DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ALASKA
TOPOGRAPHIC SERIES

Explanation

- ○ completely serpentinized ultramafic body (Group I)
- △ partially serpentinized ultramafic body (Group II)
- □ ultramafic rock (Group III)
- granitic rocks
- large ultramafic body

TRUE NORTH

Map of the Eagle quadrangle, Alaska showing the location of ultramafic rocks.

1973

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey standards and nomenclature.

BASIC DATA ON THE ULTRAMAFIC ROCKS OF THE EAGLE QUADRANGLE, EAST-CENTRAL ALASKA

By Terry E. C. Keith and Helen L. Foster

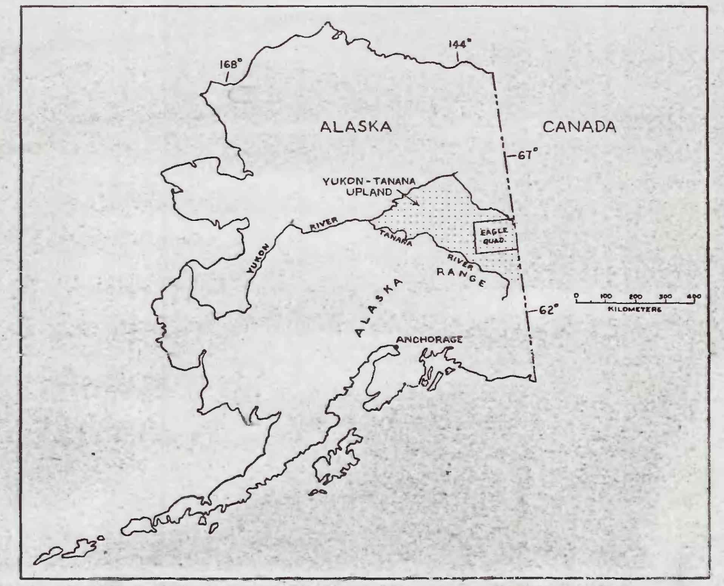
More than 97 separate occurrences of ultramafic rock were found south of the Yukon River in the Eagle quadrangle, east-central Alaska during the course of reconnaissance geologic mapping. The size of outcrops of ultramafic rock ranges from a square meter to 41 square kilometers, but most are small.

The mineralogy and textures of the ultramafic rocks have been determined by field examination and by preliminary study of approximately 150 thin sections and approximately 130 X-ray diffraction traces. Not all exposures have been studied and some have been examined in considerably more detail than others. Rocks from about 62 percent of the outcrops were either X-rayed, sectioned, or both.

For purposes of description, the ultramafic rocks are divided into three groups: (1) those that are completely serpentinized or altered still further to talc, magnesite, and rarely dolomite; (2) those that are partly serpentinized; and (3) several types of hornblendites and pyroxenites. Groups II and III are each further divided into two parts. Groups IIA and IIIA include the largest bodies in each of these groups, and Groups IIB and IIIB include the smallest bodies in each group. The rocks of Group I and II are probably related and differ only in their degree of alteration. They are considered to be alpine-type peridotites and may include dismembered ophiolite. Group III rocks are probably of intrusive origin.

This report consists of an index map (fig. 1), a map showing the location of the ultramafic bodies of the Eagle quadrangle (fig. 2), a table which gives detailed information, particularly on mineralogy, for each of the 97 localities (table 1), a table presenting the results of semiquantitative spectrographic analyses of 96 samples from these localities (table 2), and a table presenting the results of fire assay-spectrographic analyses for platinum-group elements (table 3).

This report is intended to supplement a paper entitled, "Ultramafic rocks in the Eagle quadrangle, east-central Alaska," by Foster and Keith (in prep) which presents this data in less detail but attempts to interpret and relate the data.



Index map of Alaska

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

TABLE 1.--ULTRAMAFIC ROCKS OF THE EAGLE QUADRANGLE, ALASKA

1/ S - One or more semiquantitative spectrographic analyses made
T - One or more thin sections examined
X - One or more X-ray diffraction traces examined

2/ Small - 1 square meter to 1/2 square kilometer
Medium - 1/2 square kilometer to 5 square kilometers
Large - 5 square kilometers or larger

