MINERAL DEPOSIT PROFILES B.C. PROFILES

MINERAL DEPOSIT PROFILE TABLES

LISTED BY DEPOSIT GROUP

BC Ministry of Energy, Mines and Petroleum Resources

1895 - 1995 100 YEARS OF GEOLOGICAL SURVEYING

Geological Survey Branch

OPEN FILE 1995-8

MINERAL DEPOSIT PROFILE TABLES

Sheet 1 of 2

By David V. Lefebure, Dani J. Alldrick and George J. Simandl

BC PROFILE #	DEPOSIT TYPE	SYNONYMS	GLOBAL EXAMPLES Deposit (Province, State or Country)	B.C. EXAMPLES
A - ORGANIC				
A01	Peat		Ireland, Ontario, New Brunswick	Fraser Delta, North Coast
A02	Lignitic coal	"Brown coal"	Estevan (Saskatchewan)	Skonun Point (Graham Island)
A03	Sub-bituminous coal	Thermal coal, Black lignite	Highvale (Alberta), Powder River Basin (Wyoming)	Hat Creek, Princeton
A04	Bituminous coal	Coking coal, Thermal coal	Gregg River (Alberta), Sydney Coalfield (Nova Scotia)	Quintette, Bullmoose, Greenhills, Fording
A05	Anthracitic coal	Stone coal	Pennsylvannia Coalfields, Canmore (Alberta)	Mt Klappan
B - RESIDUAL/SURFICIAL				
B01*	Laterite Fe	Gossan Fe	Glenravel (Ireland), Araxa (Brazil)	
B02*	Laterite Ni		Riddle (Oregon)	
B03*	Laterite-Saprolite Au	Eluvial placers	Boddington, Mt. Gibson (Australia), Akaiwang (Guyana)	
B04*	Bauxite Al	Lateritic bauxite	Queensland, Pocos de Caldas (Brazil), Salem Hills (Oregon)	Florence (Sooke)
B05	Residual kaolin	Primary kaolin	Germany, North Carolina, Idaho	Lang Bay, Sumas Mountain
B07*	Bog Fe, Mn, U, Cu, Au		Trois Rivières (Québec)	Whipsaw Creek, Limonite Creek
B08	Surficial U	"Calcrete U"	Flodelle Creek (Washington)	Prairie Flats
B09*	Karst-hosted Fe, Al, Pb-Zn		Transvaal (Pb-Zn, South Africa), Sardinia (Pb-Zn), Jamaica (Al)	Villalta (Fe)
B10	"Terra Rossa" Au-Ag	Residual Au; Precious metal gossans	Rio Tinto (Spain)	Villalta
B11*	Marl			Cheam Lake (Chilliwack)
B12*	Sand and Gravel			
C - PLACER				
C01	Surficial placers	Placer Au-PGE-Sn-diamond-mag-gar-gems	North Saskatchewan River (Saskatchewan), Nome (Alaska)	Fraser River, Quesnel River, Graham Island
C02	Buried-channel placers		Livingstone Creek (Yukon), Valdez Creek (Alaska)	Williams Creek, Otter Creek, Bullion mine
C03*	Marine placers	Off-shore heavy mineral sediments	New South Wales & Queensland (Australia)	Middlebank (off north end of Vancouver Island)
C04*	Paleoplacer U-Au-PGE-Sn-Ti-diam-mag-gar-zir	Quartz pebble conglomerate Au-U	Elliot Lake & Blind River (Ontario), Witwatersrand (South Africa)	Mulvehill
D- CONTINENTAL SEDIMENTS AND VOLCANICS				
D01	Open-system zeolites		Ash Meadows (California), John Day Formation (Oregon)	Princeton Basin, Cache Creek area
D02	Closed basin zeolites		Bowie (Arizona), Lake Magadi (Kenya)	
D03	Volcanic redbed copper	Basaltic Cu	Keewenaw (Michigan), Coppermine (Northwest Territories)	Sustut
D04	Basal U		Sherwood (Washington)	Blizzard, Tyee
D05*	Sandstone U	Roll front U, Tabular U	Colorado Plateau, Grants (New Mexico)	
D06	Volcanic-hosted U	"Epithermal" U, Volcanogenic U	Marysvale (Utah), Aurora (Oregon)	Rexspar, Bullion (Birch Island)
D07	Iron oxide Cu-Au-U breccias and veins	Olympic Dam type, Kiruna type	El Romeral (Chile), Sue-Dianne (Northwest Territories)	Iron Range
E - SEDIMENT-HOSTED				
E01*	Almaden Hg		Almaden (Spain), Santa Barbara (Peru)	
E02*	Kipushi Cu-Pb-Zn	Carbonate-hosted Cu-Pb-Zn	Tsumeb (Namibia), Kipushi (Zaire), Ruby Creek (Alaska)	
E03	Carlin-type sediment-hosted Au-Ag	Carbonate-hosted Au-Ag	Carlin, Getchell & Cortez (Nevada)	
E04*	Sediment-hosted Cu	Sandstone Cu, Sediment-hosted stratiform Cu	Kupferschiefer (Germany & Poland), White Pine (Michigan)	Sage Creek
E05	Sandstone Pb		Laisvall (Sweden), George Lake (Saskatchewan)	
E06	Bentonite	Volcanic clay, Soap clay	Black Hills (Wyoming), Rodalquilar (Spain)	Princeton, Quilchena
E07*	Sedimentary kaolin	"Secondary" kaolin	Cordova District (Alabama), Ozark Region (Missouri), Felipe (Brazil)	Sumas Mountain, Quinsam
E08	Carbonate-hosted talc	Dolomite-hosted talc	Treasure Mtn (Montana), Trimouns (France), Henderson (Ontario)	Red Mountain, Silver Dollar
E09	Sparry magnesite	Veitsch-type, carbonate-hosted magnesite	Eugui (Spain), Veitsch (Austria)	Mt. Brussilof, Driftwood Creek
E10	Mississippi Valley type barite		Illinois - Kentucky, Italian Alps	Muncho Lake
E11	Mississippi Valley type fluorite		Illinois - Kentucky, Italian Alps	Liard Fluorite
E12	Mississippi Valley type Pb-Zn	Carbonate-hosted Pb-Zn, Appalachian Zn	Viburnum Trend (Missouri), Pine Point (Northwest Territories)	Robb Lake, Monarch
E13	Kootenay Arc type Pb-Zn		Navin & Tynagh (Ireland)	Reeves MacDonald, H.B., Aspen, Duncan
E14	Sedex Zn-Pb-Ag	Sediment-hosted massive sulphide	Mount Isa (Australia), Faro & Grum (Yukon)	Sullivan, Cirque, Driftpile
E15	Blackbird massive sulphide Cu-Co	Sediment-hosted Cu-Co massive sulphide	Blackbird & Sheep Creek (Montana), Boleo (Mexico)	
E16	Sediment-hosted Ni		Nick (Yukon), Tianeshan & Zunyi (China)	
E17	Sediment-hosted barite	Bedded barite	Tea (Yukon), Magcobar (Ireland)	Kwadacha
F - CHEMICAL SEDIMENT				
F01	Sedimentary Mn		Molongo (Mexico), Atasu (Kazakhstan), Kalahari (South Arica)	
F02	Bedded gypsum / anhydrite	Marine evaporite gypsum	Paris Basin (France), Appalachian Basins (New York, Pennsylvania)	Lussier River, Windermere
F03	Gypsum-hosted sulphur	Frasch sulphur	Texas, Louisiana, Poland, Coronation (Alberta)	Trutch area
F04*	Bedded celestite		Lake Enon (Nova Scotia), Mexico, Germany	Kitsault Lake
F05*	Palygorskite	Attapulgite	Metalline Falls (Washington)	
F06	Lacustrine diatomite	Diatomaceous earth, Kieselguhr	Juntura and Trout Ck Formations (Oregon), Lake Myvatn (Iceland)	Crownite Formation (Quesnel)
F07	Phosphate, upwelling type		Phosphoria Formation (Idaho), Meskala (Morocco)	Fernie synclinorium
F08	Phosphate, warm-current type		Athabaska Basin (Saskatchewan), Florida	
F09*	Playas	Hydromagnesite, Na carbonate lake brines		Milk River
F10*	Superior type iron formation		Mesabi Ranges (Minnesota), Minas Gervas (Brazil)	Falcon
G - MARINE VOLCANIC ASSOCIATION				
G01*	Algoma Fe		Vermillion iron formation (Minnesota), Helen mine (Ontario)	
G02	Volcanogenic Mn		Olympic Mountains (Washington), Nicoya (Costa Rica)	
G03*	Volcanogenic anhydrite / gypsum			Britannia, Falkland
G04	Besshi massive sulphide Zn-Cu-Pb	Kieslager	Besshi (Japan), Greens Creek (Alaska)	Goldstream, Windy Craggy
G05	Cyprus massive sulphide Cu		Cyprus, Oman	Anyox, Chu Chua
G06	Noranda / Kuroko massive sulphide Cu-Pb-Zn		Horne & Millenbach (Québec), Kuroko District (Japan)	Britannia, Kutcho Creek, Myra Falls
G07	Subaqueous hot spring Ag-Au		Osorezan (Japan)	Eskay Creek

