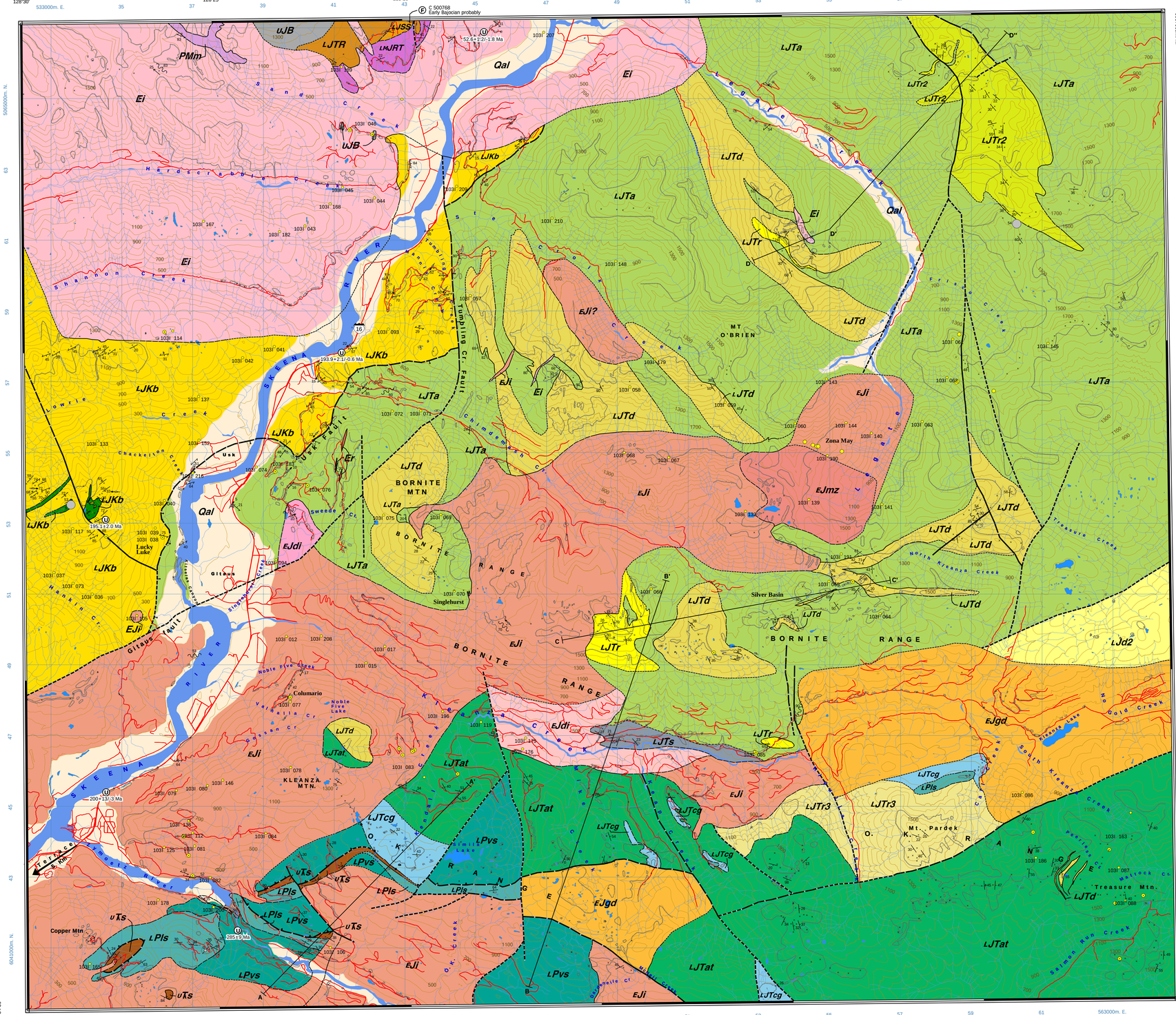
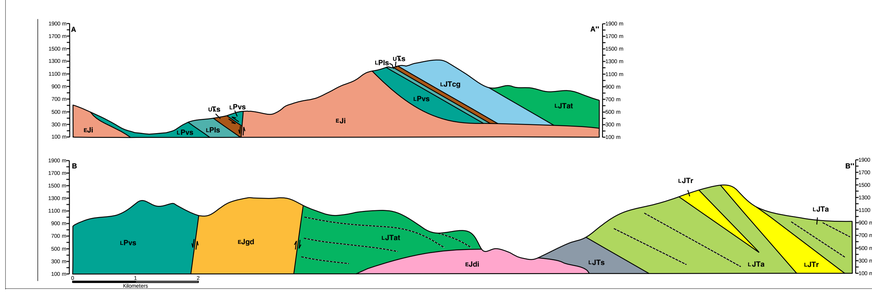
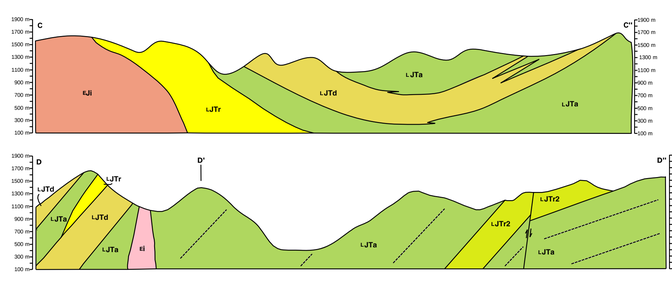






