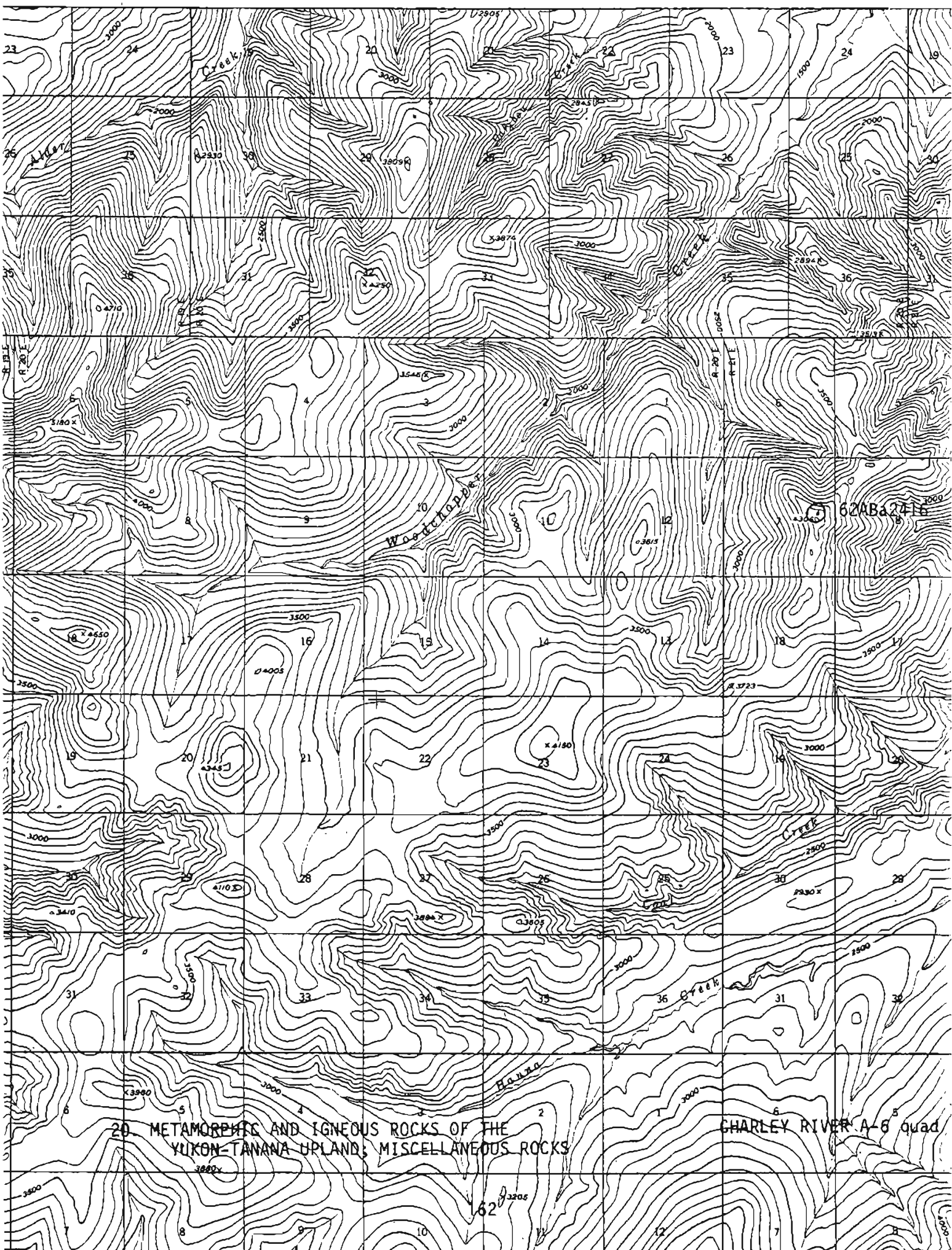
SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS (Cont'd.)

