CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES

Geological Survey of Canada

OPEN FILE 116 SUPPLEMENT

KAM KOTIA - JAMELAND PILOT PROJECT

ACCOMPANYING NOTES

R. G. Skinner

OTTAWA
1973

OPEN FILE 116 SUPPLEMENT

Open File 116, released November 6, 1972, included raw geochemical data from the 1971-72 winter works overburden drilling program in the Abitibi region. Only data from reconnaissance projects were released. Data from the Kam Kotia-Jameland (KJ) pilot project are in this supplementary release.

The user is referred to an earlier report entitled: Drift Prospecting in the Abitibi Clay Belt; Overburden Drilling Program - Methods and Costs (O.F. 116) for a description of drilling, sampling, and sample-processing techniques. Figure 3 in that report is a flow-chart of laboratory procedures and indicates that the F-Fraction (10-60 mesh) was one of the fractions stored. However, some F-Fraction samples from the KJ project were subjected to heavy mineral separation using Bromoform (S.G.$\simeq$ 2.85). Magnetic grains were removed and the remainder pulverized and analyzed. The following holes have F-Fraction geochemical logs and the user is advised to compare them with other fractions from the same holes: KJ - 22, 25, 30, 31, 33 and 60.

The Kam Kotia-Jameland pilot project was conducted to test overburden drilling methods, sampling and sample processing techniques. The project comprises two phases:

1. The Jameland Grid (Map #2)

   Twenty one holes were drilled at maximum 100-foot centres in a grid over and down-ice from the sulphide-bearing 'Dominion Gulf Zone' which strikes NW-SE beneath the Jameland Mine shaft. The drilling revealed:

   (a) an anomalous Cu-Zn zone in the bedrock, coincident with known mineralization,

   (b) high Cu-Zn values in till on the bedrock but displaced down-ice from the Cu-Zn-rich zone in bedrock,

(c) high Cu-Zn values at various levels in the till section, that if interpolated from hole to hole, could represent former Cu-Zn-rich shear planes or debris bands in the glacier.

2. The Kam Kotia Grid (Map #1)

Ninety two holes including the Jameland Grid were drilled in a 10 square mile area down-ice from the Kam Kotia ore body. Anomalous Cu-Zn values, presumably from the ore body, can be detected up to 2½ miles down-ice from the mine. By using hand and/or computer contouring techniques, an indicator fan can be delineated. This is achieved by averaging the E-Fraction values from till (sediment type #1 on the geochemical logs) and sand and/or gravel (#3 - in most cases probably ablation till or a sandy lodgement till with little matrix) or simply by plotting Cu-Zn values of the lowest overburden sample (E or H Fractions) in each hole.

(KJ) KAMISKOTIA-JAMELAND PROJECT (JAMIESON AND ROBB TOWNSHIPS, ONTARIO)

PETROGRAPHIC DESCRIPTIONS OF BEDROCK FROM THIN-SECTIONS

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-01-04	sericite-chlorite schist	opaques feldspar/quartz saussurite/sericite chlorite carbonate	5% 45% 25% 15% 10%	moderately schistose, fine grained highly altered dacitic rock; probably volcanic.
KJ-02-03	chlorite-sericite schist	Opaques chlorite saussurite/sericite feldspar/quartz	10% 40% 25% 25%	strong schistosity; fine grained , opaques mainly pyrite; a highly altered andesitic rock, probably volcanic.
KJ-03-06	Saussurite-chlorite schist	opaques saussurite sericite chlorite plagioclase carbonate	5% 35% 10% 30% 10% 10%	no preferred orientation of component minerals in this section, a featureless mass of component minerals; a fine grained, highly altered andesitic rock, probably volcanic.
KJ-03-07	saussurite-chlorite schist	As KJ-03-06		as KJ-03-06
KJ-04-05 (1)	chlorite-sericite schist	opaques chlorite plagioclase saussurite/sericite	5% 30% 50% 15%	plagioclase as small, heavily sericitized laths occurring in a weakly schistose mass of alteration minerals; fine-grained, after andesitic rock, probably volcanic.
(2) (3)	Pyroxene Gabbro or basalt	opaques pyroxene plagioclase chlorite carbonate	5% 50% 30% 10% 5%	pyroxene crystals badly broken up and highly altered, difficult to determine original grain, probably rather fine; rock is either a fine-grained gabbro or a basaltic flow.
KJ-05-18	Porphyritic Meta-andesite	opaques chlorite feldspar/quartz sericite/saussurite carbonate actinolite	10% 30% 35% 15% 5% 5%	a few large, tabular, albite-twinned plagioclase phenocrysts in a finer, moderately schistose groundmass of remaining minerals.
KJ-06-09	Meta-andesite	Same as KJ-05-18		As KJ-05 but rock is non-porphyritic.