British Columbia Geological Survey

Open File 2006-3

Geology of Usk Map-area, Terrace, British Columbia

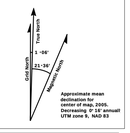
NTS 103I/09

by J.L. Nelson, T. Barresi, E. Knight and N. Boudreau

Digital Cartography by Jesse Dill and Tim Hewett

Scale 1:50,000

Fieldwork carried out in 2005
Map published in January, 2006



Legend

INTRUSIVE UNITS

Eocene
Carpenter Lake pluton ca. 53 Ma

- Ei — Fine to medium-grained leucogranite and hornblende-bearing granite, granodiorite, diorite; felsite and andesite in dike complexes

Eocene

- Er — Rhyolite

Early Jurassic
Kieanza pluton ca. 200 Ma

- EJi — Undivided mafic, intermediate and felsic intrusive rocks
- EJdi — Diorite, microdiorite,gabbro: heterogeneous in texture and composition: also porphyritic andesite dikes and small intrusions
- EJmz — Pink, plagioclase-phyric, fine-grained monzonite
- EJgd — Granodiorite, granite:equigranular, coarse to medium grained, homogeneous

STRATIFIED UNITS

Upper Jurassic
Bowser Lake Group

- uJB — Sandstone, siltstone, shale with minor rip-up clasts

Middle Jurassic
Troy Ridge Formation

- MJTR — "Pyjama beds": alternating, thin-bedded black/dark grey and pale green weathering, siliceous siltstone and felsic tuff

Lower? To Middle Jurassic
Nilkitkwa and Smithers formations

- MJss — **Bajocian** Bivalve-bearing brown to grey sandstone
- LMJRT — **Toarcian? Red Tuff Member** Thin-bedded, maroon volcanic sandstone, siltstone and tuff; bright maroon basalt flows

Lower Jurassic
Telkwa Formation
Flow-dominated division

- LJTa — Coherent, variably amygdaloidal andesite and basalt. Green, locally maroon to brick-red. Amygdules large to small. Andesites are plagioclase-phyric. In places contains minor dacite and rhyolite in bodies too small to depict at map scale.
- LJTd — Dacite and ?rhyolite. In part coherent, flow-banded; also volcaniclastic with variable clast sizes and degree of welding. Red, maroon, lavender, pink, cream. Small plagioclase phenocrysts common, quartz rare. Contains minor amounts of andesite too small to depict at map scale.
- LJTd2 — Grey, plagioclase-phyric, coherent dacite flow? intrusion?
- LJTr — Rhyolite and lesser dacite. Coherent to volcaniclastic; grey, lavender, pink, cream.
- LJTr2 — Well-bedded sequence of rhyolite, rhydacite, and andesite. Felsic units are welded tuffs, unwelded lapilli tuffs, coherent flows/domes.
- LJTs — Volcanic sandstone, siltstone, minor conglomerate; thin-bedded, green to maroon. At base of flow-dominated division in Kleanza Creek valley.