Lab No.	64M-1483	64M-1499	64M-1506	64M-1507	64M-1508
Nb	0	.002	0	0	.0015
Ni	.002	.005	.015	.005	.01
Pb	0	.0015	0	0	.001
Pd	0	0	0	0	0
Pt	0	0	0	0	0
Re	0	0	0	0	0
Sb	0	0	.07	0	0
Sc	.0005	.003	.002	.0005	.0015
Sn	0	0	0	0	0
Sr	0	.007	.02	.005	.007
Ta	0	0	0	0	0
Te	0	0	0	0	0
Th	0	0	0	0	0
Tl	0	0	0	0	0
U	0	0	0	0	0
V	.003	.015	.03	.02	.05
W	0	0	0	0	0
Y	0	.005	.005	.0015	.003
Yb	0	.0005	.0007	.0002	.0003
Zn	0	0	0	0	0
Zr	.002	.015	.015	.01	.015
Looked for only when La or Ce found:					
Pr		0	0		
Nd		0	0		
Sm		0	0		
Eu		0	0		



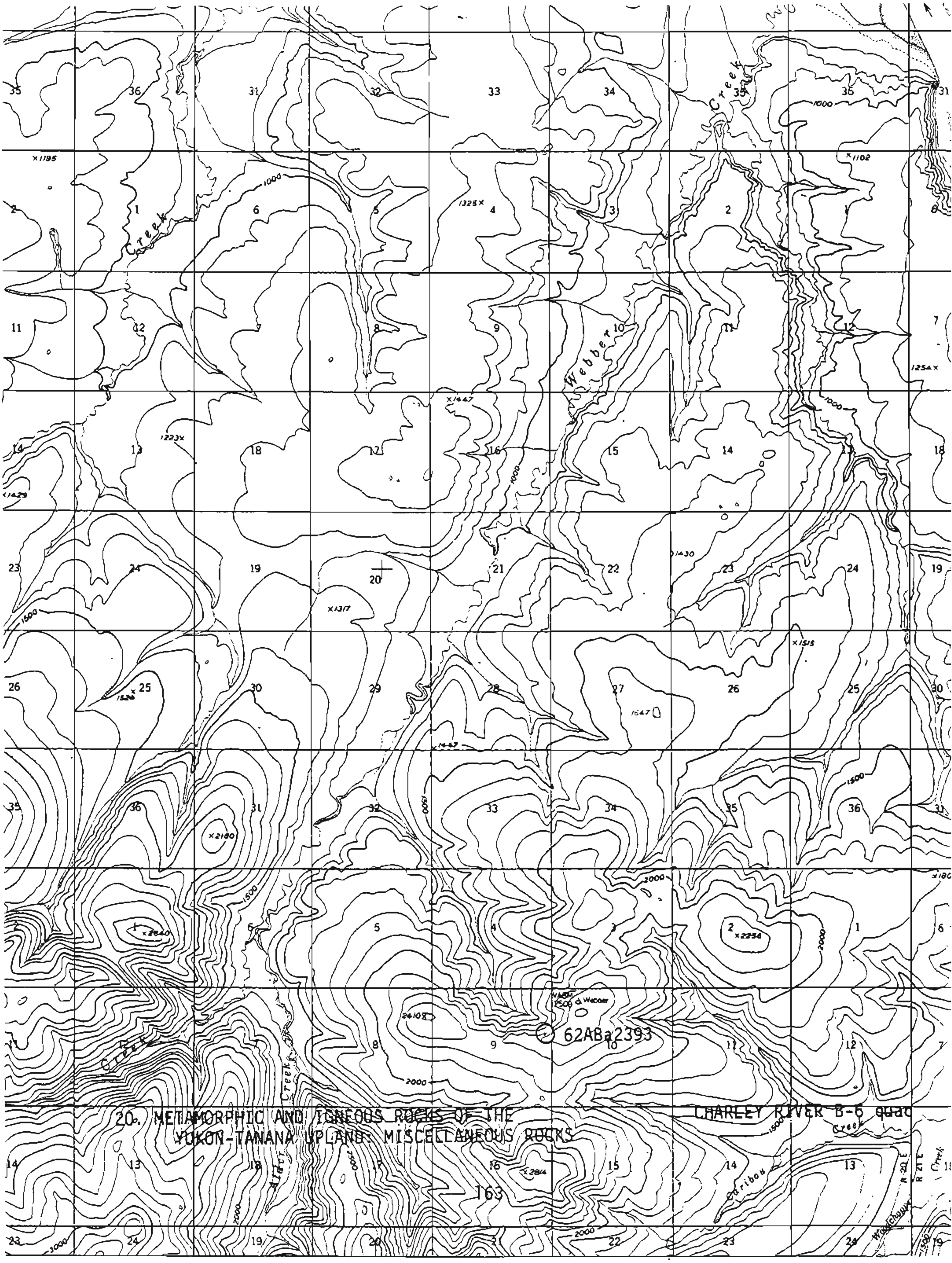
20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MISCELLANEOUS ROCKS