3/ Includes talc, actinolite and chlorite

GROUP 1

Map No.	Field No.	Location: Quad	Location: Lat(N) Long(W)	Data 1/	Approx. size 2/	Rock name	Mineralogy: Primary	Mineralogy: Secondary	Serpentinization (percent)	Other significant alteration	Textural features	Adjacent country rock	Structural data	Remarks
1	70AWr42	D-5	64°59'10" 143°18'10"	S,X	Small	Serpentinite		Serpentine (lizardite + clinochrysotile), minor chlorite, magnetite; trace of brucite	100			Quartz-biotite gneiss and granitic rocks		May be part of no. 2
7	71AFr9 71AFr10	D-4	64°56'25" 142°06'12"		Small	Serpentinite		Serpentine	100		Fine-grained	Quartz-mica schist		
8	71AFR22	D-4	68°58'10" 142°05'25"		Small	Serpentinite?		Serpentine?	100?			Quartzite, quartz-mica schist	Dike	
9	71AWr50	D-4	64°59'15" 142°42'05"	X,T	Small	Serpentinite		Serpentine (lizardite + clinochrysotile) 99%; brucite, 1%	100			Till, basalt(?) and gabbro		
10	71AFr209	D-4	65°00'00" 142°30'30"	S	Small	Serpentinite			100		Massive, fine-grained	Gabbro(?), basalt(?), and chert		Could be continuation of Mt. Sorenson ultramafic, no. 3
11	68ACs181	D-3	64°59'45" 142°29'10"	S,T,X	Small	Serpentinite		Serpentine (lizardite + clinochrysotile) 97%; brucite, 2%, magnetite, 1%	100		Massive texture of fine-grained fibrous aggregates and bastite. Most serpentine is replacing orthopyroxene, some replacing olivine. Late veinlets of clinochrysotile	Chert(?)		
12	68ACs183 68ACs184 68ACs185	D-3	64°59'20" 142°25'30"	S,T,X	Medium	Serpentinite		Serpentine (lizardite + clinochrysotile)	100	Formation of silica-carbonate rock zone up to 40 ft wide		Phyllite	South of Seventymile fault. Altered diabase may be tectonic inclusion. Silica-carbonate veinlets cut both the diabase and serpentinite	Only ultramafic mass with which gold, silver, and arsenic have been found. Rare 1.5 mm seams of cross fiber
	68ACk24 68ACs393 71AFr1158							Serpentine 98%; magnetite 1%, chromite <1%		Associated light-colored, fine-grained rodingite	Massive fine-grained serpentine. Large grains of serpentinized orthopyroxene, 5%; original rock was harzburgite			
	68ACs391							Serpentine with magnesite and minor quartz						
13	71AFr1153	D-3	64°58'47" 142°22'45"		Small	Serpentinite			100		Fine-grained	Quartz-mica schist		May be continuation of Flume Creek ultramafic mass, no. 12
14	68AFr760	D-2	64°57'45" 142°26'40"	S	Small	Serpentinite		Antigorite 98%; dolomite 1%, magnetite 1%	100			Greenstone, quartzite, quartz-graphite schist		
15	68AFr3007	D-3	64°58'32" 142°19'56"	S	Small	Serpentinite		Serpentine, numerous carbonate veins	100(?)			Quartz biotite schist; quartz vein zone	Strongly cleaved	Silver detected
	68AFr3008	D-3	64°58'30" 142°19'58"											
16	68ACs177	D-3	64°58'10" 142°21'20"	S	Small	Serpentinite		Serpentine	100(?)			Phyllite		Rubble only
17	68AFr3015	D-3	64°57'20" 142°17'15"		Small	Serpentinite		Serpentine	100		Fine-grained massive serpentinite with about 5% large serpentinized orthopyroxene phenocrysts indicating original rock may have been harzburgite; green slip fiber	Silicified greenstone		
19	68ACs307	D-3	64°56'50" 142°10'30"	X	Small	Serpentinite		Serpentine (lizardite + clinochrysotile)	100			black quartzite and argillite		
20	72AFr433	D-3	64°36'30" 142°08'50"	T,X	Small	Serpentinite		Serpentine (lizardite + clinochrysotile) 92%; magnetite 7%; brucite 1%	100		Mesh texture of serpentine totally replacing olivine; good bastite. Small clinochrysotile veinlets cut rock. Original rock was harzburgite.	Argillite and graywacke rock		
21	68AFr416 68ACs319	D-3	64°55'02" 142°04'25"	S	Small	Serpentinite		Serpentine			Massive serpentine	Quartzite and quartz-graphite schist; silicic igneous rock	Foliated; dike?	
22	68AFr335	D-2	64°51'20" 141°57'00"	S	Small	Serpentinite?						Quartzite and hornfels	Dike or sill	Silver detected
23	68ACs424	D-3	64°48'47" 142°06'40"	S,X	Small	Serpentinite		Serpentine (lizardite + clinochrysotile), major; talc, minor; chlorite, trace	100			Marble and quartzite		Color banding; silver detected
24	68AFr434	D-2	64°47'40" 141°40'35"		Small	Serpentinite		Serpentine	100(?)		Small amount of poorly developed fibrous serpentine in massive serpentine	Marble and quartzite		
25	66AFr395	C-1	64°44'47" 141°25'20"		Small	Serpentinite		Serpentine	100(?)			Greenstone		
27	66AFr800 66AFr801	C-1	64°39'50" 141°17'20"	X	Small	Serpentinite		Serpentine (antigorite) 98%; trace of actinolite and chlorite	100		Fine-grained, massive with local short fibers	Greenschist and marble	Local fault zone	
28	66AFr796	C-1	64°39'58" 141°16'58"	X	Small	Serpentinite		Serpentine (antigorite) 98%; dolomite 1%; actinolite 1%	100		Fine-grained; massive	Greenstone	Fault zone, probably minor	
29	70AFr122	C-1	64°39'55" 141°13'15"	S,X	Small	Serpentinite		Serpentine (antigorite) 98%; magnetite 2%	100		Some hard fibrous serpentine	Quartz-mica schist		
30	70AFr82	C-1	64°40'20" 141°07'01"	T,X	Small	Serpentinite		Serpentine (antigorite) 90%; clinochrysotile 1%; actinolite 7%; magnetite 1%; calcite 1%	100		Serpentine has fine mesh texture and bastite; original rock was harzburgite. Late cross-cutting veinlets of clinochrysotile	Greenstone, quartz-mica schist, and greenschist		
31	70AFr79	C-1	64°40'10" 141°07'20"	X	Small	Serpentinite		Serpentine (antigorite); minor actinolite, dolomite and talc	100		Coarse and fine actinolite in massive, well-crystallized antigorite	Quartz-mica schist		
32	70AFr66	C-1	64°40'14" 141°06'30"	S	Small	Serpentinite		Serpentine, major; actinolite, minor	100(?)		Coarse actinolite in massive fine-grained serpentine	Quartz-mica schist and quartzite		
33	70AFr31	C-1	64°36'50" 141°05'59"	S	Small	Serpentinite		Serpentine	100(?)		Massive, fine-grained	Quartz-mica schist, quartzite		Similar to 37
34	66AFr262	C-1	64°36'15" 141°04'01"		Small	Serpentinite		Serpentine	100		Fine-grained, massive	Quartz-mica schist, quartzite		
35	66AFr279	C-1	64°35'45" 141°01'40"		Small	Serpentinite		Serpentine	100		Fine-grained, massive	Granitic rock	Slickensided locally. May be part of no. 34	
36	66AFr1397	C-1	64°35'01" 141°10'17"		Small	Serpentinite		Serpentine	100(?)		Fine-grained; some talcy rocks	Greenschist and quartz-graphite schist		Green stains on rocks
37	70AFr16	C-1	64°36'20" 141°14'30"	S,T,X	Small	Serpentinite		Serpentine (antigorite) 97%; magnesite 2%; magnetite 1%	100		Fine-grained, massive serpentine. Some stiff, fibrous serpentine	Quartz-mica schist	Foliated	
38	66AFr823	C-1	64°35'45" 141°19'45"		Small	Serpentinite		Serpentine	100(?)			Quartz-graphite schist		
39	70AFr2281	C-1	64°35'29" 141°19'08"		Small	Serpentinite		Serpentine	100(?)		Fine-grained, massive	Quartz-graphite schist		
40	70AFr2280	C-1	64°35'30" 141°18'50"		Small	Serpentinite		Serpentine	100(?)		Fine-grained, massive	Quartz-graphite schist		
41	70AFr2273	C-1	64°34'30" 141°18'29"	S,X	Small	Serpentinite		Antigorite; minor talc, quartz, dolomite	100	White carbonate in lenses; silicification of much of outcrop	Fine-grained	Quartz-graphite schist		Bright green stain. Quartz veinlets 6 mm thick in silica-rich areas
42	66AFr1123 66AFr1124	C-1	64°34'20" 141°20'58"	X	Small	Serpentinite		Antigorite 100%	100			Greenstone and quartz-graphite schist		
43	66AFr816	C-1	64°34'30" 141°18'40"		Small	Serpentinite		Serpentine, minor actinolite	100(?)		Massive serpentine	Quartz-graphite schist		
44	66AFr756	C-1	64°35'45" 141°15'59"		Small	Serpentinite		Serpentine	100(?)			Quartz-mica schist and quartzite		
45	66AFr755	C-1	64°33'30" 141°16'00"		Small	Serpentinite		Serpentine	100(?)			Quartz-mica schist		
46	66AFr1110	C-1	64°33'00" 141°18'36"	X	Small	Serpentinite		Antigorite 98%, dolomite 2%	100		Fine-grained massive; evidence of large serpentinized orthopyroxene grains. Some stiff fibrous serpentine	Greenstone		
47	66AFr1104	C-1	64°32'15" 141°19'38"	X	Small	Serpentinite		Antigorite 95%; dolomite 2%; magnesite <1%; talc <1%; chlorite <1%	100		Fine-grained, massive	Quartz-graphite schist		
48	66AFr327	C-1	64°31'50" 141°28'02"		Small	Serpentinite		Serpentine 98%; actinolite 2%	100		Massive serpentine, fine-grained. Local cross-fiber in 7 mm wide veinlets; radiating actinolite crystals	Quartzite, quartz-mica schist		
49	68AFr2166	C-2	64°36'45" 141°34'25"	S,X	Small	Partially steatized serpentinite		Major magnesite; minor dolomite, quartz, talc; trace serpentine and chlorite		Serpentine altered to talc + magnesite		Greenstone and greenschist		
50	71AFr283	C-2	64°38'02" 141°32'28"	S	Small	Serpentinite(?)		Serpentine	100(?)		Minor 3 mm thick veinlets of cross-fiber	Quartzite and quartz-mica schist		
51	69AFr442	C-3	64°41'50" 142°03'15"	S	Small	Serpentinite		Serpentine; minor talc and actinolite	100			Quartz-mica schist and quartzite		
55	68AFr2430	C-4	64°33'50" 142°30'30"	X	Small	Serpentinite		Serpentine (antigorite); later veins of chrysotile	100(?)		Highly serpentinized harzburgite with abundant good cross-fiber. 7 mm to 15 mm bands of asbestos			Asbestos occurrence of possible commercial significance (see Foster, H. L., "Asbestos occurrence in the Eagle C-4 quadrangle, Alaska," U.S. Geol. Survey Cir. 611, 1967)
56	71AFr447	B-2	64°29'02" 141°43'15"	T	Medium	Serpentinite and partially steatized serpentinite		Talc 96%; serpentine 2%; opaques 1%; magnesite 1%		Serpentine altered to talc + magnesite	Fine-grained, massive; some microfolds in talc	Greenstone		
	68AFr202								100(?)		Fine-grained; 3 mm thick bands of cross-fiber	Greenschist, greenstone, and quartz-graphite schist		
	68ACs109			S										
58	63AFr375 66AFr81	B-1	64°28'42" 141°19'25"	T,X	Small	Partially steatized serpentinite		Antigorite 25-95%; talc 1-60%; actinolite 1-10%; magnetite 2%; chlorite 1-2%	100	Serpentine has partially altered to talc	Mostly fine-grained, massive, serpentine has random fibrous texture; some deformed bastite. Local cross-fiber veinlets approximately 1 mm wide	Quartz-graphite schist and greenstone		
59	66AFr73 66AFr74	B-1	64°26'15" 141°20'30"	X	Small	Serpentinite		Antigorite	100			Greenstone		Relation to greenstone uncertain
60	70AFr2332	B-1	64°26'20" 141°22'40"	S,T,X	Small	Serpentinite		Antigorite 60-95%; actinolite 5-40%; magnetite 1-5%	100		Massive fine-grained serpentine with large radiating actinolite crystals	Greenstone		
61	66AFr65	B-1	64°26'30" 141°27'59"		Small	Serpentinite		Serpentine	100(?)			Quartz-mica schist		
62	66AFr67 71AFr479	B-1	64°26'15" 141°28'59"	S	Small	Serpentinite		Serpentine	100(?)	Associated quartz-carbonate rock		Quartz-mica schist		
63	66AFr64 68AFr2074	B-1	64°25'18" 141°28'58"		Small	Serpentinite		Serpentine	100(?)		Fine-grained, massive serpentine	Greenschist, greenstone		
64	70AFr2259	B-1	64°24'43" 141°29'59"	S,X	Small	Serpentinite		Antigorite 100%	100		Fine-grained, massive; some stiff chrysotile or actinolite fiber around outcrop	Quartz-graphite schist and quartzite		
68	66AFr712 67AFr47	B-1	64°22'10" 141°24'45"	S,T,X	Small	Partially steatized serpentinite		Talc 30-90%, antigorite 1-50%; actinolite <5%; dolomite <5%; magnesite 5-15%; chlorite <5%; magnetite 1%	100(?)	Serpentine altered to talc + magnesite	Fine-grained serpentine and talc, massive; cross-cutting veinlets of magnesite and dolomite up to 25 mm wide	Garnetiferous quartz-biotite schist		Some brecciation
72	66AFr1156	A-1	64°07'15" 141°01'40"	X	Small	Serpentinite		Antigorite 98%; talc 1%; magnetite 1%	100		Fine-grained, massive; opaques concentrated along small fractures	Garnetiferous hornblende-biotite gneiss		Large blocks of rubble
96	70AFr4023	A-5	64°14'47" 143°15'20"	S,T	Small	Serpentinite		Serpentine 97%; magnesite 2%; magnetite 1%	100		Massive, fine-grained fibrous serpentine. Magnetite and magnesite form crude segregations	Quartz-mica schist		