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-07-14	meta-diorite	opaques	5%	medium grained, moderately altered intrusive; crystals everywhere as anhedral masses; some plagioclase crystals highly poikilitic.
		chlorite	15%	
		sericite	5%	
		actinolite	45%	
		plagioclase	15%	
		saussurite	15%	
		minor quartz		
KJ-07-15	meta-diorite	as KJ-07-14		as KJ-07-14
KJ-08-21	sericite-chlorite schist	opaques	3%	a strongly schistose mass of alteration minerals containing patches and lenses of feldspar and probably some quartz; fine grained after andesitic rock; probably volcanic.
		chlorite	35%	
		saussurite/sericite	40%	
		feldspar/quartz	20%	
KJ-09-18 (1)	meta-andesite	plagioclase	55%	rock not as highly altered as others in area; plagioclase often as small, albite twinned laths and as poikilitic anhedra, no preferred orientations in this section; fine grained.
		actinolite	20%	
		chlorite	15%	
		saussurite/sericite	10%	
		minor opaques		
(2)	meta-andesite	plagioclase	35%	basically similar to KJ-09-18 (1), contains more brownish, semi-opaque saussurite; amphibole as ragged masses; no preferred orientations; fine grained.
		actinolite	25%	
		saussurite/sericite	25%	
		chlorite	15%	
		minor opaques		
KJ-10-08 KJ-11-08	diorite	opaques	5%	coarse grained, moderately altered intrusive; opaque is mainly sulphide; much fine, high relief epidote group; cleavage traces of anhedral actinolite crystals often bent and wavy as a result of deformation.
		actinolite	45%	
		plagioclase	30%	
		saussurite/sericite	10%	
		chlorite	5%	
		epidote	5%	
KJ-12-04	chlorite-saussurite schist	opaques	2%	strong schistosity, very fine quartz/feldspar "groundmass" containing masses of alteration minerals; large percent carbonate; fine grained; after andesitic rock, probably volcanic.
		chlorite	25%	
		actinolite	5%	
		saussurite/sericite	25%	
		feldspar/quartz	25%	
		carbonate	20%	

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-13-06	porphyritic meta-dacite	chlorite saussurite/sericite quartz-feldspar phenocrysts quartz-feldspar groundmass	15% 10% 10% 65%	strongly porphyritic rock; large euhedral to subhedral crystals of quartz/feldspar in fine groundmass of remaining minerals; flow textures obvious around larger grains; some inclusion-rich aureoles around larger grains.
KJ-14-12	chlorite-saussurite schist	chlorite saussurite/sericite actinolite feldspar/quartz	30% 25% 15% 30%	a featureless matted mass; highly altered; amphibole as ragged remnants; after andesitic rock, probably volcanic.
No bedrock KJ-15 KJ-16 KJ-17				
KJ-18-28	saussurite-chlorite schist	saussurite chlorite feldspar/quartz	45% 25% 30%	moderately schistose, fine grained; a few larger feldspar laths in schistose mass of alteration minerals and fine quartz/feldspar; much saussurite; after andesitic rock, probably volcanic.
KJ-20-17	chlorite schist	opaques chlorite saussurite/clinozoisite sericite feldspar/quartz	5% 50% 10% 10% 25%	strongly schistose; large, elongate masses of deep blue (X-ed nicols) chlorite; much epidote group; highly altered, fine grained, after andesitic rock, probably volcanic.
KJ-21-13	chlorite-saussurite schist	actinolite chlorite saussurite/clinozoisite sericite feldspar/quartz carbonate	5% 35% 25% 5% 20% 10%	weakly schistose; very small quartz/feldspar grains and patches in mass of alteration minerals; amphibole as ragged longitudinal sections; much epidote group, highly altered, fine grained, after andesitic rock, probably volcanic.
KJ-22				
KJ-23-19	sericite-chlorite schist	saussurite sericite chlorite feldspar/quartz	15% 35% 25% 25%	strongly schistose, highly altered, anhedral grains and masses quartz/feldspar in schistose mass of alteration minerals; fine grained, after andesitic, probably volcanic.