BC PROFILE #	DEPOSIT TYPE	SYNONYMS	GLOBAL EXAMPLES Deposit (Province, State or Country)	B.C. EXAMPLES
H - EPITHERMAL				
H01*	Travertine	Tufa		Clinton, Slocan
H02	Hot spring Hg		Sulphur Bank (California), Steamboat Springs (Nevada)	Ucluelet
H03	Hot spring Au-Ag		McLaughlin (California), Round Mountain (Nevada)	Cinola
H04	Epithermal Au-Ag; high sulphidation	Acid-sulphate epithermal, Nansatsu-type	El Indio (Chile), Nansatsu (Japan)	Taseko property, Expo
H05	Epithermal Au-Ag; low sulphidation	Adularia-sericite epithermal	Comstock (Nevada), Sado (Japan)	Lawyers, Blackdome, Silbak Premier
H06*	Epithermal Mn		Talamantes (Mexico), Gloryana (New Mexico)	
H07	Polymetallic Sn veins		Black Range (New Mexico), Potosi (Bolivia), Ashio (Japan)	D Zone (Cassiar)
H08*	Au-Ag-Te veins		Emperor (Fiji), Cripple Creek (Colorado)	
H09*	Hydrothermal alteration clays-Al-Si	Kaolin, Alunite, Siliceous cap, Pyrophyllite	Cornwall (England)	Monteith Bay, Pemberton Hills
I - VEIN, BRECCIA AND STOCKWORK				
I01	Gold-quartz veins	Mesothermal, Motherlode, saddle reefs	Alaska-Juneau (Alaska), Red Lake (Ontario)	Bralorne, Erickson
I02	Subvolcanic shear-hosted gold			Scottie, Snip, Johnny Mountain, Iron Colt
I03*	Turbidite-hosted gold veins	Meguma type	Ballarat (Australia), Meguma (Nova Scotia)	Frasergold
I04*	Iron formation-hosted gold		Homestake (South Dakota)	
I05	Polymetallic veins Ag-Pb-Zn		Keno Hill (Yukon)	Silver Queen, Beaverdell
I06*	Cu-Ag quartz veins		Nikolai & Kathleen-Margaret (Alaska)	Davis-Keays, Churchill Copper
I07*	Silica veins			Granby Point
I08	Silica-Hg carbonate		Red Devil? (Alaska)	Pinchi, Bralorne Takla
I09	Stibnite veins and disseminations	Simple and disseminated Sb deposits	Jerritt Canyon (Nevada), Bolivia	Minto, Congress, Snowbird
I10	Vein barite		Del Rio district (Tennessee), Jebel Ighoud (Morocco)	Parson, Brisco
I11	Barite-fluorite veins		Mongolian fluorite belt	Rock Candy, Eaglet
I12*	W veins	Quartz-wolframite veins	Pasto Bueno (Peru), Carrock Fell (England)	
I13*	Sn veins and greisens		Cornwall (England), Lost River (Alaska)	Duncan Lake
I14*	U-Th-REE veins		Uranium City (Sakatchewan), Schwartzwalder (Colorado)	Little Gem
I15*	Felsic plutonic U		Roy Creek & Bokan Mountain (Alaska), Massif Central (France)	Coryell intrusions, Surprise Lake
I16*	Unconformity U-Au-Ni	Vein-like type U	Key Lake (Saskatchewan), Jabiluka (Australia)	
I17	Magnesite veins and stockworks	Bone magnesite, Kraubath-type magnesite		
J - REPLACEMENT				
J01	Polymetallic mantos Ag-Pb-Zn	Polymetallic replacement deposits	East Tintic (Utah), Naica (Mexico), Sa Dena Hess (Yukon)	Bluebell, Midway
J02	Sn mantos and stockworks	"Replacement Sn"	Renison Bell & Cleveland (Australia), Dachang district (China)	
J03*	Mn veins and replacements	"Replacement Mn"	Lake Valley (New Mexico), Phillipsburg (Montana)	
J04	Sulphide manto Au	Au-Ag sulphide mantos	Ketza River (Yukon)	Mosquito Creek , Island Mountain
K - SKARN				
K01	Cu skarn		Mines Gaspé (Québec), Carr Fork (Yukon)	Craigmont, Phoenix
K02	Zn-Pb skarn		San Antonio (Mexico), Ban Ban (Australia)	Piedmont, Contact
K03	Fe skarn		Shinyama (Japan), Cornwall (Pennsylvannia)	Tasu, Jessie, Merry Widow, HPH
K04	Au skarn		Fortitude & McCoy (Nevada), Buckhorn Mountain (Washington)	Nickel Plate
K05	W skarn		Cantung & Mactung (Yukon), Pine Creek (California)	Emerald Tungsten, Dimac
K06	Sn skarn		Lost River (Alaska), JC (Yukon)	Daybreak
K07	Mo skarn		Little Boulder Creek (Idaho), Mt. Tennyson (Australia)	Coxey, Novelty
K08	Garnet skarn			Crystal Peak
K09	Wollastonite skarn		Fox Knoll & Lewis (New York)	Mineral Hill, Rossland
L - PORPHYRY				
L01	Subvolcanic Cu-Ag-Au (As-Sb)	Enargite Au, Transitional Au-Ag	Lepanto (Philippines), Resck (Hungary), Kori Kollo (Bolivia)	Equity Silver, Thorn
L02	Porphyry-related Au	Granitoid Au, Porphyry Au	Marte & Lobo (Chile), Lihir (Papua New Guinea)	Snowfields
L03	Alkalic porphyry Cu-Au		Tai Parit (Philippines)	Afton, Copper Mountain, Galore Creek