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

TABLE 1.--ULTRAMAFIC ROCKS OF THE EAGLE QUADRANGLE, ALASKA (CONTINUED)

GROUP II-A

Map No.	Field No.	Location: Quad	Location: Lat(N) Long(W)	Data[1]	Approx size[2]	Rock name	Mineralogy: Primary	Mineralogy: Secondary	Serpentinization (percent)[3]	Other significant alteration	Textural features	Adjacent country rock	Structural data	Remarks
3	68AFr2017 70AFr2376 to 70AFr2380	D-4 D-5	64°55' 142°57'	S,T,X	Large	Dominantly serpentinized dunite and harzburgite	Olivine (Fo_{80-95}) 10-70%; orthopyroxene (enstatite) 0-50%; clinopyroxene (augite) 0-12%; chromite 1%	Serpentine (lizardite and clinochrysotile) 0-90%; magnetite < 3% chlorite < 5%; actinolite 0-15%; talc < 4%; brucite < 1%	Variable 0-100%; most rock was at least 25% serpentinized; degree of serpentinization increased toward the eastern ends of the limbs	Quartz-magnesite vein with green stain, about 1.1 m wide in NW part of mass. Hornblendite and epidote-hornblendite in local boundary zones	Massive serpentinized harzburgite and dunite; minor veinlets of late chrysotile cross-cutting rock throughout the mass; local slip-fiber developed on surfaces. Orthopyroxene commonly occurs as segregations in western part of body; usually fewer and as solitary grains as bastite in eastern part of body. Schiller structure along original cleavage; exsolving reddish-brown mineral is common in bastite. Clinopyroxene is found only in the western part; a lens consists of 90% augite. Chromite is scarce but occurs as large grains up to 5 mm across	Argillite, graywacke, quartzite	Faulted; has tectonic inclusions of diabase	Additional sample nos: 70AWr30, 70AWr31, 70AWr77, 70AFr241, 70AFr243, 70AFr2434, 71AFr218, 71AFr222, 71AFr223, 71AFr228, 71AWr34, 71AWr36, 71AWr37, 71AWr44, 71AWr59, 71AWr64, 71AWr126, 71AWr127, 70AFr232
26	70AFr2333 to 70AFr2349	C-1	64°43' 141°16'	S,T,X	Large	Serpentinized harzburgite	Olivine (Fo_{90-95}) 10-90%; orthopyroxene (enstatite) 5-35%; clinopyroxene (augite) <5%; chromite <1%	Serpentine (antigorite; locally later chrysotile veinlets) 5-90%; magnetite < 3%; actinolite 0-15%; brucite (bordering late veinlets with magnetite) < 1%; chlorite variable < 5%	Variable 5-100%; most rock was at least 25% serpentinized; little was completely serpentinized	Saussuritized northern contact zone	Massive serpentinized harzburgite; minor veinlets of late chrysotile with local cross-fiber near southern border. Olivine commonly granulated; orthopyroxene commonly deformed; clinopyroxene occurs sporadically but never more than 5%. Orthopyroxene grains occur as segregations in places; clinopyroxene occurs occasionally in some segregations with orthopyroxene. Chromite scarce, occurs as relatively large, pulverulic grains	Greenstone, quartzite, quartz-mica schist	Faulted; has inclusions of country rock near boundaries	Additional sample nos: 66AFr407 to 66AFr410, 66AFr533, 66AFr806, 66AFr807, 66AFr810 to 66AFr812, 66AFr1038, 66AFr1057 to 66AFr1059, 71AFr4, 71AFr1102, 71AFr1103, 71AFr1105, 71AFr1116, 71AWr4 to 71AWr6
73	64AFr345 64AFr355 65AFr797 65AFr799 65AFr800 65AFr801 65AFr805	A-1	64°30'00" 141°01'30"	T,X	Large	Serpentinized harzburgite	Olivine 1%	Serpentine (antigorite) 0-90%; talc 0-50%; chlorite 0-65%; magnesite 0-3%; magnetite 0-3%; actinolite 0-5%; dolomite 0-10%	90-100%	Antigorite is altered to talc and magnesite with local development of chlorite and actinolite	Massive, fine-grained, much deformation by squeezing and shearing. Moderately fine fibrous antigorite has replaced original minerals. Large magnetite grains up to 4 mm across occur, commonly with brucite. Late, thin, cross-cutting serpentine veinlets are common, locally showing traces of cross-fiber development; hard serpentine fibers up to 100 mm long are found locally. Much antigorite has been altered to talc and magnesite; local concentrations of coarse green chlorite and magnesite.	Quartzite, quartz-mica schist, greenschist		