Volcaniclastic-dominated division

- LJTat — Plagioclase-phyric andesite lapilli tuff: coarse to fine-grained, monolithologic to texturally polymictic, less commonly, compositionally polymictic. Minor hornblende and rare clinopyroxene phenocrysts. Also plagioclase-phyric andesite flows and flow breccia; minor dacite, rhyolite, and volcanic sedimentary rocks. Green, maroon and bright burgundy.
- LJTr3 — Mt Pardek felsic unit: rhyolite, andesite volcaniclastics
- LJTcg — Polymictic conglomerate,volcanic-derived sandstone, siltstone and lapilli tuff. Contains both intraformational (plagioclase-phyric andesite and dacite) and extraformational (limestone, chert, felsite, clinopyroxene-phyric volcanic) clasts.

Kitselas facies ca. 195 Ma

- LJKv — White-weathering, light grey rhyolite (and rhyodacite?) lapilli tuff,welded tuff, ignimbrite; also grey coherent rhyolite. Minor coherent basalt, basalt breccia; rhyolite-derived clastic sedimentary beds.
- LJKb — Basalt: coherent, brecciated.

Triassic(?)

- uTs — Thin-bedded black to dark grey siliceous argillite, siltstone, chert

Permian
Zymoetz Group

- LPls — Limestone, marble, silty limestone, calcareous mudstone; minor green + pink lapilli tuff and volcanic sandstone
- LPvs — Green, fine to coarse-grained lapilli tuff, bedded volcanic sandstone, siltstone; polylithic conglomerate transitional to lapilli tuff with limestone clasts; volcanic rocks.
- PMm — Metamorphic unit in Carpenter Lake pluton: metagreywacke, metatuff, skarn, hornfels

SYMBOLS

- Contact (Inferred, Approximate, Defined, Transitional)
- Fault (Inferred, Approximate, Defined)
- Normal Fault (Inferred, Approximate, Defined)
- Thrust Fault (Inferred, Approximate, Defined)
- Unconformity (Inferred, Approximate, Defined)
- Limits of outcrop observed
- Bedding; (tops unknown, tops known)
- Dike; (inclined, vertical)
- Lineation (elongation); Fold axis
- Brittle Shear/ Fault Plane
- Slickenside - Brittle fault lineation
- Foliation -first phase
- Igneous flow banding
- Vein- early
- Field Station
- Mineral Occurrence, MINFILE
- Mineral Occurrence, located this project
- Fossil locality
- U-Pb zircon locality (Gareau et. al 1997a)
- Contours at 100m intervals
- Road
- River
- Lake
- Quaternary deposits