L04	Porphyry Cu ± Mo ± Au		Chuquicamata & La Escondida (Chile)	Highland Valley, Gibraltar
L05	Porphyry Mo		Quartz Hill (Alaska)	Endako, Kitsault, Glacier Gulch
L06	Porphyry Sn	"Subvolcanic tin"	Llallagua (Bolivia), Potato Hills (Yukon)	
L07	Porphyry W		Logtung (Yukon), Xingluokeng (China)	Boya
L08	Climax-type Porphyry Mo		Climax & Henderson (Colorado)	
M - ULTRAMAFIC / MAFIC ASSOCIATION				
M01*	Basaltic subvolcanic Cu-Ni-PGE		Noril'sk (Russia), Duluth (Minnesota)	
M02	Gabbroid Ni-Cu-PGE		Lynn Lake (Manitoba), Kluane (Yukon), Noril'sk-Talnakh (Russia)	Giant Mascot, Nickel Mountain
M03	Podiform chromite		Josephine ophiolite (Oregon), Coto (Philippines), Elazig (Turkey)	
M04*	Anorthosite Ti-V		Roseland (Virginia), Pluma Hidalgo (Mexico)	
M05	Alaskan-type PGE	Zoned ultramafic Fe-Ti-V / PGE / Cr / Cu-Ni	Duke Island (Alaska)	Tulameen
M06	Asbestos	Serpentinite-hosted asbestos	Thetford (Québec)	Cassiar, Kutcho
M07	Serpentinite-hosted magnesite-talc		Thetford & Magog (Québec), Deloro (Ontario)	
M08	Vermiculite		Enoree (USA)	Fort Fraser area
N - ALKALIC ASSOCIATION (includes kimberlites and lamproites)				
N01	Carbonatite-hosted deposits		Palabora (South Africa), Oka (Québec), Mountain Pass (California)	Aley, Mount Grace tuff
N02*	Kimberlite-hosted diamonds	Diamond pipes	Kimberley & Premier (South Africa)	Cross
N03*	Lamproite-hosted diamonds		Argyle (Australia)	
O - PEGMATITE				
O01	Rare element pegmatite - LCT family	Zoned pegmatite (Lithium-Cesium-Tantalum)	Bikita Field (Zimbabwe), Blackhills (South Dakota)	
O02	Rare element pegmatite - NYF family	Niobium-Yttrium-Fluorine pegmatite	South Platte district (Colorado), Bancroft (Ontario)	
O03	Muscovite pegmatite	Mica-bearing pegmatite	Rajahstan (India), Appalachian Province (USA)	
O04*	Feldspar-quartz pegmatite	Barren pegmatite	Buckingham (Québec)	
P - METAMORPHIC HOSTED				
P01	Andalusite hornfels		Bushveld (South Africa), Brittany (France)	Leech River
P02	Kyanite family		Willis Mountain (Virginia), NARCO (Québec)	
P03	Microcrystalline graphite	"Amorphous" graphite	Keiserberg (Austria)	
P04	Crystalline flake graphite		Lac Knife (Québec)	AA
P05	Vein graphite	"Lump and chip" graphite	Calumet & Clot (Québec), Bogala (Sri Lanka)	
P06	Corundum in aluminous metasediments		Gallatin & Madison Counties (Montana)	
Q - GEMS AND SEMI-PRECIOUS STONES (diamonds under N)				
Q01	Jade			Cry Lake, Ogden Mountain
Q02	Rhodonite			Hill 60, Arthur Point, Cassiar
Q03*	Agate			
Q04*	Amethyst		Thunder Bay (Ontario), Artigas (Uruguay), Maraba (Brazil)	
Q05*	Jasper			
Q06	Columbia-type emerald		Chivor and Muzo districts (Columbia)	
Q07	Schist-hosted emerald	Exometamorphic emerald deposit	Habachtal (Austria), Leysdorp (South Africa), Socoto (Brazil)	
Q08	Australian-type opal	Sediment-hosted opal	Coober Pedy (Australia)	
Q09	Gem corundum in contact zones		Umba (Tanzania), Kinyki Hill (Kenya)	
Q10	Gem corundum hosted by alkalic rocks		Yogo Gulch (Montana)	
Q11	Volcanic-hosted opal			
R - INDUSTRIAL ROCKS				
R01	Cement shale			Dunsmuir shale, Sumas Mountain
R02	Expanding shale		Wabamun shales (Alberta)	Nanaimo shale, Saturna Island
R03	Dimension stone - granite		Rivière à Pierre (Québec), Black Hills (South Dakota)	Nelson Island
R04	Dimension stone - marble		Vermont, Alabama, Georgia	Marblehead, Anderson Bay (Texada Island)
R05	Dimension stone - andesite			Haddington Island
R06*	Dimension stone - sandstone			Saturna Island, Newcastle Island
R07	Silica sandstone	High-silica quartzite		Moberley, Nicholson
R08*	Flagstone		Southowram (England)	Salmo, Revelstoke
R09	Limestone			Texada Island, Quatsino Belt
R10*	Dolomite			Crawford Bay, Rock Creek
R11*	Volcanic ash - pumice			Meagher Mountain, Buse Lake
R12*	Volcanic glass - perlite			Frenier, Francois Lake
R13*	Nepheline syenite		Blue Mountain (Ontario)	Trident Mountain
R14*	Alaskite		Spruce Pine alaskite (North Carolina)	
R15*	Crushed rock	Road metal, Riprap, Railroad ballast		McAbbee, Gissome