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-24-26 (1)	porphyritic meta-andesite	opaques	5%	strongly porphyritic; larger feldspar and quartz phenocrysts in a fine groundmass of alteration minerals and quartz/feldspar; opaques include 1% of light brown, translucent mineral.
		chlorite	20%	
		sericite	10%	
		feldspar/quartz phenocrysts	10%	
		feldspar/quartz groundmass	55%	
(2)	chlorite-saussurite schist	opaques	1%	some larger quartz/feldspar grains may be phenocryst remnants; weak schistosity; highly altered; generally fine grained; much epidote group; after andesitic rock, probably volcanic.
		chlorite	45%	
		saussurite/clinozoisite	25%	
		feldspar/quartz	30%	
KJ-25-06 (1)	meta-dacite	opaques	3%	fine grained, moderately schistose; quartz/feldspar as small, rounded grains in mosaic pattern; much carbonate as large blebs and streaks along foliation.
		chlorite	10%	
		quartz-feldspar	60%	
		carbonate	25%	
(2)	chlorite schist	opaques	5%	fine grained, highly schistose mass of chlorite containing lenses and disseminated grains of quartz/feldspar, after andesitic rock, probably volcanic.
		chlorite	65%	
		quartz/feldspar	25%	
		carbonate	5%	
KJ-26-18 (1)	chlorite-saussurite schist	opaques	2%	strongly schistose mass of alteration minerals and anhedral quartz/feldspar; fine grained, highly altered;after andesitic rock, probably volcanic.
		chlorite	35%	
		saussurite-sericite	15%	
		feldspar/quartz	40%	
		carbonate	10%	
(2)	diorite	actinolite	40%	medium grained, moderately altered intrusive; amphibole as ragged anhedra; plagioclase often albite-twinned and is usually inclusion-rich; incipient alteration of actinolite to chlorite.
		plagioclase	55%	
		saussurite	2%	
		minor quartz?		
		minor chlorite		
KJ-27-15 (1)	chlorite-saussurite schist	opaques	5%	very fine-grained; quartz/feldspar anhedra in strongly schistose mass of alteration minerals; after andesitic rock, probably volcanic.
		chlorite	20%	
		saussurite-sericite	10%	
		quartz/feldspar	35%	
		carbonate	30%	

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
(2)	quartz-sericite schist	Opaques	15%	strongly schistose, fine grained, quartz/ feldspar as small, rounded anhedra, sometimes elongate; sericite often as discrete fibrous mass and as disseminations of small shreds; after rhyolitic rock, probably volcanic.
		chlorite	3%	
		quartz/feldspar	40%	
		sericite	25%	
		carbonate	15%	
KJ-28-14 (1)	chlorite-saussurite schist	opaques	2%	strongly schistose, fine-grained; schistose mass of alteration minerals containing anhedral grains and patches of quartz/ feldspar; much clinozoisite; after andesitic rock, probably volcanic.
		saussurite-sericite	10%	
		chlorite	40%	
		quartz/feldspar	25%	
		clinozoisite	5%	
		carbonate	3%	
		actinolite	10%	
(2)	chlorite-saussurite schist	Same as above		as above
KJ-29-22 (1)	chlorite-saussurite schist	opaques	3%	as KJ-28-14
		chlorite	50%	
		saussurite/sericite	15%	
		actinolite	5%	
		quartz/feldspar	25%	
		clinozoisite	2%	
(2)	chlorite-saussurite schist	Same as above		as above
KJ-30-23 (1)	chlorite-saussurite schist	opaques	3%	as KJ-28-14 but with minor epidote group.
		saussurite/sericite	20%	
		chlorite	35%	
		feldspar/quartz	40%	
(2)	chlorite-saussurite schist	Same as above		as above
KJ-31-26 (1)	porphyritic-metadacite	opaques	2%	strongly porphyritic; large phenocrysts in finer groundmass with mortar texture of small, rounded quartz/feldspar anhedra; obvious flowage around large grains; some quartz/ feldspar or feldspar/feldspar intergrowths around edges of phenocrysts and in ground-mass; rock has moderate schistosity.
		chlorite	15%	
		quartz/feldspar phenocrysts	10%	
		sericite/saussurite	10%	
		quartz/feldspar groundmass	60%	
		carbonate	3%	
		clinozoisite		

