



MINERAL DEPOSIT PROFILE TABLES

LISTED BY DEPOSIT GROUP

BC Ministry of Energy, Mines and Petroleum Resources. Geological Survey Branch. OPEN FILE 1995-8. MINERAL DEPOSIT PROFILE TABLES. Sheet 1 of 2. By David V. Lefebvre, Dani J. Aldrick and George J. Simandl

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: A - ORGANIC. Rows: A01 Peat, A02 Lignite coal, A03 Sub-bituminous coal, A04 Bituminous coal, A05 Anthracitic coal.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: B - RESIDUAL/SURFICIAL. Rows: B01* Laterite Fe, B02* Laterite Ni, B03* Laterite-Saprolite Au, B04* Bauxite Al, B05 Residual kaolin, B07* Bog Fe, Mn, U, Cu, Au, B08 Surficial U, B09* Karst-hosted Fe, Al, Pb-Zn, B10 "Terra Rossa" Au-Ag, B11* Marl, B12* Sand and Gravel.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: C - PLACER. Rows: C01 Surficial placers, C02 Buried-channel placers, C03* Marine placers, C04* Paleoplacer U-Au-PGE-Sn-Ti-diam-mag-gar-zfr.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: D - CONTINENTAL SEDIMENTS AND VOLCANICS. Rows: D01 Open-system zeolites, D02 Closed basin zeolites, D03 Volcanic redbed copper, D04 Basal U, D05* Sandstone U, D06 Volcanic-hosted U, D07 Iron oxide Cu-Au-U breccias and veins.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: E - SEDIMENT-HOSTED. Rows: E01* Almaden Hg, E02* Kipushi Cu-Pb-Zn, E03 Carlin-type sediment-hosted Au-Ag, E04* Sediment-hosted Cu, E05 Sandstone Pb, E06 Bentonite, E07 Sedimentary kaolin, E08 Carbonate-hosted talc, E09 Sparry magnesite, E10 Mississippi Valley type barite, E11 Mississippi Valley type fluorite, E12 Mississippi Valley type Pb-Zn, E13 Kootenay Arc type Pb-Zn, E14 Sedex Zn-Pb-Ag, E15 Blackbird massive sulphide Cu-Co, E16 Sediment-hosted Ni, E17 Sediment-hosted barite.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: F - CHEMICAL SEDIMENT. Rows: F01 Sedimentary Mn, F02 Bedded gypsum / anhydrite, F03 Gypsum-hosted sulphur, F04* Bedded celestite, F05* Polygorskite, F06 Lacustrine diatomite, F07 Phosphate, upwelling type, F08 Phosphate, warm-current type, F09* Playas, F10* Superior type iron formation.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: G - MARINE VOLCANIC ASSOCIATION. Rows: G01* Algoma Fe, G02* Volcanogenic Mn, G03* Volcanogenic anhydrite / gypsum, G04 Besshi massive sulphide Zn-Cu-Pb, G05 Cyprus massive sulphide Cu, G06 Noranda / Kuroko massive sulphide Cu-Pb-Zn, G07 Subaqueous hot spring Ag-Au.

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), Kirby 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 (Lefebvre 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.

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 should be included. We can be contacted at the following addresses:

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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, 78 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 deposit 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 any satisfactory classification scheme for all mineral deposits. The reader is directed to summaries by Jensen and Eide (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 Lacroix'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 a number of meetings to determine which deposit types should be included. The work of Chris Ash, Neil Church, Tim Giles, David Griese, Kirk Hancock, Don Hora, Fyffe Hoy, Vic Lesyon, Don MacIntyre, Nick Massey, Andrew Nelson, Graham Nixon, Andre Panfiliyev, Tom Schroter 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 Bissett, Tomas Feininger, Suzanne Paradis, Ann Sabina, Don Sangster and Dave Sinclair have contributed profiles or acted as co-authors. Ian Knuckey and Christopher Plinski of Hyming, Peter Conry of the University of Manitoba, Wilfred Krizan of Albany Graphite Mills, Inc., and Eric Force, Greta Orin 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 Stomach House 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.

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Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: H - EPITHERMAL. Rows: H01* Travertine, H02 Hot spring Hg, H03 Hot spring Au-Ag, H04 Epithermal Au-Ag; high sulphidation, H05 Epithermal Au-Ag; low sulphidation, H06* Epithermal Mn, H07 Polymetallic Sn veins, H08* Au-Ag-Te veins, H09* Hydrothermal alteration clays-Al-Si.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: I - VEIN, BRECCIA AND STOCKWORK. Rows: I01 Gold-quartz veins, I02 Subvolcanic shear-hosted gold, I03* Turbidite-hosted gold veins, I04* Iron formation-hosted gold, I05 Polymetallic veins Ag-Pb-Zn, I06* Cu-Ag quartz veins, I07* Silica veins, I08 Silica-Hg carbonate, I09 Stibnite veins and disseminations, I10 Vein barite, I11 Barite-fluorite veins, I12* W veins, I13* Sn veins and greisens, I14* U-Th-REE veins, I15* Felsic plutonic U, I16* Unconformity U-Au-Ni, I17 Magnesite veins and stockworks.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: J - REPLACEMENT. Rows: J01 Polymetallic mantos Ag-Pb-Zn, J02 Sn mantos and stockworks, J03* Mn veins and replacements, J04 Sulphide manto Au.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: K - SKARN. Rows: K01 Cu skarn, K02 Zn-Pb skarn, K03 Fe skarn, K04 Au skarn, K05 W skarn, K06 Sn skarn, K07 Mo skarn, K08 Garnet skarn, K09 Wollastonite skarn.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: L - PORPHYRY. Rows: L01 Subvolcanic Cu-Ag-Au (As-Sb), L02 Porphyry-related Au, L03 Alkaline porphyry Cu-Au, L04 Porphyry Cu ± Mo ± Au, L05 Porphyry Mo, L06 Porphyry Sn, L07 Porphyry W, L08 Climax-type Porphyry Mo.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: M - ULTRAMAFIC / MAFIC ASSOCIATION. Rows: M01* Basaltic subvolcanic Cu-Ni-PGE, M02 Gabbroid Ni-Cu-PGE, M03 Podiform chromite, M04* Anorthosite Ti-V, M05 Alaskan-type PGE, M06 Asbestos, M07 Serpentine-hosted magnesite-talc, M08 Vermiculite.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: N - ALKALIC ASSOCIATION (includes kimberlites and lamprolites). Rows: N01 Carbonatite-hosted deposits, N02* Kimberlite-hosted diamonds, N03* Lamprolite-hosted diamonds.