GROUP II-B

Map No.	Field No.	Location: Quad	Location: Lat(N) Long(W)	Data[1]	Approx size[2]	Rock name	Mineralogy: Primary	Mineralogy: Secondary	Serpentinization (percent)	Other significant alteration	Textural features	Adjacent country rock	Structural data	Remarks
2	70AFr2438	D-5	64°59'15" 143°16'02"	S,T,X	Small	Serpentinized harzburgite or dunite	Olivine 10%; orthopyroxene 5%	Serpentine (lizardite and clinochrysotile) 78%; ± actinolite 5%; chlorite 5%; magnetite 1%; talc 1%	75	Talc and actinolite are altered from the pyroxene	Lumpy weathered surface from resistant orthopyroxene. Serpentine after olivine has mesh texture, after orthopyroxene is bastite	Granitic rock		
4	71AWr29 71AWr30	D-4	64°55'20" 142°45'00"	S,T	Small	Serpentinized harzburgite	Olivine 45%; altered orthopyroxene	Serpentine 17%; actinolite 20%; talc 10%; magnetite 3%; chlorite 5%	30			Glacial till covers bedrock		
5	71AWr124 71AWr125	D-4	64°53'50" 142°35'10"	S,T	Small	Serpentinized dunite	Olivine 0-40%	Actinolite 0-40%; serpentine 10-99%; talc 0-17%; magnetite <1%	5 to 100		Massive serpentine with some cross-fiber. Serpentine replaces olivine along fractures, textures obliterated where fine-grained serpentine replaces the original minerals. Some long, stiff, fibrous serpentine	Quartzite		
6	71AWr117 71AFr161	D-4	64°53'45" 142°32'30"	S,T	Small	Serpentinized dunite	Olivine 7-75%	Actinolite 10-70%; serpentine 10-25% chlorite 0-10%; magnetite < 1-3%; talc 0-10%	25-90	Talc and actinolite are altered from pyroxene	Massive serpentinized ultramafic with some cross-fiber	Hornfels and granitic rock		
18	68ACs301	D-3	64°54'50" 142°11'45"		Small	Serpentinized peridotite						Black quartz-graphite phyllite		
57	66AFr1086 67AFr54	B-1	64°29'05" 141°12'10"	S,X	Small	Serpentinized dunite	Olivine 10%	Serpentine (antigorite 75%); actinolite 10%; talc 5%; local sulfide crystals, probably pyrite	90		Serpentine is fine-grained; actinolite and talc are locally concentrated; coarse actinolite is fibrous but hard	Greenstone near Liberty Fork		
79	70AFr913 70AFr915	B-3	64°16'00" 142°06'15"	S,T,X	Small	Serpentinized dunite and serpentinite	Olivine 10-20%	Serpentine (lizardite and clinochrysotile) 50 ±; actinolite 15-20%; talc 10-15%; magnetite 5%; magnesite 0-1%; brucite 1%	30-100		Olivine grains are exceptionally large, 15 mm x 2 mm wide, and are randomly oriented. Serpentine has mesh texture after olivine. Talc increases in abundance with serpentine; actinolite decreases in abundance with increase in talc. Locally, actinolite crystals in serpentine.	Quartzite, quartz-mica schist, marble		
84	70AFr2352	B-5	64°27'58" 142°03'30"	S,T,X	Small	Serpentinized harzburgite	Olivine 10%; orthopyroxene < 5%	Serpentine (lizardite + clinochrysotile) 45%; actinolite 40%; talc 0-20%; magnetite 3%; brucite 2%; chlorite 5-10%	80		Rock is dark, fine-grained massive to crumbly; relict grain outlines can be seen on weathered surfaces. Serpentine shows mesh texture after olivine. Actinolite occurs in radiating fibrous bundles	Quartz-mica schist	Dike or pod	
85	70AFr2353 68AFr2365	B-5	64°28'08" 143°03'30"		Small	Serpentinized harzburgite					Similar to 84	Greenschist	Similar to 84	
86	70AFr2354	B-5	64°28'17" 143°03'30"	T,X	Small	Serpentinized harzburgite	Olivine 25%; orthopyroxene < 5%	Actinolite 40%; serpentine (lizardite + clinochrysotile) 15%; chlorite 10%; magnetite 5%	60		Similar to 84	Greenschist	Similar to 84	
87	70AFr2355	B-5	64°28'25" 143°03'05"	S,X	Small	Serpentinized harzburgite	Orthopyroxene 25%; olivine?	Talc 40%; chlorite 15%; serpentine (lizardite + clinochrysotile) 15%; magnetite < 2%	70		Similar to above. 12.5 cm veinlet of orthopyroxene trends parallel to outcrop	Greenschist and possibly granitic rock	Dike or pod parallel to and north of 86	
88	68AFr2361 71AWr323 71AWr324	B-5	64°27'45" 143°06'00"	X	Small	Serpentinized dunite	Olivine (10%)	Serpentine 65%; talc 20%; chlorite 10%; magnetite 5%	90		Serpentine is probably antigorite although X-ray diffraction peaks are not clear. Possibly it is a mixture. Serpentine is partially altered to talc	Greenstone		
97	64AFr83 69AFr27 69AFr28 69AWr13	A-6	64°10'00" 143°43'00"	X S,X S,X	Medium	Serpentinized harzburgite	Olivine 0-25%; orthopyroxene (bastite) 0-30%	Serpentine (antigorite with late clinochrysotile veinlets), minor actinolite, chlorite, brucite, magnetite	60 ±		Massive antigorite cut by abundant late chrysotile veinlets. Foliated; preferred orientation of tabular bastite. Rare cross fiber and slip fiber; some fibrous actinolite	Quartz biotite schist and gneiss		Cut by fine-grained gray dike rock