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
(2)	porphyritic meta-dacite	Same as above		as above
KJ-32-21 (1)	meta-dacite	opaques chlorite saussurite/sericite quartz/feldspar	5% 15% 20% 60%	fine grained, weakly schistose, featureless mass of component minerals.
(2)	meta-dacite	Same as above		as above
KJ-32-08	meta-diorite	actinolite saussurite/sericite feldspar/quartz carbonate	35% 15% 40% 10%	a highly altered rock; remnant medium grain; amphibole as larger, ragged masses and anhedra; plagioclase as heavily altered anhedral masses.
KJ-33-19 (1)	meta-rhyolite	quartz/feldspar carbonate sericite epidite/clinozoisite	80% 10% 5% 5%	quartz/feldspar either as large anhedral masses, often highly poikilitic, or as rounded, interlocking grains, often fairly large and very fresh; rock may be porphyritic and/or intrusive; overall medium to fine grained.
(2)	meta-rhyolite	Same as above		as above
KJ-34-06 (1)	meta-rhyolite	quartz/feldspar sericite/clinozoisite carbonate elbaite	70% 20% 7% 3%	very similar to KJ-33-19; quartz/feldspar patches of small, rounded grains or as large, interlocking grains which may represent a veinlet; tourmaline associated mainly with large grains and appears as vivid, green, segmented crystals.
(2)	chlorite-sericite schist	Same as above		as above
KJ-36-16 (1)	chlorite-sericite schist	sericite/saussurite chlorite quartz/feldspar	25% 35% 40%	moderately schistose, fine grained; quartz/feldspar as grains and patches in mass of alteration minerals.

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
(2)	chlorite-sericite schist	Same as above		as above
KJ-37-23 (1)	meta-dacite	opaques	2%	weakly schistose; fine grained mass of small quartz/feldspar anhedra often heavily sericitized and inclusion-rich containing alteration minerals disseminated throughout as elongate lenses and shreds.
		chlorite	20%	
		saussurite/sericite	10%	
		feldspar/quartz	60%	
		carbonate	5%	
		clinozoisite	3%	
(2)	meta-dacite	Same as above		as above
KJ-38-17 (1)	meta-dacite	opaques	10%	opaques mainly coarse pyrite; rest as KJ-37-23
		chlorite	15%	
		sericite	20%	
		saussurite	5%	
		carbonate	5%	
		quartz/feldspar	45%	
(2)	meta-dacite	Same as above		as above
KJ-39-09 (1)	chlorite-sericite schist	opaques	1%	fine grained, strongly schistose; small quartz/feldspar anhedra in fibrous mat of alteration minerals; highly altered, after andesitic rock, probably volcanic.
		saussurite	15%	
		sericite	25%	
		chlorite	35%	
		quartz/feldspar	25%	
		minor carbonate, clinozoisite		
(2)	chlorite-sericite schist	Same as above		as above
KJ-41-13 (1)	gabbro (diabasic)	opaques	1%	relatively fresh, coarse intrusive; pyroxene is augite and shows local alteration to amphibole; plagioclase mainly as large, twinned subhedra, often dusted with sericite; plagioclase perhaps a labradorite (An_{61} by two Michel-Levy determinations); a dike rock according to geological map of area.
		pyroxene	40%	
		sericite	5%	
		plagioclase	55%	
		minor quartz?		
(2)	gabbro (diabasic)	Same as above		as above

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-42-07 (1)	chlorite schist	opaque chlorite quartz/feldspar	15% 30% 55%	fine grained, strongly schistose; small quartz/feldspar grains in fibrous mass of alteration minerals; much coarse sulphide; after andesitic rock, probably volcanic.
(2)	chlorite schist	Same as above		as above
KJ-43-09 (1)	quartz-sericite chist	opaques sericite saussurite quartz/feldspar carbonate	15% 15% 5% 60% 5%	fine grained, highly deformed rock; small grains quartz/feldspar have been stretched out in a flow deformation; after rhyolite or dacite.
(2)	quartz-sericite schist	Same as above		as above
KJ-43-10 (1)	sericite schist	opaques sericite/saussurite quartz/feldspar carbonate	15% 25% 45% 15%	deformed felsic volcanic as KJ-43-09.
(2)	sericite schist	Same as above		as above
KJ-44-14 (1)	chlorite-saussurite schist	opaques saussurite clinozoisite chlorite sericite feldspar/quartz	10% 15% 10% 25% 10% 30%	fine grained, strongly schistose, highly altered; possibly some amphibole remnants; opaques mainly coarse sulphide; after andesitic rock, probably volcanic.
(2)	chlorite-saussurite schist	Same as above		as above
KJ-45-13	meta-andesite	opaques saussurite/sericite chlorite feldspar/quartz actinolite	5% 20% 5% 55% 15%	fine grained, weakly schistose volcanic; plagioclase as small lathy masses, often albite twinned; probably only minor quartz.