Note: B01* - asterisk beside profile number indicates no draft profile completed

INTRODUCTION

The British Columbia Geological Survey Branch (BCGS) started a mineral potential assessment of the province in 1992 utilizing deposit models for defining and characterizing mineral and coal deposits which exist, or for which favourable geological environments exist, in the province. The current methodology for this resource assessment process is described by Grunsky *et al.* (1994), Kilby *et al.* (1995) and Grunsky (1995). A fundamental part of this process is compilation of information about mineral deposits including descriptions, classification and resource data (Lefebure *et al*, 1995). The resulting deposit models are being used to classify known deposits and occurrences, to guide experts in their estimation of the number of possible undiscovered mineral deposits, and to group deposits to allow compilation of representative grade and tonnage data.

These deposit models are called 'deposit profiles' to distinguish them from other published descriptions, such as the USGS 'deposit models'. One value of the profiles is that they will provide geologists and prospectors with a reference guide to deposits with which they have little familiarity. In some cases they may encourage consideration of new exploration targets within the province (Lefebure, 1995).

FEEDBACK

With new data being produced every day by industry and research geologists, it is expected that some of today's models will be out-of-date tomorrow. The BCGS profiles will change as we receive more information from industry and research geologists who are invited to contribute to the continuing evolution of these deposit models. Better models assist both the exploration community and resource assessment geologists. One of the objectives of this Open File is to elicit comments and criticisms from readers which can assist the authors, especially by identifying additional deposit models and deposit examples that could be included. We can be contacted at the following addresses:

Dave Lefebure (604) 952-0404 dlefebure@galaxy.gov.bc.ca
Dani Alldrick (604) 952-0412 dalldrick@galaxy.gov.bc.ca
George Simandl (604) 952-0413 gsimandl@galaxy.gov.bc.ca

B.C. Geological Survey Branch,
Ministry of Energy, Mines and Petroleum Resources
1810 Blanshard Street,
Victoria, B.C. V8V 1X4
fax (604) 952-0381

B.C. MINERAL DEPOSIT PROFILES

Mineral deposit profiles are concise descriptions tied to a series of headings which will fit on two or three pages. This format is similar to those for deposit models published by the GSC and the USGS (Eckstrand, 1984; Cox and Singer, 1986). They are designed to be primarily descriptive because the ore-forming processes are sometimes poorly understood. As with the USGS models, the profiles are intended to be global models with sufficient information to describe the deposit type anywhere in the world. However, they incorporate more information specific to British Columbia with respect to tectonic setting, age of mineralization, examples, references, resource data and economic factors.

A number of deposit types that are not relevant to British Columbia have not yet been addressed by completing profiles. For example, there seems very little likelihood of Bushveld type Fe-Ti-V or komatiitic nickel deposits in the province. In some cases very specific deposit models have been combined to provide a more robust general model that better meets the needs of the mineral potential assessment process.

Profiles are based on a combination of published information and the personal knowledge of the authors and, in many cases, information provided informally by industry geologists. More than 140 general deposit models are thought to be relevant to British Columbia including 79 metal, 70 industrial mineral and four coal profiles. The Branch is completing descriptions for approximately 100 of these deposit models. We are also compiling grade and tonnage data for selected deposits models.

CLASSIFICATION

The best method for grouping different deposit types continues to generate discussion. This reflects the difficulties in any subdivision of complex natural phenomena, particularly when some deposit types are end members of a continuum. The many classification systems developed since Agricola are testimony to the elusive nature of identifying one satisfactory classification scheme for all mineral deposits. The reader is directed to summaries by Jensen and Bateman (1979) and Peters (1978) for a review of different classification systems.

With our profiles, the approach has been to regard the deposit models as the key element and any classification system as merely an index for placing the models into a useful context for the user. Profiles will be published with multiple indexes, such as by deposit examples, commodity and host lithology. An excellent example of providing indexes to mineral deposit types is Laznicka's text (1985). This reference proved invaluable in researching international examples of deposits similar to those in British Columbia.

Two classification schemes for British Columbia deposit profiles are presented in this open file. Sheet 1 is organized by deposit groups which are defined by a combination of characteristics to separate deposits into groupings frequently used by geologists. This is a single-entry listing with headings, such as: porphyry, industrial rocks, organic and placer deposits. These groups relate well to areas of expertise of economic geologists. Sheet 2 groups profiles according to the most commonly associated host lithologies. A multiple entry index, this scheme is modified from the principal USGS classification system of Cox and Singer (1986). It is particularly useful for mineral potential assessments where the bedrock geology is often the most important criteria for estimating the number of undiscovered deposits.

ACKNOWLEDGMENTS

The authors would like to thank all the economic geologists who have contributed their input to the deposit profiles as this is truly a team effort. Branch staff have contributed the majority of the deposit models and participated in number of meetings to determine which deposit types should be included. The work of Chris Ash, Neil Church, Tim Giles, David Grieve, Kirk Hancock, Dan Hora, Trygve Höy, Vic Levson, Don MacIntyre, Nick Massey, JoAnne Nelson, Graham Nixon, Andre Panteleyev, Tom Schroeter and Paul Wilton is much appreciated.

A number of geologists from government, universities and industry have also written or co-authored profiles allowing us to tackle more deposit models. Staff of the Geological Survey of Canada have been particularly helpful. Tyson Birkett, Tomas Feininger, Suzanne Paradis, Ann Sabina, Don Sangster and Dave Sinclair have contributed profiles or acted as co-authors. Ian Kuckey and Christopher Pilarski of Baymag; Peter Cerny of the University of Manitoba; Wilfred Kenan of Asbury Graphite Mills Inc.; and Eric Force, Greta Orris and Richard Sheppard of the United States Geological Survey have willingly shared their expertise by co-authoring profiles.

Nick Carter and Ron McMillan of the Stonehouse Group and Robert Brown and Robert Helgason of Quest Canada Resources Corporation were among the first users of the draft profiles and related indexes as they classified the MINFILE occurrences. They provided key insights into the choice of deposit models.

Many people have made useful suggestions; including Dennis Cox and Ted Theodore of the USGS, Ken Dawson and Rod Kirkham of the GSC, and John Thompson of the University of British Columbia. The final version of this Open File includes a number of suggestions from Dan Hora and Gerry Ray which were particularly helpful.

REFERENCES

Cox, D.P. and Singer, D.A., Editors (1986): Mineral Deposit Models; *U.S. Geological Survey*, Bulletin 1693, 379 pages.

Eckstrand, O.R., Editor (1984): Canadian Mineral Deposit Types: A Geological Synopsis; *Geological Survey of Canada*, Economic Geology Report 36, 86 pages.

Grunsky, E.C., Kilby, W.E. and Massey, N.W.D. (1994): Resource Assessment in British Columbia; *in Nonrenewable Resources*, Volume 3, No. 4, pages 271-283.

Grunsky, E.C (1995): Grade-Tonnage Data for Mineral Deposit Models in British Columbia; *in* Geological Fieldwork 1994, Grant, B. and Newell, J.M., Editors, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1995-1, 417-423.

Kilby, W. (1995): Mineral Potential Project -Overview; *in* Geological Fieldwork 1994, Grant, B and Newell, J.M., Editors, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1995-1, 411-416.

Jensen, M. L. and Bateman, A. M. (1979): Economic Mineral Deposits; John Wiley & Sons, New York, 593 pages.

Laznicka, P. (1985): Empirical Metallogeny - Depositional Environments, Lithologic Associations and Metallic Ores, Vol. 1: Phanerozoic Environments, Associations and Deposits, *Elsevier*, New York, 1758 pages.

Lefebure, D.V., Alldrick, D.J, Simandl, G.B. and Ray, G.E. (1995): British Columbia Mineral Deposit Profiles, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1995-1, pages 469-490.

Lefebure, D.V. (1995): Two Intriguing Mineral Deposit Profiles for British Columbia, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1995-1, pages 491-499.

Lefebure, D.V., Alldrick, D.J. and Simandl, G.J. and Ray, G.E. (1995): British Columbia Mineral Deposit Profiles, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1995-1, pages 469-490.

McMillan, W.J., Höy, T., MacIntyre, D.G., Nelson, J.L., Nixon, G.T., Hammock, J.L., Panteleyev, A., Ray, G.E. and Webster, I.C.L. (1991): Ore Deposits, Tectonics and Metallogeny of the Canadian Cordillera, *B. C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1991-4, 276 pages.