GROUP III-A

Map No.	Field No.	Location: Quad	Location: Lat(N) Long(W)	Data[1]	Approx size[2]	Rock name	Mineralogy: Primary	Mineralogy: Secondary	Serpentinization (percent)	Other significant alteration	Textural features	Adjacent country rock	Structural data	Remarks
70	66AFr608	B-1	64°10'00" 141°08'23"	T,X	Small	Biotite, pyroxenite; pyroxene hornblendite, fresh and serpentinized	Clinopyroxene (diopsidic augite) 5-80%; hornblende (colorless) 0-20%; biotite 0-12%; olivine 0-2%	Actinolite 5-55%; chlorite 0-18%; sphene < 1%; calcite 0-2%; epidote, local concentrations; magnetite 2%; hematite < 1%	Local, variable 0-60%		Coarse (3-6 mm) to moderately fine-grained; generally massive and fairly equigranular. Serpentinized rock was noted at edge of this mass	Granitic rock(?)		Veins of pegmatite and granitic rock cut the ultramafic
71	66AFr960	B-1	64°15'45" 141°08'40"	T,X	Small	Biotite hornblendite; minor hornblende pyroxenite	Biotite 50% ±; hornblende (dark green) 50% ±; clinopyroxene (local) 80% ±; apatite < 2%	Actinolite ± 5%; chlorite ± 5%; sphene < 1%; serpentine < 1%; magnetite < 1%; phlogopite < 1%; garnet (red) < 1%; epidote veinlets; albite, intergranular; calcite	Local < 1%		Much is very coarse-grained (50-75 mm long) hornblende and biotite crystals. Grain size ranges down to 2± mm in some parts of the mass. Late epidote veins roughly 75 mm wide cut the mass; grain size is about 2 mm. Mineral grains are commonly fractured and have crushed boundaries. Secondary minerals are found in intergranular pockets and along grain boundaries.	Quartz-mica schist and gneiss		Cut by granitic stringers
81	70AFr805 70AFr806 71AFr870 63AFr476	B-3	64°18'20" 142°23'45"	S,T,X	Medium	Hornblende pyroxenite; hornblendite; minor biotite hornblendite	Clinopyroxene (diopside) 0-72%; hornblende (green) 10-80%; biotite 0-15%; apatite < 1%	Hornblende (green to pale blue-green) 5-50%; actinolite 0-10%; sphene 0-1%; albite 0-3%; magnetite 0-3%; calcite 0-8%; pyrite 0-3%; chlorite 0-10%; penninite < 1%; epidote 0-18%; albite 0-3%; garnet < 1%	0	Clinopyroxene partially altered to hornblende, actinolite. Hornblende partially altered to actinolite, chlorite	Coarse to fine grained; hornblende crystals locally up to 40 mm long. Main intrusive part is massive; thin layers intruded into marble show good to poor foliation. Grains are fairly equigranular, ±0.75 mm diameter, subhedral	Marble	Ultramafic rock appears to be intruded into marble; marble and ultramafic folded and metamorphosed together	
89	70AFr2405 69AWr150 69AFr221	B-5	64°29'30" 143°23'15"	S,T,X	Small	Hornblendite to pyroxenite with gradations between; biotite hornblendite; magnetite pyroxenite; hypersthene hornblendite	Clinopyroxene (diopside) 0-75%; hornblende (medium to dark green) 10-95%; biotite 0-50%; orthopyroxene (hypersthene) 0-25%; magnetite 0-30%; apatite 1%	Actinolite 0-90% (local); chlorite 1-5%; quartz 0-5%; epidote 0-15%; albite 0-3%; sphene < 1%; zoisite 1%; clinozoisite < 1%	0	Blue amphibole rims on green hornblende near center of mass in various amounts	Coarse to medium grained, massive, generally in equigranular lenses, some with large hornblende crystals (12 mm diameter and 25-40 mm long) in finer-grained clinopyroxene matrix. Local magnetite-rich zone in pyroxenite with about 30% magnetite as large subhedral grains	Quartz-mica schist and quartzite	Possibly bounded by fault on north end	
90	69AFr841 70AFr2449 70AFr2450 70AFr2552 70AFr2553 71AFr3008 71AWr280 71AFr613 71AFr614	B-5	64°23'50" 143°07'25"	S,T,X	Medium	Hornblendite; hornblende pyroxenite; biotite hornblendite; biotite pyroxenite	Clinopyroxene (augite) 0-80%; hornblende (dark green) 10-90%; biotite 0-25%; apatite 0-1%	Actinolite 5-15%; chlorite 1-3%; magnetite 0-1%; sphene 0-1%; calcite 0-3%; minor epidote and albite	0		Generally quite coarse-grained, hornblende and biotite ranging from about 10 mm to 40 mm in length. Biotite flakes are exceptionally large in some biotite hornblendites while hornblende is exceptionally large in others. Small segregations (0.3 to 0.7 m across) are composed of 100% hornblende, biotite, or pyroxenite	Quartz-mica gneiss and schist intruded by granitic rocks	Cut by aplitic dikes about 0.6 m wide, some garnet-bearing. Large (0.3 to 2 m diameter) blocks of coarse hornblende-rich rocks are twisted up in aplitic material near the center of the outcrop	K^{40}/A^{40} age determined on hornblende 170.7 m.y. and on biotite 180.9 m.y. Determinations by Donald Turner, University of Alaska (personal commun.)
91	70AFr2533 70AFr316 70AFr317	B-5	64°23'58" 143°04'30"	T,X	Medium	Hornblendite; hornblende pyroxenite; biotite hornblendite	Hornblende 5-90%; clinopyroxene (augite) 5-90%; biotite 0-15%	Actinolite 0-18%; chlorite 0-18%; calcite 0-1%; sphene 0-1%; magnetite 0-3%; epidote 0-8%; albite 0-3%; zoisite 0-1%	0		More distortion of grains than in 90. Coarse-grained, about 40 mm maximum length for hornblende, 40 mm maximum diameter for biotite. Pyroxene grains have maximum length about 10 mm.	Quartz-biotite gneiss, quartzite	Small intrusive. Cut by aplitic dikes	May be related to or part of 90; mineralogy similar but textures indicate more deformation.

GROUP III-B

Map No.	Field No.	Location: Quad	Location: Lat(N) Long(W)	Data[1]	Approx size[2]	Rock name	Mineralogy: Primary	Mineralogy: Secondary	Serpentinization (percent)	Other significant alteration	Textural features	Adjacent country rock	Structural data	Remarks
52	69AFr748	C-3	64°38'35" 142°10'35"	S,T,X	Small	Biotite pyroxenite	Diopsidic augite 70%; biotite 25%; apatite <1%	Hornblende (dark green from clinopyroxene) <2%; actinolite < 2%	0		Coarse-grained, biotite crystals 4 mm long. Diopside is mosaic of anhedral grains (>1.5 mm diameter); many embayed and partially altered to green hornblende. Biotite crystals embayed and many are bent slightly	Mafic plutonic rock	Dike	
53	71AFr332	C-3	64°37'50" 142°11'55"	S,T	Small	Biotite pyroxenite and pyroxene hornblendite	Diopside 75%; biotite 30% Hornblende 50%; pigeonite 40%; biotite 1%	Chlorite 0-3%; actinolite 2-3%; albite 2-3%; magnetite <1%	0		Equigranular; random orientation of crystals; pyroxene forms mosaic. Two distinct rock types	Hornblende granodiorite	Dike	Significant platinum and palladium values, see table 2
54	69AFr2051	C-3	64°37'30" 142°24'40"		Small	Pyroxenite						Quartzite		
65	70AFr209	B-2	64°22'00" 141°41'45"	S,T,X	Small	Pyroxenite, olivine pyroxenite	Clinopyroxene 60-85%; olivine 0-10%; phlogopite 0-3%	Hornblende (green to pale blue-green, after clinopyroxene) 10%, serpentine (after olivine) 10%; magnetite 1-8%; calcite 0-2%; quartz 0-2%	0-10%		Interlocking mosaic of equigranular clinopyroxene grains with hornblende as alteration product of clinopyroxene. Scarce olivine altering to serpentine and magnetite. Quartz and calcite are late intergranular	Quartzite	Dike?	
66	70AFr189	B-2	64°19'30" 141°18'55"		Small	Biotite pyroxenite			0		Coarse-grained, massive	Diorite		Only single boulder found
67	70AFr170 68AFr141	B-2	64°20'40" 141°13'45"	T,X	Small	Hornblende pyroxenite	Clinopyroxene (diopsidic augite) 46%; hornblende 46%; hypersthene 1%; biotite < 1%	Chlorite 2%; actinolite 2%; magnetite 1%; minor local serpentine	Slight locally		Interlocking mosaic of anhedral hornblende (3 mm ±) and clinopyroxene (0.75 mm ±)	Marble, quartzite, and quartz-biotite gneiss		Stringers of hard cross fiber about 3 mm thick. Local serpentinized harzburgite
69	65AFr831	B-1	64°18'50" 141°09'10"	T	Small	Hornblendite	Hornblende (blue-green) 80%; apatite < 1%	Epidote 15%; hematite 1%; calcite 1%; sphene and rutile 1%	0		Amphibole grains randomly oriented. Many grains have lighter blue-green rims. Epidote occurs in and near veinlets	Garnetiferous quartz-biotite gneiss	Dike	Cut by granitic stringers
74	65AFr655	A-1	64°00'00" 141°15'30"	T	Small	Hornblendite	Hornblende (colorless, green, pale blue-green) 80%	Actinolite 5%; chlorite 5%; albite 2%; epidote 12%; sphene <1%		Green hornblende altered to chlorite in places	Coarse-grained, fairly equigranular with grains ±0.75 mm across. Hornblende crystals up to 20 mm long	Marble	Vertical dike or intrusive	
75	70AFr970	A-3	64°00'47" 142°18'15"	T	Small	Phlogopite olivine pyroxenite	Clinopyroxene (augite) 75%; olivine 7%; phlogopite 12%; apatite 1%	Hornblende (green) 1%; actinolite 1%; chlorite 1%; magnetite 2%	0		Fairly coarse-grained, equigranular, grains 2-3 mm diameter	Hornblende-biotite granodiorite	Dike	
76	70AFr847	A-3	64°12'10" 142°[illegible]'20"		Small	Hornblendite	Hornblende		0		Large hornblende crystals up to 50 mm long	Quartz-mica schist, hornblende gneiss	Dike? May be slightly foliated	
77	70AFr852	A-3	64°12'35" 142°07'10"		Small	Hornblendite	Hornblende		0		Coarse hornblende crystals	Quartzite	Dike	
78	70AFr855	A-3	64°14'05" 142°07'03"	S,T	Small	Hornblendite	Hornblende (green to brown) 85%; biotite 2%; apatite < 1%	Albite(?) < 4%; chlorite < 4%; pyrite < 1%; magnetite < 1%; sphene < 1%; calcite < 1%; epidote < 1%	0		Coarse-grained, massive, no foliation. Stubby hornblende grains are equigranular, abut 12 mm long	Marble and quartz-mica schist		
80	70AFr815	B-3	64°18'02" 142°21'25"		Small	Biotite pyroxenite					Coarse-grained	Quartz-mica schist and marble	Dike; infolded in schist	
82	69AFr306	B-4	64°25'25" 142°58'20"		Small	Pyroxenite			0		Massive	Quartz-mica schist, marble	Dike	
83	68AFr2375 68AFr2376	B-5	64°25'45" 143°01'00"	T	Small	Biotite hornblendite	Hornblende-major; biotite-minor		0		Massive large hornblende crystals; grades into finer-grained hornblendite	Quartz-biotite schist	Foliated	
92	70AFr3108	B-5	64°22'40" 143°09'30"			Hornblende(?) pyroxenite			0			Quartzite		
93	69AFr223	B-5	64°23'00" 143°09'30"	S,T	Small	Hornblende pyroxenite	Diopside 72%; hornblende 20%; apatite 3%	Zoisite 3%; sphene < 1%; magnetite-hematite <1%	0		Coarse-grained	Marble and quartzite	Dike, later than marble and quartzite	
94	70AFr3106	B-5	64°23'00" 143°10'30"	S	Small	Biotite-hornblende pyroxenite			0		Coarse-grained	Quartz-mica schist and marble		
95	70AFr4041 69AWr149	B-5	64°25'30" 143°28'15"	S,T,X	Small	Biotite hornblendite	Hornblende (blue-green) 45%; biotite 5%	Chlorite 10%; epidote 10%; albite 5%; rutile-sphene 3%; muscovite 3%			Biotite grains are ±7 mm long and partially altered to chlorite in slivers parallel to cleavage. Hornblendite is fairly equigranular about 0.75 mm diameter	Quartz-mica schist and quartzite	Dike	