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-46-13	meta-rhyolite	opaques	5%	fine grained, moderately schistose aggregate of rounded quartz/feldspar anhedra, alteration minerals and much carbonate.
		chlorite	10%	
		saussurite	5%	
		sericite	15%	
		feldspar/quartz	45%	
		carbonate	20%	
KJ-47-09	meta-rhyolite	opaques	1%	as KJ-46-13 except total mafic content somewhat lower; identification of chlorite not positive.
		saussurite/sericite	20%	
		chlorite	5%	
		quartz/feldspar	65%	
		carbonate	10%	
KJ-48-07	felsic rock	opaques	1%	about 20% of larger, clear grains and masses of mainly quartz in a finer, moderately schistose mass of quartz/feldspar and alteration minerals; foliation warped around larger quartz masses; probably a rhyolitic volcanic.
		saussurite/sericite	25%	
		quartz/feldspar	55%	
		quartz	20%	
KJ-49-04	felsic rock	opaques	5%	as KJ-48-07 with about 15% of larger quartz grains in fine quartz/feldspar/mainly sericite mass.
		chlorite	5%	
		sericite/saussurite	30%	
		quartz/feldspar	45%	
		quartz	15%	
KJ-50-07	meta-diorite	opaques	5%	a highly altered, coarse intrusive; amphibole as ragged masses mainly but some subhedral basal sections; plagioclase as anhedral masses, usually heavily sericitized.
		actinolite	35%	
		feldspar	40%	
		minor quartz?		
		minor chlorite		
		saussurite/sericite	20%	
KJ-51-39	quartz diorite	opaques	5%	rock might be coarser flow rather than intrusive as grain is rather fine; plagioclase as anhedral masses, often highly poikilitic and sericitized.
		actinolite	10%	
		chlorite	10%	
		feldspar	50%	
		saussurite/sericite	15%	
		clinozoisite	5%	
		quartz	5%	

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-53-07	chlorite schist	opaques chlorite carbonate feldspar/quartz minor sericite	5% 50% 35% 10%	fine grained, highly schistose mass of chlorite containing large masses and crystals carbonate and some small quartz/feldspar anhedra; highly altered; flow textures apparent around carbonate crystals; after basaltic or andesitic rock, probably volcanic.
KJ-56-32	porphyritic meta-andesite	saussurite-clinozoisite actinolite chlorite sericite feldspar/quartz	30% 25% 15% 5% 25%	a few very large feldspar phenocrysts in a fine groundmass of remaining minerals, highly altered.
KJ-57-03	meta-rhyolite	saussurite chlorite feldspar/quartz/sericite	7% 3% 90%	fine grained, weakly schistose mass of small quartz/feldspar grains; feldspar heavily sericitized with sericite totalling about 20%; some clear, fresh quartz grains.
KJ-60-12	porphyritic meta-andesite	chlorite unidentified brown mineral saussurite/clinozoisite feldspar/quartz	20% 5% 5% 70%	a few very large feldspar phenocrysts in finer groundmass of remaining minerals; light brown (plain light) unidentified mineral forms wavy bands enveloping masses of other minerals; no preferred orientations.
KJ-65-11	gabbro (diabasic)	opaques quartz pyroxene plagioclase	3% 3% 40% 50%	very coarse, fresh intrusive; pyroxene is augite and shows local alteration to chlorite; plagioclase occurs as large subhedra, usually heavily dusted with sericite; gabbroic texture; a dike rock according to geological map of area.

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-66-14	carbonatized intermediate rock (meta-diorite?)	opaques saussurite/epidote chlorite feldspar/quartz carbonate	3% 15% 25% 25% 35%	a very highly altered, difficult rock, original nature impossible to determine for certain, vague suggestion based on present composition and what appears to be remnant medium grain is that rock is a highly altered dioritic intrusive; epidote group occurs mainly as masses of small grains often associated with ragged chlorite masses; feldspar is heavily sericitized; component minerals have no preferred orientations
KJ-67-09	porphyritic meta-andesite	opaques amphibole feldspar/quartz saussurite	1% 35% 60% 5%	weakly porphyritic rock; a few large remnants of amphibole phenocrysts in a finer ground mass of amphibole and sericitized feldspar; amphibole is pleochroic in brownish green and appears to be hornblende rather than actinolite
KJ-68-14	chlorite-epidote schist	opaques chlorite epidote/saussurite quartz/feldspar	5% 35% 20% 40%	fine, even grained massive rock; much colourful epidote group as masses of small anhedra; much quartz, mainly as small clear anhedra; veinlet filled with epidote in one slide; probably after an andesitic or dacitic? volcanic
KJ-68-15	meta-dacite	opaques chlorite epidote group feldspar/quartz carbonate	3% 25% 10% 55% 5%	essencially as KJ-68-14 but mafic content somewhat less and grain is slightly coarser; also, at least half of feldspar/quartz is albite-twinned albitic plagioclase; both KJ-68-14 and KJ-68-15 might be finer grained intrusives as moderate schistosity usually noted in the volcanics is absent.