EAGLE C-1 quad



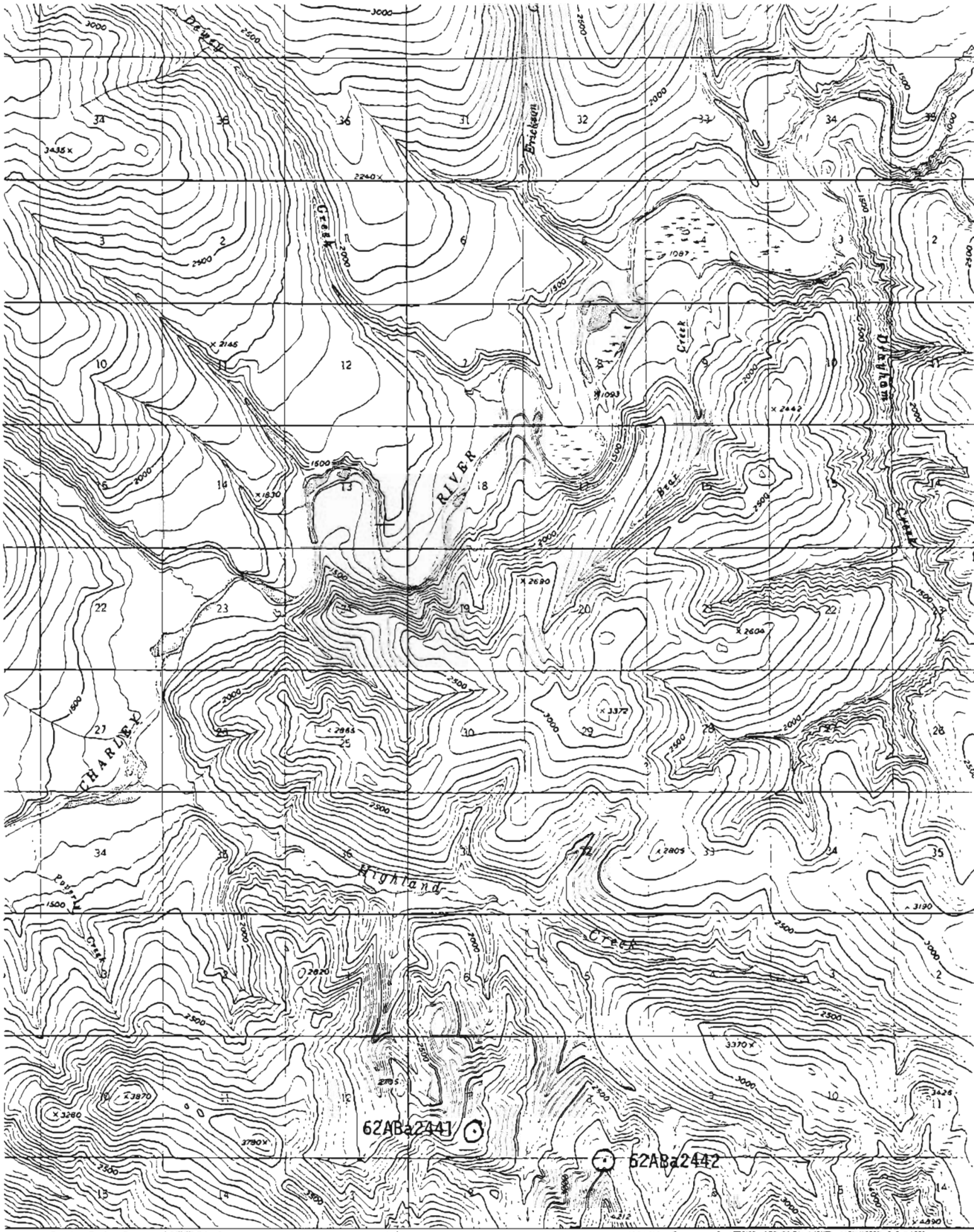
20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MISCELLANEOUS ROCKS

CHARLEY RIVER A-6 quad



20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND: MISCELLANEOUS ROCKS

CHARLEY RIVER B-6 quad



EAGLE D-5 SCALE 1:63360

20. METAMORPHIC AND IGNEOUS ROCKS OF THE YUKON-TANANA UPLAND; MISCELLANEOUS ROCKS

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