MINFILE OCCURENCES CONFIRMED IN FIELD 2005

Minfile name	Minfile number	Station	New easting	New northing	Description
Gold Star B zone	38	05-JVL1-2	534294	6053101	trench with quartz veins, chalcocite, bornite, chalcopyrite
Gold Star A zone	38	05JNJ1-3	534555	6052629	trench with quartz veins, chalcocite, bornite, chalcopyrite
Lucky Luke	39	05JNI02-5	536153	6052601	quartz vein with bornite, chalcocite, pyrite
Pitman	46	05EK09-03	542074	6053995	quartz stockwork with molybdenite
Pitman	46	05EK09-05	541443	6054115	quartz stockwork with molybdenite
United Sta. Croix	59	05JNI07-9	551722	6049346	complex vein up to 1 m with chalcopyrite, pyrite, chalcocite, malachite, azurite quartz vein 20 cm with chalcocite
Silver Basin Main Trench	65	05TB26-13	555646	6051545	quartz vein 20 cm with chalcocite bornite; in WSW striking shear zone
Emma	74	05TB09-9	539331	6054456	Malachite-stained quartz veins in fault
Four Aces	76	05TB06-7	540244	6054066	flat quartz vein with pyrite, chalcopyrite, galena, sphalerite
Columario	77	05JNI04-3	539757	6048084	quartz vein with coarse pyrite
Zymoetz	82	05NB04-5	536999	6043038	70 cm quartz vein with pyrite, galena, chalcopyrite, sphalerite, chalcopyrite, minor gold
Kino	83	05TB04-2	544488	6045917	disseminated pyrite in quartz veins; silicification
Kino	83	05EK13-05	543271	6046592	microdiorite with chalcopyrite, pyrite
Kino	83	05EK13-06	543284	6046628	microdiorite with chalcopyrite, pyrite
Kino	83	05EK13-10	543284	6046628	microdiorite with chalcopyrite, pyrite
Kino	83	05EK13-11	543271	6046592	andesite with chalcopyrite, pyrite
Alvija	85	05TB03-7	552920	6046509	fractures with malachite, bornite; wide zone
Wells	87	05EK26-01	563858	6042482	massive chalcocite vein in ankerite-altered andesite; 10 cm thick; flat dip
Montana	88	05EK25-08	563061	6042263	malachite-stained andesite
Treasure Mtn. - north	90	05EK24-06	561337	6040604	Cu-stained shear zone - over 2 m wide
New Hardequin	112	05NB04-3	536748	6044151	quartz vein with pyrite
Shan	167	05TB41-4	536205	6058404	40 cm quartz vein with abundant pyrite, molybdenite
Copper King	163	05EK41-08	562893	6043778	20 cm shear with epidote, bornite, chalcocite, malachite, azurite
Excelsior	181	05NB04-4	536890	6043614	quartz stockwork with pyrite
Peerless	186	05JNI06-3	560746	6044270	massive chalcocite vein in ankerite-altered andesite; 10 cm thick; flat dip

GPS locations of mineral occurrences established by Raymond Cook (pers. comm. 2005)

Silver Basin headwall zone	65b		5565552	6051171	disseminated tetrahedrite, bornite in amygdules
Pass	new		559633	6056738	Gossan (brecciа zone) 40 m wide, continuous 200 metres in pass. Assays pending.
Frisco	61		558656	6058339	Cu, Ag in veins, stringers, dissemination in 12 m wide zone (MINFILE)
M&K main adit	62		558609	6057003	Quartz veins with Au, Ag values (.98 g/t Au, 119 g/t Ag in grab; Sebat, 2001), in sheared, brecciated zone. Discontinuous mineralized zone up to 1.2 m wide. - chalcocite, galena, sphalerite, chalcopyrite, pyrite, specularite, in tuff.
M&K (stratabound zone)	62b		558577	6056985	Stratabound mineralized zone up to 1.2 m wide. - chalcocite, galena, sphalerite, chalcopyrite, pyrite, specularite, in tuff.
Zona May vein	60a		554523	6055208	2-3 m wide quartz vein over 700 (possibly 1800) metres, strikes ESE. Grabs .03-24 g/t Au, .3-3364 g/t Ag (Sebat, 2005)
Zona May west wall			554296	6055299	see above
Zona May vein (glacier zone)	60		554631	6055172	see above
Zona May east			554674	6055172	see above
Dynasty			555343	6055033	Extension of Zona May vein to east?: quartz vein with Cu, Ag, strikes east-west

Geochemical and assay data

Units (note that assays in % and g/tonne are in red and bold)