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-69-10	monzonite	opaques	1%	medium-grained aggregate of anhedral quartz/ feldspar crystals and masses; both feldspars often occur as skeletal grains poikilitically enclosing patches of clear quartz/feldspar anhedra which have similar optical orientation different from that of the enclosing grain; rock is massive
		chlorite	4%	
		perthitie	25%	
		plagioclase	30%	
		quartz	40%	
KJ-70-04	meta-gabbro	opaques	1%	medium-grained, massive intrusive; plagioclase as larger, blocky subhedra or smaller laths usually heavily altered to white mica
		pyroxene	25%	
		chlorite	2%	
		plagioclase	70%	
		quartz	2%	
KJ-71-14	monzonite	epidote	3%	very similar to KJ-69-10; medium grained mass of anhedral quartz and feldspar usually complexly inter mixed; rock is massive
		perthite	20-25%	
		plagioclase	20-30%	
		quartz	40-50%	
KJ-72-17	diabasic gabbro	opaques	3%	massive, medium grained, relatively fresh rock; plagioclase is andesine/labradorite and occurs mainly as subhedral laths with local blotchy sericitization.
		pyroxene	40%	
		plagioclase	55%	
		quartz	2%	
KJ-73-08	diabasic gabbro	opaques	2%	as KJ-72-17
		pyroxene	40%	
		plagioclase	55%	
		quartz	4%	
KJ-74-06	diabasic gabbro	opaques	10%	essentially as last two slides; opaques mainly coarse sulphide; some chloritic alteration of pyroxene
		chlorite	7%	
		pyroxene	30%	
		plagioclase	45%	
		quartz	7%	
KJ-75-13	meta-andesite	saussurite	25%	very fine-grained, essentially massive rock; much of feldspar/quartz is plagioclase occurring as tiny laths
		chlorite	25%	
		actinolite	10%	
		feldspar/quartz	40%	

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-76-16	diabasic gabbro	opaques	7%	relatively fresh, sub-ophitic textured diabasic intrusive as KJ-74-06 etc.
		pyroxene	35%	
		chlorite	8%	
		plagioclase	50%	
		quartz	3%	
KJ-77-03	meta-andesite	opaques	1%	fine-grained, moderately schistose rock; feldspar heavily altered to dense mass of sericite; saussurite occurs as always as small, rounded blebs and masses, brown in colour and semi-opaque.
		saussurite	30%	
		chlorite	10%	
		feldspar/quartz	55%	
		clinozoisite/epidote	3%	
KJ-78-14	meta-diorite	amphibole	40%	a medium-coarse grained, massive rock; amphibole as very large, ragged anhedra; lathy plagioclase is moderately sericitized; possibly minor quartz
		saussurite	5%	
		chlorite	5%	
		plagioclase	45%	
		epidote	5%	
KJ-79-22	saussurite schist	saussurite	75%	moderately schistose, fine grained saussurite rock; remnants of 3 larger feldspar phenocrysts, probably after a basaltic rock
		feldspar/quartz	10%	
		chlorite	10%	
		epidote	5%	
KJ-80-23	chlorite-saussurite chist	opaques	1%	a few larger masses chlorite possibly after original phenocrysts in a fine, weakly schistose mass of remaining minerals, much very fine epidote scattered through rock, probably after andesitic volcanic
		saussurite	15%	
		chlorite	25%	
		feldspar/quartz	45%	
		epidote	15%	
KJ-82-06	amphibole schist	opaques	10%	fine grained, strongly schistose; identification of feldspar/quartz not certain; rock is a highly altered mass of fibrous, asbestiform amphibole probably after a basaltic rock
		amphibole	80%	
		feldspar/quartz	10%	
KJ-83-10	saussurite-actinolite schist	saussurite	60%	very fine grained, moderately schistose rock probably after basaltic volcanic
		actinolite	25%	
		chlorite	5%	
		feldspar/quartz	5%	
		carbonate	5%	
		epidote	2%	