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

581
73-140
OPEN FILE REPORT
SHEET 4 OF 4

TABLE 2.--SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSES OF ULTRAMAFIC ROCKS OF THE EAGLE QUADRANGLE, ALASKA

Analysts: R. L. Miller, A. L. Meier, H. D. King, R. B. Tripp, J. J. Curry, Elizabeth Martinez, R. T. Hopkins, J. C. Hamilton, W. W. Vaugin, M. S. Rickard, W. L. Campbell, T. A. Roemer, D. G. Murray, V. Shaw, T. Huffman, L. B. Kelley, W. D. Goss, and Joseph Hoffry.

Analyses, unless noted, are semiquantitative spectrographic and are reported in the series 0.1, 0.15, 0.2, 0.3, 0.5, 0.7, 1.0, 1.5, and so on, or by the following symbols: N = not detected; L = detected but below limit of determination; - = not looked for; > = greater than.

GROUP I

Map No.	Field No.	Ag	As	Au 1/	B	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Mn	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V	W	Y	Zn	Zr	Fe	Mg	Ca	Ti
		Parts per million																										Percent			
1	70AWr	42A	N	N	N	30	30	N	N	N	300	>5000	30	N	L	150	10	5000	N	N	15	N	L	30	N	L	N	L	10	>10	L	.005
10	71AFr	209C	N	N	N	L	70	N	N	N	70	700	150	N	L	1000	L	500	L	N	15	N	150	70	N	N	N	L	5	7	7	.15
11	68ACs	181	L	N	N	70	N	N	N	N	300	>5000	70	L	N	2000	L	5000	10	N	20	N	L	100	N	L	N	L	20	>10	.07	.15
12		183	N	N	N	30	L	N	N	N	70	200	L	N	N	1500	L	50	L	N	50	N	150	500	N	30	L	70	20	5	7	>1
		184	N	N	N	10	300	N	N	N	150	3000	15	L	N	1500	10	3000	L	N	15	N	L	50	N	L	L	L	15	>10	.3	.03
		185A	L	100	.2	L	300	N	N	N	100	1500	50	L	N	300	L	1500	10	N	7	N	L	30	N	L	L	L	7	10	1	.02
		185C	.5	1500	.4	N	2000	N	N	N	70	1500	15	L	N	100	L	1000	10	N	10	N	300	30	N	L	N	30	3	10	7	.03
		185E	L	N	.02	70	1500	N	N	N	200	5000	30	L	N	500	L	5000	L	N	15	N	L	30	N	L	N	L	20	>10	.1	.007
		393B	N	N	N	20	150	N	N	N	70	2000	100	L	N	2000	L	300	L	N	50	N	150	200	N	L	N	L	15	>10	20	.3
15	GBAFr	3007	N	N	N	30	700	1	N	N	15	150	200	30	N	100	20	70	15	N	50	N	150	300	N	30	N	1000	15	3	3	>1
		3008	L	N	N	L	100	N	N	N	70	500	300	L	N	1500	10	100	L	N	50	N	700	300	N	30	N	70	15	7	20	>1
16	GBACs	177	N	N	N	30	L	L	N	N	100	3000	30	L	N	500	L	2000	L	N	10	N	L	30	N	L	N	L	10	>10	.5	.02
21	GBAFr	416	N	N	N	200	150	L	N	N	200	5000	20	L	N	1500	15	3000	L	N	15	N	L	70	N	L	L	L	15	>10	.3	.03
	GBACs	319	N	N	N	200	150	L	N	N	200	5000	20	L	N	1500	15	3000	L	N	15	N	L	70	N	L	L	L	15	>10	.3	.03
22	GBAFr	335	L	N	N	70	L	L	N	N	150	5000	50	L	N	100	L	3000	10	N	5	N	L	50	N	L	N	L	10	>10	.1	.02
23	GBACs	424	L	N	.04	10	L	N	N	N	200	5000	10	L	N	1000	L	5000	L	N	15	N	L	100	N	L	N	L	>20	>10	L	.02
29	70AFr	122A	N	N	N	L	150	1.5	N	N	30	1500	10	N	L	500	10	700	10	N	L	N	1000	30	N	N	N	L	7	10	7	.015
32		66	N	N	N	1	L	N	N	N	150	1000	10	N	L	1500	10	300	L	N	10	N	300	100	N	15	L	70	15	10	15	>1
33		31	N	N	N	10	150	N	N	N	300	5000	10	N	L	3000	L	3000	L	N	20	N	N	150	N	N	N	N	10	>10	L	.015
37		16	N	N	N	20	L	N	N	N	300	5000	10	N	N	500	L	3000	L	N	15	N	N	70	N	N	N	L	10	>10	L	.02
41	70AFr	2213B	N	N	N	L	100	L	N	N	200	>5000	10	N	L	3000	10	>5000	20	N	20	N	100	150	N	L	N	L	15	>10	>20	.03
		2273C	N	N	N	15	70	N	N	N	300	>5000	100	N	L	1500	10	5000	15	N	20	N	L	100	N	L	N	L	15	>10	2	.03
49	GBAFr	2166	N	N	N	10	L	L	N	N	100	1500	1	L	N	100	L	1500	L	N	5	N	100	30	N	N	N	N	7	7	1.5	.01
50	TIAFr	283	N	N	N	50	L	N	N	N	150	1500	10	N	L	1500	L	2000	L	N	20	N	N	50	N	N	N	N	10	>10	.3	.07
51	69AFr	442	N	N	N	10	200	N	N	N	10	150	L	N	L	1500	10	100	N	N	50	N	100	300	N	20	L	70	10	7	5	.7
56	GBACs	109	N	N	N	30	L	L	N	N	150	1500	30	L	N	1000	L	1000	10	N	20	N	L	70	N	L	L	L	10	>10	L	.03
60	70AFr	2332D	N	N	N	10	100	N	N	N	150	10	300	N	5	3000	10	150	L	N	10	N	L	1500	N	20	N	L	20	7	15	>1
62	TIAFr	419	N	N	N	L	100	1	N	N	100	1500	150	50	7	2000	15	500	L	N	30	N	1500	300	N	30	N	300	15	7	10	>1
64	70AFr	2259	N	N	N	20	L	N	N	N	300	5000	100	N	L	1500	10	5000	L	N	15	N	N	30	N	L	N	L	15	>10	L	.03
68	GTAFr	472/	L	L	N	L	L	1	N	N	1	2000	15	L	L	500	1	1000	L	N	L	L	300	L	L	L	L	3	L	2	L
96	70AFr	4023A	N	N	N	10	50	N	N	N	200	5000	10	N	L	1000	10	3000	L	N	15	N	L	70	N	N	N	L	10	>10	.3	.007