Method																										
Detr-Limit																										
										Mo	W	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Sb	Bi	Hg
										ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppb
										(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
										ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM	ARM
										0.01	0.2	0.01	0.01	0.01	0.1	2	0.01	0.02	0.1	0.02	0.1	0.02	5
Station ID	Easting	Northing	Description of Sample	Mindep Name	Minfile Number																		
05EK09-2	539957	6041104	quartz + chalcocite			0.36	<0.1	37.73	2	36.6	0.4	57	0.14	0.13	0.12	1.8	0.13	3
05EK09-1	549676	6058984	quartz vein + pyrite in microdiorite			0.36	2.3	18.32	2.18	28.4	2.2	149	1.06	0.11	0.37	0.7	0.12	5
05EK08-2	545527	6046833	quartz vein + pyrite in microdiorite			8.05	78.8	1518.6	41	3.5	17.8	1486	14.53	0.1	6.57	0.4	0.42	5
05EK06-01	540489	6062800	20 cm quartz vein in sericitized apite with pyrite, chalcopyrite, chalcocite, bornite, galena			4.17	>100	128.53	1042.8	370.5	17.4	30234	84.02	18.62	3.57	2	0.15	65
05-EK-06-01a	540488	6062800	20 cm quartz vein in sericitized apite with pyrite, chalcopyrite, chalcocite, bornite, galena			10.83	5.6	261.67	**0.41**	3137.3	41.3	**253**	446.65	1159.04	19.87	24	21.93	204
05EK08-02	545503	6062590	quartz vein in sericitized apite with pyrite, chalcopyrite, chalcocite, bornite, galena			0.91	0.5	42.79	4.19	99	-0.2	75	0.71	0.67	0.04	1.1	0.21	13
05EK08-03	540646	6062609	quartz vein in sericitized apite with pyrite, chalcopyrite, chalcocite, bornite, galena			0.62	0.3	4.27	5.55	20.1	-0.2	69	0.39	0.06	-0.02	1.4	0.09	15
Silver Basin Main Trench	65	05TB26-13	555646	6051545	quartz vein 20 cm with chalcocite bornite; in WSW striking shear zone			61.78	0.1	2984.3	1.29	97.1	11.1	16081	1.83	1.81	0.38	-0.1	0.08	-5
Emma	74	05TB09-9	539331	6054456	Malachite-stained quartz veins in fault			37.78	0.5	7.37	4.45	10.1	-0.2	227	4.39	0.06	0.33	0.6	0.12	-5
Four Aces	76	05TB06-7	540244	6054066	flat quartz vein with pyrite, chalcopyrite, galena, sphalerite	Pitman	46	5.7	0.3	30.9	1.1	1.2	0.2	1.2	0.02	0.02	0.01	0.1	0.02	-5
Columario	77	05JNI04-3	539757	6048084	quartz stockwork with molybdenite	Pitman	46	1.12	<0.1	447.03	2.17	22.6	0.9	179	1.45	0.07	0.24	0.6	0.18	-5
Zymoetz	82	05NB04-5	536999	6043038	quartz vein with coarse pyrite			0.97	<0.1	419.88	2.18	18.7	1.1	176	0.37	0.06	0.22	0.7	0.16	-5
Kino	83	05TB04-2	544488	6045917	70 cm quartz vein with pyrite, galena, chalcopyrite, sphalerite, chalcopyrite, minor gold			1.92	<0.1	28.8	0.44	39.4	0.2	354	0.76	0.06	0.19	0.9	0.06	-5
Kino	83	05EK13-05	543271	6046592	microdiorite with chalcopyrite, pyrite silicification			43.58	0.3	481.54	4.21	44.6	0.3	336	3.33	0.13	0.53	0.8	0.58	-5