Peters, W. C. (1978): Exploration and Mining Geology; John Wiley & Sons, Inc., New York, 696 pages.

MINERAL DEPOSIT PROFILE TABLES

LISTED BY LITHOLOGICAL AFFINITIES

BC Ministry of Energy, Mines and Petroleum Resources

1895 - 1995 100 YEARS OF GEOLOGICAL SURVEYING

Geological Survey Branch

OPEN FILE 1995-8

MINERAL DEPOSIT PROFILE TABLES

Sheet 2 of 2

By David V. Lefebure, Dani J. Alldrick and George J. Simandl

Note: B01* - asterisk beside profile number indicates no draft profile completed

(Sediment-hosted Ni) - not the most common lithological affinity for the deposit profile

DEPOSIT TYPE	SYNONYMS	GLOBAL EXAMPLES Deposit (Province, State or Country)	B.C. EXAMPLES	BC PROFILE #	U.S.G.S. MODEL #
UNCONSOLIDATED DEPOSITS					
Peat		Ireland, Ontario, New Brunswick	Fraser Delta, North Coast	A01	--
Bog Fe, Mn, U, Cu, Au		Trois Rivières (Québec)	Whipsaw Creek, Limonite Creek	B07*	--
Surficial U	"Calcrete U"	Flodelle Creek (Washington)	Prairie Flats	B08	--
Residual					
Laterite Fe	Gossan Fe	Glenravel (Ireland), Araxa (Brazil)		B01*	--
Laterite Ni		Riddle (Oregon)		B02*	38a
Laterite-Saprolite Au	Eluvial placers	Boddington (Australia), Akaiwang (Guyana)		B03*	38g
Bauxite Al	Lateritic bauxite	Pocos de Caldas (Brazil), Salem Hills (Oregon)	Florence (Sooke)	B04*	38b
Residual kaolin	Primary kaolin	Germany, North Carolina, Idaho	Lang Bay, Sumas Mountain	B05	38h*
Karst-hosted Fe, Al, Pb-Zn		South Africa (Pb-Zn), Jamaica (Al)	Villhalta (Fe)	B09*	--
"Terra Rossa" Au-Ag	Residual Au; Precious metal gossans	Rio Tinto (Spain)	Villalta	B10	--
Alluvium					
Sand and Gravel				B12*	
Surficial placers	Placer Au-PGE-Sn-U- diam-mag-gar-gems	North Saskatchewan River (Saskatchewan), Nome (Alaska)	Fraser River, Quesnel River	C01	39a
Buried-channel placers		Livingstone Creek (Yukon), Valdez Creek (Alaska)	Williams Creek, Otter Creek	C02	39a
Marine					
Marine placers	Off-shore heavy mineral sediments	Australia (New South Wales, Queensland)	Middlebank (north of Vancouver Island)	C03*	39f*?
SEDIMENTARY ROCKS					
CHEMICAL SEDIMENTARY ROCKS					
(Sediment-hosted Ni)		Nick (Yukon), Tianeshan & Zunyi (China)		E16	--
Sedimentary Mn		Molongo (Mexico), Atasu (Kazakhstan)		F01	34b
Palygorskite	Attapulgite	Metalline Falls (Washington)		F05*	34e*
Phosphate, upwelling type		Phosphoria Formation (Idaho)	Fernie synclinorium	F07	34c
Phosphate, warm-current type		Athabaska Basin (Saskatchewan), Florida		F08	34d
Superior Type Iron formation		Mesabi Ranges (Minnesota), Minas Gervas (Brazil)	Falcon	F10*	34a
Playa Evaporites					
Playas	Hydromagnesite, Na carbonate lake brines		Milk River	F09*	35ba
Lacustrine					
Marl			Cheam Lake (Chilliwack)	B11*	
Marine Evaporites					
Bedded gypsum / anhydrite	Marine evaporite gypsum	Paris Basin (France), Appalachian Basins (USA)	Lussier River, Windermere	F02	35ae
Gypsum-hosted sulphur	Frasch sulphur	Texas, Louisiana, Poland, Coronation (Alberta)	Trutch area	F03	--
Bedded celestite		Lake Enon (Nova Scotia), Mexico, Germany	Kitsault Lake	F04*	35aa*
CARBONATE ROCKS					
No Associated Igneous Rocks					
Kipushi Cu-Pb-Zn	Carbonate-hosted Cu-Pb-Zn	Kipushi (Zaire), Tsumeb (Namibia), Ruby Creek (Alaska)		E02*	32c
Carbonate-hosted talc	Dolomite-hosted talc		Red Mountain, Silver Dollar	E08	18?i*
Sparry magnesite	Veitsch-type, carbonate-hosted magnesite	Eugui (Spain), Veitsch (Austria)	Mt. Brussilof, Driftwood Creek	E09	18i*
Mississippi Valley type barite		Illinois - Kentucky, Italian Alps	Muncho Lake	E10	--
Mississippi Valley type fluorite		Illinois - Kentucky, Italian Alps	Liard Fluorite	E11	32d*
Mississippi Valley type Pb-Zn	Carbonate-hosted Pb-Zn, Appalachian Zn	Viburnum Trend (Missouri), Pine Point (Northwest Terr.)	Robb Lake, Monarch	E12	32a/32b
Kootenay Arc type Pb-Zn		Navin & Tynagh (Ireland)	Reeves MacDonald, H.B., Aspen	E13	--
Travertine	Tufa		Clinton, Slocan	H01*	35d*
(Vein barite)			Muncho Lake	I10	IM27e
(Polymetallic mantos Ag-Pb-Zn)	Polymetallic replacement deposits		Bluebell	J01	19a
(Sn mantos and stockworks)	"Replacement Sn"			J02	14c
(Mn veins and replacements)	"Replacement Mn"			J03*	19b
Sulphide manto Au	Au-Ag sulphide mantos	Ketza River (Yukon)	Mosquito Creek , Island Mountain	J04	--
Limestone			Texada Island, Quatsino Belt	R09	--
Dolomite			Crawford Bay, Rock Creek	R10*	--
Associated Igneous Rocks					
Carlin-type sediment-hosted Au-Ag	Carbonate-hosted Au-Ag	Carlin (Nevada)		E03	26a,19c
Polymetallic mantos Ag-Pb-Zn	Polymetallic replacement deposits	East Tintic (Utah), Naico (Mexico), Sa Dena Hess (Yukon)	Midway	J01	19a
Sn mantos and stockworks	"Replacement Sn"	Renison Bell (Australia), Dachang district (China)		J02	14c
Mn veins and replacements	"Replacement Mn"	Lake Valley (New Mexico), Phillipsburg (Montana)		J03*	19b
(Cu skarn)		Mines Gaspé (Québec), Carr Fork (Yukon)	Craigmont, Phoenix	K01	18a,b
Zn-Pb skarn		Yeonhwa Ulchin District (S. Korea), Darwin (California)	Piedmont, Contact	K02	18c
(Fe skarn)		Shinyama (Japan)	Tasu, Jessie, Merry Widow	K03	18d
(Au skarn)		Fortitude & McCoy (Nevada), Buckhorn Mtn (Washington)	Nickel Plate	K04	--
(W skarn)		Cantung & Mactung (Yukon), Pine Creek (California)	Emerald Tungsten, Dimac	K05	14a
(Sn skarn)		Lost River (Alaska), JC (Yukon)	Daybreak	K06	14b
(Garnet skarn)			Crystal Peak	K08	--
(Wollastonite skarn)		Fox Knoll, Lewis (New York)	Mineral Hill	K09	18g
CLASTIC SEDIMENTARY ROCKS					
Biogenic					