GROUP IIA

Map No.	Field No.	Ag	As	Au 1/	B	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Mn	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V	W	Y	Zn	Zr	Fe	Mg	Ca	Ti
		Parts per million																										Percent			
3	70AWr	31	N	N	N	30	30	N	N	N	300	>5000	50	N	L	1500	10	5000	N	N	15	N	L	50	N	L	N	L	10	>10	1	.003
	70AFr	241	N	N	N	15	20	N	N	N	200	>5000	30	N	L	1500	10	2000	N	N	15	N	L	50	N	L	N	L	15	>10	.7	.015
		243	N	N	N	50	20	N	N	N	200	>5000	70	N	N	1000	10	5000	N	N	20	N	L	70	N	L	N	L	10	>10	1	.015
		2378D	N	N	N	20	20	N	N	N	200	>5000	70	N	N	1500	L	5000	N	N	15	N	L	50	N	N	N	N	15	>10	1.5	.02
		2379	N	N	N	50	20	N	N	N	150	3000	100	N	N	700	L	2000	N	N	15	N	L	50	N	N	N	N	7	>10	.3	.01
	TIAFr	214A	N	N	N	L	10	L	N	N	10	500	150	N	L	2000	L	150	L	N	10	N	150	500	N	50	N	100	15	7	7	1
		218	N	N	N	L	L	N	N	N	200	3000	70	N	L	1000	L	3000	N	N	30	N	N	70	N	N	N	N	10	>10	.05	.015
		220	N	N	N	N	150	N	N	N	50	100	150	N	L	2000	L	150	10	N	10	N	1500	300	N	30	N	70	10	7	5	7
		222A	N	N	N	10	700	L	N	N	50	150	150	N	L	2000	L	100	15	N	50	N	300	500	N	30	N	100	10	3	5	.7
	70AFr	232	N	N	N	10	20	N	N	N	300	5000	70	N	L	1500	10	5000	N	N	15	N	L	50	N	L	N	L	15	>10	1.5	.005
	71AWr	34	N	N	N	L	200	N	N	N	50	300	10	N	L	1500	L	150	N	N	50	N	150	300	N	20	N	100	7	5	3	.7
		36D	N	N	N	10	L	N	N	N	100	3000	5	N	N	700	L	2000	N	N	15	N	N	30	N	N	N	N	7	>10	.2	.03
		440	N	N	N	L	10	N	N	N	50	150	150	N	N	1500	L	70	N	N	50	N	200	300	N	30	N	70	7	5	7	.7
		126	N	N	N	L	L	N	N	N	100	2000	50	N	L	1000	L	2000	N	N	15	N	N	50	N	N	N	N	10	10	L	.007
26	GBAFr	1057	N	N	N	20	L	N	N	N	150	5000	7	L	N	1000	L	5000	L	N	30	N	L	70	N	10	L	N	10	>10	.2	.03
		1059	N	N	N	20	L	N	N	N	200	5000	15	L	N	1000	L	5000	L	N	15	N	N	50	N	N	N	N	15	>10	1.5	.02
	Limits of determination		.5	200	.02	10	5	1	10	20	5	5	5	20	5	10	10	2	10	100	5	10	50	10	50	10	200	20	.05	.02	.05	.001

1/ Atomic absorption

2/ Ni = < 0.18%, Cr = 0.25% by total digestion and atomic absorption; Pt = < 0.010 ppm, Pd = < 0.004 ppm, Rh = < 0.005 ppm by fire assay and quantitative spectrographic analysis.

3/ Ni = 0.16%, Cr = 0.28% by total digestion and atomic absorption; Pt = < 0.010 ppm, Pd = 0.007 ppm, and Rh = < 0.005 ppm by fire assay and quantitative spectrographic analysis.

GROUP IIB

Map No.	Field No.	Ag	As	Au 1/	B	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Mn	Nb	Hf	Pb	Sb	Sc	Sn	Sr	V	W	Y	Zn	Zr	Fe	Mg	Ca	Ti
		Parts per million																										Percent			
2	70AFr	243B	N	N	N	20	20	N	N	N	300	>5000	100	N	L	1500	10	5000	N	N	15	N	L	70	N	N	N	L	15	>10	L	.015
4	TIAWr	29	N	N	N	L	L	N	N	N	150	2000	7	N	L	1000	10	3000	N	N	10	N	N	20	N	N	N	N	1	>10	.07	.02
5		124B	N	N	N	L	100	N	N	N	10	500	10	N	N	1500	L	300	N	N	10	N	150	300	N	10	N	N	1	7	.15	.2
		125	N	N	N	200	3000	3	N	N	L	50	70	100	L	1500	15	20	20	N	20	N	100	150	N	30	200	150	7	1.5	3	.3
6	TIAFr	161	N	N	N	20	L	N	N	N	150	5000	50	N	L	1000	L	5000	N	N	30	N	N	50	N	N	N	L	10	>10	.1	.07
18	GBACs	301	N	N	N	10	100	N	N	N	10	200	50	L	N	2000	L	70	L	N	100	N	100	50	N	10	N	N	15	L	N	.15	5
57	G7AFr	543/	L	200	N	15	400	L	N	N	300	2000	7	L	N	500	L	7	L	N	7	N	L	20	N	L	L	L	3	1	L	L
79	70AFr	913	N	N	N	20	30	N	N	N	300	1000	30	N	L	1500	10	5000	L	N	20	N	L	100	N	L	N	N	15	>10	7	.015
84		2352B	N	N	N	30	20	N	N	N	150	300	15	N	L	700	L	2000	L	N	5	N	L	100	N	N	N	N	7	>10	L	.005
		2352C	N	N	N	15	20	N	N	N	70	100	150	N	L	3000	L	150	L	N	50	N	500	500	N	10	L	200	15	7	10	>1
87		2355	N	N	N	30	20	N	N	N	200	5000	10	N	L	1000	L	5000	N	N	10	N	L	50	N	N	N	N	10	>10	1	.015
97	G9AFr	27A	N	N	N	10	200	N	N	N	N	L	L	L	N	10	L	30	N	N	N	N	L	15	N	N	L	L	3	3	1	.03
		27B	N	N	N	10	L	N	N	N	70	5000	5	1	N	100	L	5000	N	N	10	N	70	N	N	N	N	10	>10	3	.07
		27C	N	N	N	L	L	N	N	N	150	5000	10	1	N	100	L	5000	N	N	10	N	20	N	N	N	N	15	>10	5	.03