Kino	83	05EK13-06	543284	6046628	microdiorite with chalcopyrite, pyrite			1.36	0.4	715.11	2.97	75.1	1.8	334	0.22	0.15	0.14	0.7	0.21	-5
Kino	83	05EK13-10	543284	6046628	microdiorite with chalcopyrite, pyrite			0.75	<0.1	1.03	0.02	0.1	0.2	1.2	0.02	0.02	0.01	0.1	0.02	-5
Kino	83	05EK13-11	543271	6046592	andesite with chalcopyrite, pyrite			0.5	<0.1	584.57	0.83	20.7	0.3	77.4	0.08	0.08	0.07	0.1	0.05	-5
Kino	83	05EK15-03	540004	6063198	bornite with epidote alteration, quartz veining, in microdiorite			0.37	0.2	3038.05	3.32	90.2	50.2	3326	0.84	0.14	0.15	1.1	0.13	-5
Alvija	85	05TB03-7	552920	6046509	fractures with malachite, bornite; wide zone			1.45	0.2	**3.32**	7.35	36.7	0.8	19	0.03	2.82	0.02	1.2	0.04	4
Wells	87	05EK26-01	563858	6042482	chalcocite+malachite in 30 cm+ shear	Treasure Mtn.	90	0.26	0.1	1.45	1.87	108.3	210.7	1.3	0.04	0.08	0.02	0.2	0.07	-5
						Treasure Mtn.	90	0.26	0.3	1.45	1.87	108.3	210.7	1.3	0.04	0.08	0.02	0.2	0.07	-5
						Treasure Mtn.	90	0.78	0.2	**1.85**	11.84	108.7	1082.2	5	1.36	0.39	0.04	1.6	0.05	7
Montana	88	05EK25-08	563061	6042263	malachite-stained andesite			1.17	<0.1	2087.7	40.73	79.7	13.3	1869	0.1	0.35	0.14	10.7	5.66	17
Treasure Mtn. - north	90	05EK24-06	561337	6040604	Cu-stained shear zone - over 2 m wide	Treasure Mtn.	90	0.15	<0.1	**6.158**	3.85	101.2	**189**	0.13	3.21	0.1	0.9	0.1	0.6	15
						(with showing)																	
New Hardequin	112	05NB04-3	536748	6044151	quartz vein with pyrite	Treasure Mtn.	90	0.17	<0.1	**2.234**	1.33	78.8	136.2	7	0.09	0.67	0.03	1	0.13	28
Shan	167	05TB41-4	536205	6058404	40 cm quartz vein with abundant pyrite, molybdenite			13.35	3.8	**2.2**	**0.44**	1640	360.3	1095	2.98	43.39	1.57	7.8	9.93	993
Copper King	163	05EK41-08	562893	6043778	20 cm shear with epidote, bornite, chalcocite, malachite, azurite			13	2.9	**3.287**	0.5	1077.3	180.5	7714	2.78	46.18	1.4	6.9	2.93	1133
Excelsior	181	05NB04-4	536890	6043614	quartz stockwork with pyrite	Copper King!	163	0.32	<0.1	1750.1	31.74	14	1.3	2513	0.35	1.14	0.03	7.6	18.96	10
Peerless	186	05JNI06-3	560746	6044270	massive chalcocite vein in ankerite-altered andesite; 10 cm thick; flat dip	Copper King!	163	0.26	<0.1	**1.343**	7.24	22.5	10.3	**279**	0.37	0.14	0.04	0.8	3.89	52
						Excelsior	181	9.14	2.4	731.1	8.2	81.9	958.7	13013	25.71	3.17	22.17	1	0.08	5
						Excelsior	181	0.68	0.4	2069.61	2.38	65.3	13.6	5110	2.59	0.91	0.27	0.2	0.07	5
						Excelsior	181	19.71	0.4	6145.32	1.89	27.5	246.3	13951	6.03	0.45	0.13	0.3	0.26	5
						Excelsior	181	1.84	<.1	46.73	67.26	57.1	2.8	1314	0.04	1.37	0.02	3.7	8.77	1229
						Excelsior	181	0.82	0.7	1.12	13.18	21.3	36.4	328	0.08	0.07	0.02	0.1	0.02	5