(Phosphate, upwelling type)		Phosphoria Formation (Idaho), Meskala (Morocco)	Fernie synclinorium	F07	34c
(Phosphate, warm-current type)		Athabaska Basin (Saskatchewan), Florida		F08	34d
Clays					
(Bentonite)	Volcanic clay, Soap clay	Black Hills (Wyoming), Pembina District (Manitoba)	Princeton, Quilchena	E06	28e?
Sedimentary kaolin	"Secondary" kaolin	Cordova District (Alabama), Ozark Region (Missouri)	Sumas Mountain, Quinsam	E07*	31k*
Shale-Siltstone					
Lignitic coal	"Brown coal"	Estevan (Saskatchewan)	Skonun Point (Graham Island)	A02	--
Sub-bituminous coal	Thermal coal, Black lignite	Highvale (Alberta), Powder River Basin (Wyoming)	Hat Creek, Princeton	A03	--
Bituminous coal	Coking coal, Thermal coal	Sydney Coalfield (Nova Scotia)	Quintette, Bullmoose, Greenhills, Fording	A04	--
Anthracitic coal	Stone coal	Pennsylvannia Coalfields, Canmore (Alberta)	Mt Klappan	A05	--
(Carlin-type sediment-hosted Au-Ag)	Carbonate-hosted Au-Ag	Carlin (Nevada), Cortez (Nevada)		E03	26a,19c
Sediment-hosted Cu	Sandstone Cu, Sediment-hosted stratiform Cu	Kupferschiefer (Germany & Poland), White Pine (Michigan)		E04*	30b
Sedex Zn-Pb-Ag-S	Sediment-hosted massive sulphides	Mount Isa (Australia), Faro, Grum (Yukon)	Sullivan, Cirque, Driftpile	E14	31a
Blackbird massive sulphide Cu-Co	Sediment-hosted Cu-Co massive sulphide	Blackbird & Sheep Creek (Montana)		E15	24d
Sediment-hosted Ni		Nick (Yukon), Tianeshan & Zunyi (China)		E16	--
Sediment-hosted barite	Bedded barite	Tea (Yukon), Magcobar (Ireland)	Kwadacha	E17	31b
Besshi massive sulphide Zn-Cu-Pb	Kieslager	Greens Creek (Alaska)	Goldstream, Windy Craggy	G04	24b
Polymetallic veins Ag-Pb-Zn		Keno Hill (Yukon)	Highland Bell, Lucky Jim	I05	22c, 25b
Cu-Ag quartz veins		Nikolai mine & Kathleen-Margaret (Alaska)	Davis-Keays, Churchill Copper	I06*	?
Vein barite		Nevada	Parson, Brisco	I10	IM37e
(Barite-fluorite veins)		Pforzheim-Naaburg (Germany)	Stone Mountain Park (Alaska Hwy)	I11	26c*
Columbia-type emerald deposits		Chivor and Muzo districts (Columbia)		Q06	31c
Cement shale			Dunsmuir shale, Sumas Mountain	R01	--
Expanding shale		Wabamun shales (Alberta)	Nanaimo shale, Saturna Island	R02	--
Flagstone				R08*	--
Sandstone					
(Sub-bituminous coal)	Thermal coal, Black lignite			A03	--
(Bituminous coal)	Coking coal, Thermal coal	Gregg River (Alberta)	Quintette, Bullmoose	A04	--
(Anthracitic coal)	Stone coal		Mt Klappan	A05	--
(Volcanic redbed copper)	Basaltic Cu	Keewenaw (Michigan), Coppermine (Northwest Territories)	Sustut	D03	23
Basal U		Sherwood (Washington)	Blizzard, Tyee	D04	--
Sandstone U	Roll front U, Tabular U	Colorado Plateau, Grants (New Mexico)		D05*	30c
(Iron oxide Cu-Au-U breccias and veins)	Olympic Dam-type Fe (Cu-U-Au)		Iron Range	D07	29b,25i
(Sediment-hosted Cu)	Sandstone Cu	Dorchester (New Brunswick), Nacimento (New Mexico)	Sage Creek	E04*	30b
Sandstone Pb		Laisvall (Sweden), Largentiere (France)		E05	30a
(Sedex Zn-Pb-Ag-S)	Sediment-hosted massive sulphide			E14	31a
(Blackbird massive sulphide Cu-Co)	Sediment-hosted Cu-Co massive sulphide	Blackbird (Montana)		E15	24d
Agate				Q03*	--
Australian-type opal	Sediment-hosted opal	Coober Pedy (Australia)		Q08	--
Dimension stone - sandstone			Saturna Island, Newcastle Island	R06*	30d*
Silica sandstone	High-silica quartzite	Selkirk Silica (Manitoba)	Moberley	R07	30e*
Flagstone		Southowram (England)	Salmo	R08*	--
Conglomerate and Sedimentary Breccia					
Paleoplacer U-Au-PGE-Sn-Ti-diam-mag-gar-zir	Quartz pebble conglomerate Au-U	Elliot Lake (Ontario), Witwatersrand (South Africa)		C04*	39c,d,e
(Sandstone U)	Roll front U, Tabular U			D05*	30c
REGIONALLY METAMORPHOSED ROCKS					
Carbonate-hosted talc	Dolomite-hosted talc	Treasure Mountain (Montana), Henderson (Ontario)		E08	18i*
Gold-quartz veins	Mesothermal, saddle reefs	Alaska-Juneau (Alaska)		I01	36a
Turbidite-hosted gold veins	Meguma type	Ballarat (Australia), Meguma (Nova Scotia)	Frasergold	I03*	36a
Iron formation-hosted gold		Homestake (South Dakota)		I04*	36b
U veins		Uranium City (Sask.), Schwartzwalder (Colorado)	Little Gem	I14*	--
Unconformity U-Au-Ni	Vein-like type U	Key Lake (Saskatchewan), Jabiluka (Australia)		I16*	37a
(Asbestos)	Serpentinite-hosted asbestos	Thetford (Québec)	Cassiar	M06	8d
Rare element pegmatite - LCT family	Zoned pegmatite (Lithium-Cesium-Tantalum)	Bikita Field (Zimbabwe), Blackhills (South Dakota)		O01	13a*,b*
Rare element pegmatite - NYF family	Niobium-Yttrium-Fluorine pegmatite	South Platte district (Colorado), Bancroft (Ontario)		O02	--
Muscovite pegmatite	Mica-bearing pegmatite	Rajahstan (India), Appalachian Province (USA)		O03	13f*
Feldspar-quartz pegmatite	Barren pegmatite	Buckingham (Quebec)		O04*	--
Kyanite family		Willis Mountain (Virginia), NARCO (Québec)		P02	--
Microcrystalline graphite	"Amorphous" graphite	Kieserberg (Austria)		P03	--
Crystalline flake graphite		Lac Knife (Québec)	AA	P04	--
Vein graphite	"Lump and chip graphite"	Calumet & Clot (Québec), Bogala (Sri Lanka)		P05	--
Corundum in aluminous metasediments		Gallatin & Madison Counties (Montana)		P06	--
(Schist-hosted emerald deposits)		Santana Dos Ferros & Itabira (Brazil)		Q07	--
(Dimension stone - granite)	metamorphic gneiss and migmatite			R03	--
Dimension stone - marble		Vermont, Alabama, Georgia	Marblehead, Anderson Bay (Texada Is.)	R04	--
Silica sandstone	High-silica quartzite		Moberley, Nicholson	R07	30e*
Flagstone			Revelstoke	R08*	--