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-84-06	boulder of amphibole schist	opaques amphibole saussurite feldspar/quartz chlorite	10% 60% 5% 20% 5%	fine grained, moderately schistose aggregate of fibrous, asbestiform amphibole and a maximum of 20% of feldspar/quartz; after a basaltic rock
KJ-84-07	boulder of meta-andesite	opaques actinolite chlorite feldspar/quartz epidote	5% 45% 3% 45% 2%	fine grained, massive rock noticeably less altered than preceding volcanics; actinolite as ragged, pleochroic anhedra; much very fine epidote as inclusions in featureless feldspar/quartz
KJ-84-08	meta-diorite	opaques amphibole plagioclase saussurite/epidote	3% 40% 40% 15%	a coarse-grained, massive intrusive rock; amphibole occurs as very large crystals, moderately pleochroic from green to light green and as smaller crystals strongly pleochroic from blue-green to yellow green (Z and X direction in both cases); plagioclase occurs as fairly large, blocky subhedra and is clearly altered in varying degrees to saussurite/epidote and some sericite
KJ-85-06	felsic rock	chlorite quartz epidote/clinozoisite feldspar	35% 50-60% 5% 0-10%	masses of green chlorite (plain light) enclose rounded grains and masses of quartz giving pseudo net texture; one slide contains no feldspar, about 10% plagioclase in second slide, some as graphic-like intergrowths in quartz; rock is fine grained; original nature hard to determine
KJ-86-11	chlorite schist	opaques saussurite chlorite feldspar/quartz sericite	1% 10% 50% 35% 5%	very fine grained, weakly schistose mass of alteration minerals and featureless blebs of quartz/feldspar, after an andesitic rock
KJ-86-13	chlorite schist	as KJ-86-11		as KJ-86-11

HOLE-SAMPLE	ROCK-TYPE	ESTIMATED COMPOSITION		COMMENTS
KJ-87-09	chlorite-saussurite schist	chlorite plagioclase alteration minerals	10% 5% 85%	a few larger masses of chlorite and about 5% of very small, clear plagioclase laths in a dense greyish mat of alteration minerals which appear to be saussurite in large part; rock is probably a very fine-grained volcanic
KJ-88-04	chlorite-carbonate schist	opaques chlorite quartz/feldspar sericite carbonate epidote	9% 15% 15% 10% 40% 10%	a fine grained, sheared rock rich in carbonate; original nature impossible to determine
KJ-89-06	porphyritic felsic volcanic	opaques quartz/feldspar alteration minerals	10% 45% 45%	a few, larger quartz/feldspar phenocrysts and remnants in an extremely fine groundmass of quartz/feldspar and unidentified alteration minerals which may be finely disseminated chlorite in part; opaques are yellowish in reflected light - leucoxene?
KJ-90-10	saussurite-actinolite schist	opaques saussurite actinolite chlorite	5% 50% 35% 10%	fine-grained, weakly schistose volcanic; all minerals as small, anhedral grains and masses; no quartz/feldspar identified; after basaltic volcanic
KJ-91-17	meta-diorite	opaques chlorite actinolite plagioclase saussurite quartz carbonate epidote	5% 15% 5% 60% 5% 5% 3% 3%	medium-grained, highly altered, massive intrusive; plagioclase forms larger crystals of either tabular or lathy habit; amphibole occurs mainly as fibrous, asbestiform laths; many euhedral sections of epidote

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
1	4	(5)	35	11	95	13	9	.9	27
2	8	(5)	96	26	43	56	32	1.2	59
3	7	(5)	75	9	85	51	44	.6	69
4	15	(5)	100	9	29	2	30	.8	65

BEDROCK ANALYSES

PROJECT - KJ ROBB TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			PARTS PER MILLION						
5	18	(5)	40	10	83	33	37	1.0	104
7	15	(5)	47	10	94	37	59	1.1	46

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
8	21	(5)	165	17	95	54	39	1.9	83
9	18	(5)	74	7	61	40	39	.6	87
11	8	(5)	50	7	72	31	44	.4	69
12	4	(5)	89	8	72	35	32	.8	31
13	6	(5)	13	8	88	4	9	.2	35
14	12	(5)	62	8	67	42	44	.7	51

BEDROCK ANALYSES

PROJECT - KJ . ROBB TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
17	18	(5)	18	7	55	7	71	.1	113