GROUP IIIA

Map No.	Field No.	Ag	As	Au 1/	B	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Mn	Nb	Hf	Pb	Sb	Sc	Sn	Sr	V	W	Y	Zn	Zr	Fe	Mg	Ca	Ti
		Parts per million																										Percent			
81	TCAFr	805A	1.5	N	N	10	150	N	N	N	200	>5000	1000	N	L	2000	10	>5000	10	N	100	N	100	300	N	15	N	L	15	10	20	.3
		805B	1	N	N	10	30	N	N	N	300	>5000	1500	N	L	3000	10	3000	N	N	100	N	100	300	N	15	N	L	15	10	15	.2
	TIAFr	810C	N	N	N	L	150	L	N	N	10	70	70	N	L	1000	L	30	10	N	100	N	100	50	N	20	N	20	15	7	15	.5
		810E	N	N	N	L	200	L	N	N	70	150	100	1	L	1500	L	50	10	N	70	N	100	50	N	30	N	L	15	5	5	.7
		8706	N	N	N	L	100	N	N	N	10	70	100	1	L	1500	L	100	N	N	10	N	100	300	N	10	N	L	10	7	7	.15
89	70AFr	2405E	N	N	N	30	20	N	N	N	30	150	100	N	L	5000	10	50	N	N	>100	N	L	1000	N	30	L	20	20	10	15	>1
	G9AWr	150A	N	N	N	L	L	N	N	N	50	300	20	N	L	2000	L	30	N	N	30	N	L	150	N	10	L	N	15	10	5	.2
		150B	N	N	N	20	100	N	N	N	10	100	10	N	L	1000	L	50	L	N	70	N	L	500	N	10	L	N	>20	7	7	>1
	G9AFr	221A	N	N	N	L	L	N	N	N	10	100	50	N	L	1500	10	70	N	N	50	N	L	200	N	10	L	N	10	10	5	.2
		221B	N	N	N	L	100	N	N	N	50	100	15	N	N	1000	10	30	N	N	50	N	L	200	N	15	L	L	15	7	3	.3

GROUP IIIB

Map No.	Field No.	Ag	As	Au 1/	B	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Mn	Nb	Hf	Pb	Sb	Sc	Sn	Sr	V	W	Y	Zn	Zr	Fe	Mg	Ca	Ti
		Parts per million																										Percent			
90	G9AFr	841	N	N	N	N	150	1	N	N	50	100	10	N	N	500	10	100	N	N	50	N	200	150	N	10	N	30	5	5	10	.2
	70AFr	2552B	N	N	N	N	3000	L	N	N	N	L	L	N	N	100	L	30	20	N	N	N	1500	N	L	N	150	7	15	15	.15
		2552D	N	N	N	L	10	N	N	N	70	500	50	N	L	1500	10	150	N	N	3100	N	200	500	N	L	N	L	15	>10	320	.3
		2553	N	N	N	N	300	1	N	N	N	L	20	N	L	100	L	L	30	N	N	N	300	30	N	N	N	10	1.5	.01	.15	.015
	TIAFr	300B	N	N	N	L	100	N	N	N	10	50	200	N	L	1500	L	30	N	N	100	N	300	100	N	20	N	30	20	7	5	1
		613C	N	N	N	L	300	L	L	N	10	15	300	N	L	2000	N	10	15	N	70	N	300	100	N	15	N	20	20	7	7	7
91	70AFr	2533E	N	N	N	10	150	N	N	N	150	500	300	N	L	1500	15	150	N	N	>100	N	150	300	N	10	N	20	15	>10	20	.3
		316B	N	N	N	10	100	L	N	N	30	100	150	N	L	2000	10	30	N	N	100	N	300	200	N	15	N	30	10	10	20	.3
		316E	N	N	N	10	70	N	N	N	30	100	10	N	L	3000	L	100	N	N	>100	N	300	700	N	15	N	50	15	>10	>20	.7
		317	N	N	N	L	150	N	N	N	50	100	100	N	N	1500	L	150	L	N	>100	N	300	200	N	10	N	20	10	>10	20	.2

		.5	200	.02	10	5	1	10	20	5	5	20	5	10	10	2	10	100	5	10	50	10	50	10	200	20	.05	.02	.05	.001
Limits of determination																														

1/ Atomic absorption

TABLE 3.--PLATINUM GROUP ANALYSES OF ULTRAMAFIC ROCKS OF THE EAGLE QUADRANGLE, ALASKA

Analysts: R. P. Carlson, E. F. Cooley, K. J. Curry

Analyses are fire assay and spectrographic and are reported in parts per million or the following symbols: N = not detected; L = detected but below limit of determination.

Limits of determination in parts per million are:

	Pt	Pd	Rh	Ru	Ir
15 gram sample:	0.005	0.002	0.002	0.100	0.050
7.5 gram sample:	0.010	0.004	0.004	0.200	0.100

Rhodium, ruthenium and iridium were looked for in all samples but not detected.

Group I

Map No.	Field No.	Pt ppm	Pd ppm
10	71 AFr 209 C	N	N
11	68 ACs 181 A	N	N
12	68 ACs 183	N	N
	184	L(0.005)	L(0.002)
	185 A	N	N
	185 C	N	0.003
	185 E	N	0.007
	393 B	N	N
15	68 AFr 3007	N	N
	3008	N	0.005
16	68 ACs 177	N	N
21	319	N	N
22	68 AFr 335	N	N
23	68 ACs 424	N	L(0.004)
29	70 AFr 122 A	N	N
32	70 AFr 66	N	N
37	16	N	0.007
41	2213 B	N	N
	2273 C	0.010	N
50	71 AFr 283	N	N
50	71 AFr 283 C	N	N
60	70 AFr 2332 D	N	N
64	2259	N	0.004
96	4023 A	N	N

Group II A

Map No.	Field No.	Pt ppm	Pd ppm
3	70 AWr 31	L(0.010)	N
	70 AFr 241	0.010	N
	243	N	L(0.004)
	2378 D	N	L(0.004)
	232	N	L(0.004)
	71 AFr 214 A	N	N
	218	N	0.010
	220	N	N
	222 A	N	0.005
	71 AWr 34	N	N
	71 AWr 36 D	N	0.007
	126	0.005	N
26	68 AFr 1057	L(0.010)	L(0.004)
	1059	0.010	L(0.004)
4	71 AWr 29	N	N
	29 B	N	N
5	124 B	N	N
	125	N	0.005
6	71 AFr 161	0.010	0.015
18	68 ACs 301	N	N
97	69 AFr 27 A	N	N
	27 B	N	0.007
	27 C	0.005	0.015

Group III A

Map No.	Field No.	Pt ppm	Pd ppm
81	71 AFr 870 C	N	N
	870 D	N	N
	870 G	N	N
89	69 AFr 221 A	N	N
	221 B	N	N
	69 AWr 150 A	N	N
	150 B	N	N
	70 AFr 2405 E	N	N
90	69 AFr 841	L(0.005)	0.03
	70 AFr 2552 B	N	N
	70 AFr 2552 D	0.030	030
	2553	N	N
	71 AFr 300 B	N	N
	613 C	N	N
91	70 AFr 316 B	N	N
	316 E	N	N
	317	0.020	010
	2533 E	0.020	010

Group II B

Map No.	Field No.	Pt ppm	Pd ppm
4	71 AWr 29	N	N
	29 B	N	N
5	124 B	N	N
	125	N	0.005
6	71 AFr 161	0.010	0.015
18	68 ACs 301	N	N
97	69 AFr 27 A	N	N
	27 B	N	0.007
	27 C	0.005	0.015

Group III B

Map No.	Field No.	Pt ppm	Pd ppm
52	69 AFr 748 A	N	N
	748 B 1/	0.300	100
54	2051 A	N	N
	2051 B	N	N
	2051 C	N	N
67	70 AFr 170	N	1
78	855	N	1
95	69 AWr 149	N	1

1/ Average values, 4 runs; 0.002 ppm Rh