DEPOSIT TYPE	SYNONYMS	GLOBAL EXAMPLES Deposit (Province, State or Country)	B.C. EXAMPLES	BC PROFILE #	U.S.G.S. MODEL #
VOLCANIC ROCKS					
SUBAERIAL VOLCANIC ROCKS - Felsic-Mafic					
Mainly Volcanic Host					
(Open-system zeolites)		John Day Formation (Oregon)		D01	25oa
Volcanic redbed copper	Basaltic Cu	Keewenaw (Michigan), Coppermine (Northwest Territories)	Sustut	D03	23
Volcanic-hosted U	"Epithermal" U, Volcanogenic U	Marysvale (Utah), Aurora (Oregon)	Rexspar, Bullion (Birch Island)	D06	25f
Iron oxide Cu-Au-U breccias and veins	Olympic Dam type Fe (Cu-U-Au), Kiruna type	El Romeral (Chile), Sue-Dianne (Northwest Territories)		D07	29b,25i
Hot spring Au-Ag		McLaughlin (California), Round Mountain (Nevada)	Cinola	H03	25a
Epithermal Au-Ag; high sulphidation	Acid-sulphate epithermal, Nansatsu-type	El Indio (Chile), Nansatsu (Japan)	Taseko property, Expo	H04	25d
Epithermal Au-Ag; low sulphidation	Adularia-sericite epithermal	Comstock (Nevada), Sado (Japan)	Lawyers, Blackdome	H05	25c
Epithermal Mn		Talamantes (Mexico), Gloryana (New Mexico)		H06*	25g
Polymetallic Sn veins		Black Range (New Mexico), Potosi (Bolivia)		H07	25h, 20b
Hydrothermal alteration clays-Al-Si	Kaolin, Alunite, Siliceous cap, Pyrophyllite		Monteith Bay, Pemberton Hills	H09*	25ib*
(Subvolcanic shear-hosted gold)			Scottie	I02	--
(Cu-Ag quartz veins)		Nikolai mine & Kathleen-Margaret (Alaska)		I06*	?
Silica veins			Granby Point	I07*	--
Barite-fluorite veins		Spor Mountain & Indian Peak District (Utah)	Rock Candy	I11	26c*
Volcanic-hosted opal		Querétaro State (Mexico)		Q11	--
Dimension stone - andesite			Haddington Island	R05	--
Volcanic ash - pumice			Meagher Mountain	R11*	--
Perlite			Frenier, Francois Lake	R12*	--
Interbedded or Underlying Sedimentary Rocks					
Almaden Hg		Almaden (Spain), Santa Barbara (Peru)		E01*	27b
Hot spring Hg		Sulphur Bank (California), Steamboat Springs (Nevada)	Ucluelet?	H02	27a
(Subvolcanic shear-hosted gold)			Snip	I02	--
Silica-Hg carbonate		Red Devil? (Alaska)	Pinchi, Bralorne Takla	I08	27c
Stibnite veins and disseminations	Simple and disseminated Sb deposits	Jerritt Canyon (Nevada), Bolivia	Minto, Congress, Snowbird	I09	27d,27e
(Barite-fluorite veins)			Rock Canyon Creek	I11	26c*
SUBAQUEOUS VOLCANIC ROCKS - Felsic-Mafic					
Mainly Volcanic Host					
Open-system zeolites		Death Valley (California), John Day Formation (Oregon)	Princeton Basin, Cache Creek area	D01	25oa
Closed basin zeolites		Bowie (Arizona), Lake Magadi (Kenya)		D02	25ob
(Volcanic-hosted U)	"Epithermal" U, Volcanogenic U		Rexspar, Bullion (Birch Island)	D06	25f
Bentonite	Volcanic clay, Soap clay	Wyoming, Alberta, Rodalquilar (Spain)	, Hat Creek	E06	28e?*
Lacustrine diatomite	Diatomaceous earth, Kieselguhr	Juntura Formation (Oregon), Lake Myvatn (Iceland)	Crownite Formation (Quesnel)	F06	31s
Algoma Fe		Vermillion iron formation (Minn.), Helen mine (Ontario)		G01*	28b
(Volcanogenic Mn)		North Island (New Zealand), Rio Tinto (Spain)		G02	24c
Volcanogenic anhydrite / gypsum			Britannia, Falkland	G03*	--
Noranda / Kuroko massive sulphide Cu-Pb-Zn		Horne & Millenbach (Québec), Kuroko District (Japan)	Britannia, Kutcho Creek, Myra Falls	G06	28a
Subaqueous hot spring Ag-Au		Osorezan (Japan)	Eskay Creek	G07	--
Subvolcanic shear-hosted gold			Johnny Mountain	I02	--
Rhodonite			Hill 60, Arthur Point, Cassiar	Q02	--
Jasper			Cowichan Lake district	Q05*	--
MARINE - Mafic (including ophiolites)					
(Blackbird massive sulphide Cu-Co)	Sediment-hosted Cu-Co massive sulphide	Boleo (Mexico)		E15	24d
Volcanogenic Mn		Olympic Mountains (Washington), Nicoya (Costa Rica)		G02	24c
(Besshi massive sulphide Zn-Cu-Pb)	Kieslager	Besshi (Japan)	Windy Craggy	G04	24b
Cyprus massive sulphide Cu		Cyprus, Oman	Anyox, Chu Chua	G05	24a
VOLCANIC ROCKS - Alkalic					
(Carbonatite-hosted deposits)			Mount Grace tuff	N01	10
Gem corundum hosted by alkalic rocks				Q10	--
INTRUSIVE ROCKS					
GRANITOID INTRUSIONS					
(Iron oxide Cu-Au-U breccias and veins)	Olympic Dam-type Fe (Cu-U-Au), Kiruna-type	Olympic Dam (Australia)		D07	29b,25i
(Polymetallic Sn veins)			D Zone (Cassiar)	H07	25h, 20b
(Hydrothermal alteration clays-Al-Si)	Kaolin, Alunite, Siliceous cap, Pyrophyllite	Cornwall (England)		H09*	25ib*
Felsic plutonic U		Roy Creek (Alaska), Massif Central (France)	Coryell intrusions, Surprise Lake	I15*	
(Alkalic porphyry Cu-Au)			Afton, Copper Mountain, Galore Creek	L03	--
Porphyry Cu ± Mo ± Au		Chuquicamata & La Escondida (Chile)	Highland Valley, Gibraltar	L04	17,20,21a1
Porphyry Mo		Quartz Hill (Alaska)	Endako, Kitsault, Glacier Gulch	L05	21b
Porphyry Sn	"Subvolcanic tin"	Llallagua (Bolivia), Potato Hills (Yukon)		L06	20a
Porphyry W		Logtung (Yukon), Xingluokeng (China)	Boya	L07	21c*