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
18	28	(5)	205	12	720	66	21	.8	80
19	25	(5)	73	10	518	22	15	.5	71
20	17	(5)	800	29	9600	49	44	2.1	63
21	13	(5)	147	9	133	52	59	1.2	56
22	24	(5)	730	23	510	66	47	2.4	80
23	19	(5)	135	10	198	11	33	1.6	80
24	26	(5)	440	11	770	74	60	1.4	73
25	6	(5)	200	11	198	60	31	1.4	42
26	18	(5)	162	11	147	60	31	1.4	60
27	15	(5)	93	13	94	49	40	1.8	69
28	14	(5)	120	8	72	50	29	1.1	55
29	22	(5)	120	11	184	65	37	1.4	60
30	23	(5)	162	15	124	72	39	1.7	68
31	26	(5)	18	8	124	7	9	.8	69
32	21	(5)	33	14	124	18	11	.9	64
33	19	(5)	7	54	138	4	7	2.3	58
34	6	(5)	8	7	74	6	9	.5	44
35	13	(5)	136	8	83	52	35	1.1	60
36	16	(5)	86	9	62	55	33	1.1	80
37	23	(5)	89	10	105	47	42	1.4	71
38	17	(5)	68	37	1740	47	44	1.8	90
39	9	(5)	144	10	77	47	40	1.4	69
41	13	(5)	180	9	31	24	31	.5	62
42	7	(5)	15500	21	500	246	35	2.7	55
43	10	(5)	23	89	207	31	22	4.6	46
44	41	(5)	37	10	61	24	31	1.1	152
45	13	(5)	165	9	95	46	32	1.1	111
46	31	(5)	220	9	1280	26	13	.8	120
47	9	(5)	18	13	520	4	6	.6	47
48	7	(5)	970	20	1145	14	7	2.3	32
49	4	(5)	270	81	2420	26	13	1.0	16
50	7	(5)	280	13	785	63	66	1.8	46
51	39	(5)	43	11	304	43	36	1.5	114
52	32	(5)	23	16	148	36	36	1.3	80

BEDROCK ANALYSES

PROJECT - KJ ROBB TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
53	7	(5)	1090	13	310	63	52	.9	21
54	10	(5)	660	11	980	126	89	.9	27
55	5	(5)	128	16	104	59	32	1.1	31
56	33	(5)	73	11	71	32	32	.7	153

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			PARTS PER MILLION						
57	3	(5)	16	13	104	7	13	.4	10

BEDROCK ANALYSES

PROJECT - KJ ROBB TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
59	9	(5)	32	16	109	7	11	.5	69
60	13	(5)	27	16	152	16	13	.7	87
61	5	(5)	64	11	71	46	39	.9	24
62	4	(5)	64	10	79	16	20	1.0	41
63	9	(5)	70	45	116	69	47	4.7	78

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			PARTS PER MILLION						
64	12	(5)	113	10	87	63	35	1.4	72
65	11	(5)	130	10	100	53	48	1.2	92

BEDROCK ANALYSES

PROJECT - KJ ROBB TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
66	14	(5)	37	14	85	45	60	2.0	71
67	9	(5)	5	4	25	32	63	.5	41
68	15	(5)	16	15	106	50	63	1.8	77
69	10	(5)	2	10	25	7	5	.4	80
70	3	(5)	185	12	85	40	53	.8	42
71	14	(5)	7	8	35	3	2	.5	90
72	17	(5)	205	9	71	35	38	.7	86
73	8	(5)	176	15	93	35	52	.7	65
74	6	(5)	204	14	136	37	28	.8	41
75	13	(5)	60	13	125	48	48	1.1	90
76	15	(5)	168	17	122	33	28	.8	63
77	3	(5)	235	12	127	80	50	1.0	26
78	14	(5)	96	10	118	35	63	.7	101
79	22	(5)	100	17	120	52	98	1.8	118
80	23	(5)	11	16	75	29	35	1.1	118
82	6	(5)	7	15	94	54	68	1.0	35
83	10	(5)	130	12	98	49	80	1.7	61
84	7	(5)	25	8	69	19	32	.3	24
85	6	(5)	13	12	127	40	22	1.3	32

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
86	13	(5)	135	11	100	50	50	1.3	89
87	9	(5)	10	11	108	55	50	1.1	48

BEDROCK ANALYSES

PROJECT - KJ ROBB TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
88	3	(5)	126	23	90	62	75	1.8	16
88	4	(5)	62	19	98	79	95	1.5	19
89	6	(5)	38	18	500	50	80	1.7	53
90	10	(5)	5	13	49	38	40	.7	51
91	17	(5)	33	19	160	49	20	1.5	91

BEDROCK ANALYSES

PROJECT - KJ JAMIESON TOWNSHIP, ONTARIO FRACTION - M

HOLE	SAMPLE NUMBER	CODE	COPPER	LEAD	ZINC	COBALT	NICKEL	SILVER	SAMPLE DEPTH(FT)
			----------PARTS PER MILLION----------						
92	9	(5)	8	16	52	10	12	.5	65