						Zona May west wall		0.78	<0.1	63.05	2.23	18	2.5	87	0.11	0.03	-0.02	0.2	0.03	-5
						Zona May vein (glacier zone)	60	3.23	0.1	**5.59**	36.42	194.6	14.7	**99**	0.23	1.68	0.57	1.4	0.2	660
						Zona May east	60	43	76.47	0.3	925.87	11.13	46.8	12.2	1276	0.17	0.4	0.12	1.6	1.07	7
						Dynasty		0.64	0.1	**1.893**	3.7	42.5	2	9213	0.55	0.23	0.23	0.8	0.06	-5
						Dynasty		4.69	17.6	**0.685**	882.48	1326.6	**1842.4**	**1449**	0.5	145.38	0.02	125.3	**8.161**	2304
						Dynasty		0.64	0.1	**1.893**	3.7	42.5	2	9213	0.55	0.23	0.23	0.8	0.06	-5
						Four Aces	76	0.3	<0.1	545.76	3.431	4.6	6000	60.2	19066	9.29	196	7.79	0.1	0.04	11
						Emma	74	2.39	1.2	671.3	3438.1	916	43.6	61000	98.73	179.29	0.1	0.4	1.36	16
						Emma	74	0.94	<0.1	928.45	8.92	108.8	1.2	11152	0.05	2.95	-0.02	23.4	117.18	210
						Emma	74	0.68	<0.1	390.26	10.14	130.5	0.7	10983	0.08	3.11	0.02	23	108.98	214
						Silver Basin Main Trench	65	1.19	0.1	3542.88	7.27	20	30.5	1754	2.61	1.84	0.74	0.8	0.56	-5
						Silver Basin Main Trench	65	0.36	<0.1	3009.2	1.61	40.9	11.3	3387	0.11	0.88	0.51	0.5	0.3	-5
						Silver Basin Main Trench	65	0.23	<0.1	1601.5	4.19	208.5	3.4	2820	0.07	0.1	0.02	0.2	0.78	-5
						Silver Basin Main Trench	65	-0.5	0.2	2222.16	0.05	21.9	3.4	640	4.22	0.03	0.23	18.8	2.15	66
						Silver Basin Main Trench	65	0.44	0.1	**1.893**	3.7	42.5	2	9213	0.55	0.23	0.23	0.8	0.06	-5
						Silver Basin Main Trench	65	-0.3	<.1	66.15	12.91	196.8	1.6	603	0.03	3.9	0.02	1.4	0.73	28
						Silver Basin Main Trench	65	0.3	<.1	46.15	12.91	196.8	1.6	603	0.03	3.9	0.02	1.4	0.73	28
						Silver Basin Main Trench	65	9.04	0.5	**1.62**	79.43	1196.6	250.2	**1481**	0.28	279.63	0.03	180.7	358	4472
						Silver Basin Main Trench	65	1.47	<.1	25.28	14.62	96.2	4.7	447	0.06	2.22	0.02	2.45	3.72	2
						Silver Basin Main Trench	65	52.38	<.1	**1.414**	5	62.9	49	55	0.5	0.93	0.81	0.8	0.56	106
						Silver Basin Main Trench	65	0.11	0.2	3418.8	17.91	93.9	0.8	4865	0.02	0.1	0.05	0.2	0.4	5
						Silver Basin Main Trench	65	0.7	<0.1	**4.28**	30.56	129.2	258.1	**161**	12.37	1.29	0.15	1.3	0.49	6
						Silver Basin Main Trench	65	8.27	<0.1	**4.557**	30.97	130.8	227.3	164	12.83	1.35	0.1	0.9	0.36	7
						Silver Basin Main Trench	65	1328.14	0.2	115	1.24	2.9	-0.2	275	0.15	0.03	-0.01	0.1	0.04	-5
						Shan	167	**0.989**	0.9	**0.035**	5.94	6.1	8	1380	4.88	0.26	0.53	0.4	0.11	6
						Shan	167	5.79	0.3	**1.123**	**1.29**	**10.84**	26.5	**2232**	0.43	765.01	0.06	387.7	**6.688**	7393

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This map may be obtained from Crown Publications Inc., Victoria, B.C. and can be viewed at:
http://www.em.gov.bc.ca/mining/geolsurv/publications/catalogue/cat_of.htm

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