Climax-type Porphyry Mo		Climax & Henderson (Colorado)		L08	16
(Rare element pegmatite - LCT family)	Zoned pegmatite			O01	13a*,b*
(Rare element pegmatite - NYF family)	Niobium-Yttrium-Fluorine pegmatite			O02	--
(Muscovite pegmatite)	Mica-bearing pegmatite			O03	13f*
(Feldspar-quartz pegmatite)	Barren pegmatite			O04*	
Amethyst		Thunder Bay (Ontario)		Q04*	--
Dimension stone - granite		Rivière à Pierre (Québec), Black Hills (South Dakota)	Nelson Island	R03	--
Alaskite		Spruce Pine alaskite (North Carolina)		R14*	
Coeval Volcanic Wallrocks					
(Epithermal Mn)		Talamantes (Mexico), Gloryana (New Mexico)		H06*	25g
(Polymetallic veins Ag-Pb-Zn)			Silver Queen, Beaverdell	I05	22c, 25b
Subvolcanic Cu-Ag-Au (As-Sb)	Enargite Au, Transitional Au-Ag	Lepanto (Philippines), Resck (Hungary), Kori Kollo (Bolivia)	Equity Silver, Thorn	L01	22a/25e
Alkalic porphyry Cu-Au			Copper Mountain, Galore Creek	L03	--
(Porphyry Cu ± Mo ± Au)		Bajo de la Alumbrera (Argentina)	Island Copper, Fish Lake	L04	17,20,21a1
(Porphyry Sn)	"Subvolcanic tin"			L06	20a
Calcareous Wallrocks					
(Carbonate-hosted talc)	Dolomite-hosted talc			E08	18?i*
Cu skarn		Mines Gaspé (Québec), Carr Fork (Yukon)	Craigmont, Phoenix	K01	18a,b
(Zn-Pb skarn)		Yeonhwa-Ulchin District (S. Korea), Darwin (California)	Piedmont, Contact	K02	18c
(Fe skarn)				K03	18d
(Au skarn)				K04	--
W skarn		Cantung (Yukon), Pine Creek (California), Salau (France)	Emerald Tungsten, Dimac	K05	14a
Sn skarn		Lost River (Alaska)	Daybreak	K06	14b
Mo skarn		Little Boulder Creek (Idaho), Mt. Tennyson (Australia)	Coxey, Novelty	K07	--
Garnet skarn			Crystal Peak	K08	--
(Wollastonite skarn)			Mineral Hill	K09	18g
Other Wallrocks					
(Polymetallic Sn veins)				H07	25h, 20b
(Gold-quartz veins)	Mesothermal, saddle reefs	Alaska-Juneau (Alaska), Red Lake (Ontario)		I01	36a
(Polymetallic veins Ag-Pb-Zn)		Riverside (Alaska)	Porter-Idaho	I05	22c, 25b
W veins	Quartz-wolframite veins	Pasto Bueno (Peru), Carrock Fell (England)		I12*	15a
Sn veins and griesens		Cornwall (England), Lost River (Alaska)	Duncan Lake	I13*	15b, 15c
Porphyry-related Au	Granitoid Au, Porphyry Au	Marte & Lobo (Chile)	Snowfields?	L02	20d
(Climax-type Porphyry Mo)		Climax & Henderson (Colorado)		L08	16
Andalusite hornfels		Bushveld (South Africa), Brittany (France)	Leech River	P01	--
(Kyanite family)			Coast plutonic complex	P02	--
(Microcrystalline graphite)	"Amorphous" graphite	South Korea		P03	--
Gem corundum in contact zones		Umba (Tanzania), Kinyiki Hill (Kenya)		Q09	S4
ANORTHOSITE INTRUSIONS					
Anorthosite Ti-V		Roseland (Virginia), Pluma Hidalgo (Mexico)		M04*	7b
Calcareous Wallrocks					
Wollastonite skarn		Fox Knoll, Lewis (New York)		K09	18g
MAFIC AND ULTRAMAFIC INTRUSIONS					
(Laterite Ni)		Riddle (Oregon)		B02*	38a
(Surficial placers)	Placer U-Au-PGE-Sn-diam-mag-garnet, gems		Atlin, Cassiar	C01	39a
(Buried-channel placers)			Otter Creek	C02	39a
(Gold-quartz veins)	Mesothermal, Motherlode	Motherlode (California)	Bralorne, Erickson	I01	36a
(Silica-Hg carbonate)		Red Devil? (Alaska)	Pinchi, Bralorne Takla	I08	27c
Magnesite veins and stockworks	Bone magnesite, Kraubath-type magnesite	--		I17	--
Podiform chromite		Josephine ophiolite (Oregon), Coto (Philippines)	Stuart Lake region	M03	8a/8b
Zoned ultramafic Fe-Ti-V / PGE / Cr / Cu-Ni	Alaskan type Fe-Ti-V / PGE / Cr / Cu-Ni	Duke Island (Alaska)	Tulameen	M05	9
Asbestos	Serpentinite-hosted asbestos	Thetford (Québec)	Cassiar	M06	8d
Serpentinite-hosted magnesite-talc		Thetford & Magog (Québec), Deloro (Ontario)		M07	8f*
Vermiculite		Libby (Montana)	Fraser Lake	M08	--
Schist-hosted emerald deposits		Habachtal (Austria), Leysdorp (South Africa), Socoto (Brazil)		Q07	--
Jade			Cry Lake, Ogden Mountain	Q01	--
Calcareous Wallrocks					
(Cu skarn)				K01	18a,b
Fe skarn		Shinyama (Japan)	Tasu, Jessie, Merry Widow, Texada Fe	K03	18d
Au skarn		Fortitude (Nevada), Buckhorn Mountain (Washington)	Nickel Plate	K04	--
Coeval Volcanic Rocks					
Basaltic subvolcanic Cu-Ni-PGE		Noril'sk (Russia), Duluth (Minnesota)		M01*	5a/5b
Gabbroid Ni-Cu-PGE		Lynn Lake (Manitoba), Noril'sk (Russia)	Giant Mascot, Nickel Mountain	M02	7a
ALKALINE INTRUSIONS					
Au-Ag-Te veins		Emperor (Fiji), Zortman (Montana), Cripple Ck (Colorado)		H08*	22b
Kimberlite-hosted diamonds	Diamond pipes	Kimberley & Premier (South Africa)	Cross	N02*	12
Lamproite-hosted diamonds		Argyle (Australia)		N03*	12
Gem corundum in alkalic rocks		Yogo (Montana)		Q10	--
Nepheline syenite		Blue Mountain (Ontario)	Trident Mountain	R13*	--
Carbonatites					
(Vermiculite)		Palabora (South Africa)	Perry River	M08	--
Carbonatite-hosted deposits		Palabora (South Africa), Oka (Québec)	Aley	N01	10