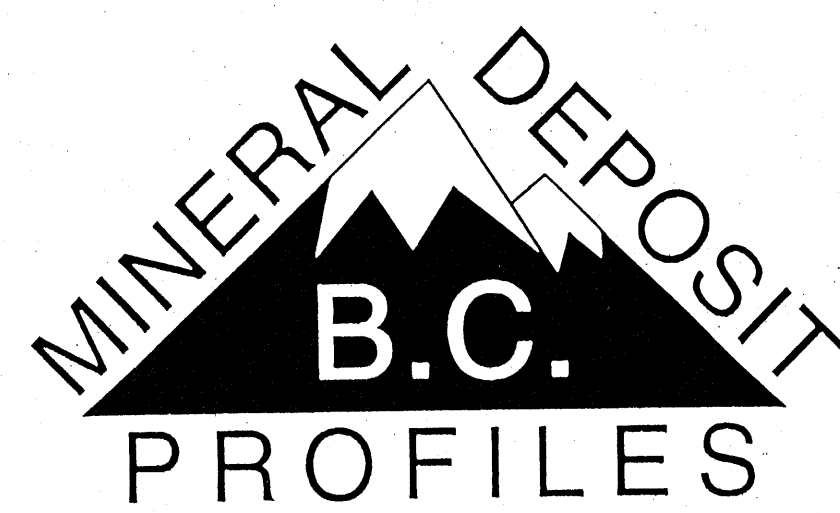
Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: O - PEGMATITE. Rows: O01 Rare element pegmatite - LCT family, O02 Rare element pegmatite - NYF family, O03 Muscovite pegmatite, O04* Feldspar-quartz pegmatite.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: P - METAMORPHIC HOSTED. Rows: P01 Andalusite hornfels, P02 Kyanite family, P03 Microcrystalline graphite, P04 Crystalline flake graphite, P05 Vein graphite, P06 Corundum in aluminous metasediments.

Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: Q - GEMS AND SEMI-PRECIOUS STONES (diamonds under N). Rows: Q01 Jade, Q02 Rhododite, Q03* Agate, Q04* Amethyst, Q05* Jasper, Q06 Columbia-type emerald, Q07 Schist-hosted emerald, Q08 Australian-type opal, Q09 Gem corundum in contact zones, Q10 Gem corundum hosted by alkaline rocks, Q11 Volcanic-hosted opal.

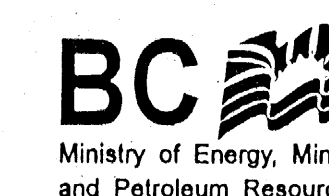
Table with columns: BC PROFILE #, DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES. Section: R - INDUSTRIAL ROCKS. Rows: R01 Cement shale, R02 Expanding shale, R03 Dimension stone - granite, R04 Dimension stone - marble, R05 Dimension stone - andesite, R06* Dimension stone - sandstone, R07 Silica sandstone, R08* Flagstone, R09 Limestone, R10* Dolomite, R11* Volcanic ash - pumice, R12* Volcanic glass - perlite, R13* Nepheline syenite, R14* Alaskite, R15* Crushed rock.

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

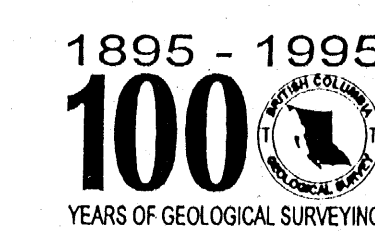


MINERAL DEPOSIT PROFILE TABLES

LISTED BY LITHOLOGICAL AFFINITIES



Geological Survey Branch
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MINERAL DEPOSIT PROFILE TABLES

Sheet 2 of 2

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Note: B01* - asterisk beside profile number indicates no draft profile completed
(Sediment-hosted Ni) - not the most common lithological affinity for the deposit profile

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: UNCONSOLIDATED DEPOSITS.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: SEDIMENTARY ROCKS.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: CLASTIC SEDIMENTARY ROCKS.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: REGIONALLY METAMORPHOSED ROCKS.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: VOLCANIC ROCKS.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: SUBAQUEOUS VOLCANIC ROCKS - Felsic-Mafic.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: VOLCANIC ROCKS - Alkaline.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: INTRUSIVE ROCKS.

Table with columns: DEPOSIT TYPE, SYNONYMS, GLOBAL EXAMPLES, B.C. EXAMPLES, BC PROFILE #, U.S.G.S. MODEL #. Section: ANORTHOSITE INTRUSIONS.