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**GEOLOGICAL SURVEY OF CANADA
OPEN FILE 7930**

World Lode Gold Deposit Database

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doi:10.4095/297322

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Recommended citation

Gosselin, P. and Dubé, B., 2015. World lode gold deposit database; Geological Survey of Canada, Open File 7930, 1 .zip file. doi:10.4095/297322

Publications in this series have not been edited; they are released as submitted by the author.

WORLD LODE GOLD DEPOSIT DATABASE

P. Gosselin and B. Dubé

1. Introduction

Gold deposits are an attractive and major target for many exploration and mining companies. Although the economics of gold itself have varied, the industry is especially productive in finding new gold deposits and new ways of exploiting them at minimal cost. However, gold deposits are one of the most difficult targets to characterize as they are one of the most geologically complex types of mineral deposit. They can be hosted in a wide variety of rocks, and linked to a broad range of tectonic and geological settings. Thus, with the renewed interest in gold exploration from mineral exploration companies in the past 10 years, the need has risen for readily available detailed geological information pertaining to individual deposits.

To support this need, the Geological Survey of Canada has launched, with the help of sponsors from the industry, the World Minerals Geoscience Database Project (WMGDP: 1998-2004) managed by W.D. Sinclair. The aim of the WMGDP is to produce high-quality, well-organized geoscience data sets that can be used in conjunction with GIS (Geographic Information Systems) and database software to help understand the broad relationships between global tectonics and the regional settings of mineral deposits. The World Gold Database (WGD) project started in 1998 and the database provided herein is an integral part of the WMGDP, and the end-result of research and compilation by the authors during this time. Companies and organizations that have financially supported the WMGDP are BHP World Exploration, Inc., Billiton International Metals B.V. (now merged with BHP World Exploration, Inc. as BHP Billiton Limited), Barrick Gold Corporation, Cominco Ltd., Cyprus Amax Minerals Company, Inco Limited, Metal Mining Agency of Japan, North Limited, Phelps Dodge Exploration Corporation, Placer Dome Exploration Inc., Randgold Resources, Rio Tinto Mining and Exploration Limited, Teck Corporation (now merged with Cominco Limited as Teck Cominco Limited), and WMC International Limited.

The World Gold Database (WGD) contains information for over 1000 gold deposits of all types located in 74 countries and covering all continents but Antarctica. The deposits in this publication are restricted to bedrock (commonly termed “lode”) gold deposits and do not include unconsolidated placer deposits. The goals of the World Gold Database are:

- To identify and locate large (\geq Moz) gold deposits
- To give detailed and referenced geological information
- To give referenced economic (production and resources) figures
- To have the information in a database framework that can be queried and updated by a third party

This database is built on data compiled from various sources: the available scientific literature, numerous databases from geological surveys or other geoscience agencies (OZMIN database from the Australian Geological Survey Organization, SAMINDABA database from the South African Council for Geoscience, MRDS database from the United States Geological Survey, Gold Resources of the Andes by David Shatwell Pty Ltd.), GSC Open Files 3490 (Jenkins et al., 1997), and GSC Bulletin 540 (Poulsen et al., 2000), as well as personal observations made by the second author. Field notes and personal records of former GSC colleagues F. Robert and K.H. Poulsen were also consulted.

Deposits considered to be “gold deposits” in this open file are those in which the value of contained gold exceeds that of co-commodities (see Poulsen et al., 2000). To calculate this, the following equation was used:

$$\frac{\text{Au (g/t)}}{\text{Cu(\%) + Pb(\%) + Zn(\%)}} > 1$$

A cut-off factor of 1 million troy ounces gold was chosen for the compilation of World deposits for a number of reasons. The economics of gold is a primary determinant in the decision to bring a deposit into production or not. Although the price of gold is definitely one of the most important factors, certainly another very important factor is the size of the deposit (or total gold content). This decision also helped to confine our research to a certain number

of important deposits. Later in the project, it was decided that a separate database for Canadian deposits should be compiled with the addition of deposits with 250,000 troy ounces gold or more, for the reason that these smaller deposits might be economic to mine in Canada given sufficient infrastructure. These databases, and derivative map products, were published separately (Gosselin and Dubé, 2005a, 2005b, 2005c, 2005d).

It is to be noted that the 1 M oz factor (or the 250,000 oz factor) represents the total gold content of a deposit. This is calculated by combining the past and current gold production with the latest available reserves figure (reserves means proven & probable reserves as defined in CIMM,1996). Confidence in the reserves figures defined by closely spaced drilling and sampling is high enough that these numbers can be included in the total gold content of the deposit. As such, deposits entered into the database may or may not be actual producers. Past producers with known production exceeding 1 Moz Au are certainly included in the database. Current large producers still active are also included. Finally, deposits which are sufficiently large but have not yet produced sufficient gold, or have not yet produced at all, may also be present in the database, providing their reserves, or total resources in the case of figures entered post 2004, are high enough. A spreadsheet of production and reserve data, as of 2004, for all but 26 deposits in the database is included in this Open File as CompWorldAu2004.xls. Another spreadsheet, CompCanadaAu2004.xls, lists production and reserve data for Canadian deposits only.

2. Structure of the World Gold Database

The World Gold Database (WGD) was initiated with index-level data previously released in GSC Open File 3490 by Jenkins et al. (1997), compiled with the support of Inmet Mining Corporation. All deposits included in OF 3490 were imported into the WGD, as well as most of the attribute data. Columns of data imported from OF 3490 include Deposit Number, Name, Country, Near City, Geological Province, Geological Subprovince, District, Longitude, Latitude and Style of Mineralization. This initial compilation was augmented with data collected by K. Howard Poulsen during his numerous years of service with the Geological Survey of Canada, who supplied a thorough list of deposits complete with some of their geological characteristics, and graciously allowed the use of his data.

Much of the conceptual design and content of the database is based on Poulsen et al. (2000), which served as a basis for determining which features were to be compiled and presented in the database, and which features were necessary for classification of a deposit. This publication also served as a guiding tool to classify all gold deposits and is an essential companion to this database.

The data fields and tables used in the WGD are based on the GlobalDBSchema developed for the World Minerals Geoscience Database Project. This schema, and the data-entry and query utilities designed to manage it, are described in the accompanying Documentation, which is modified from Laramée (2004). The following description of database entities and tables in the WGD is illustrated through screen-captures of GShell, the application designed for entering and editing data in GlobalDBSchema databases. This provides a view of the database as seen from the compiler's perspective, and explains how the tables and fields of this particular WMGSDP database were used. For additional information about the schema and support utilities, refer to Afterword: About this database near the end of this document and to the Documentation folder.

The opening screen of the GShell program (Figure 1) allows the user to select one of 7 options. The 7 buttons open up 7 different modules (sets of related forms) listed as follows:

- Deposit Group: This module is barely used in the WGD and was intended for the description of deposit clusters or camps in other WMGDP databases.
- Deposit: This module (set of forms) is used to enter and store geographical and geological data for each deposit. Please note that the term "deposit" is not restricted to a single occurrence of metal and may in places apply to a district or an area with multiple genetically-related deposits, particularly for older production areas where production data is difficult to retrieve. It may then be applied to a cluster of mines exploiting the same mineralized structure or orebody, such as Hemlo for example.
- Mine: This module is used for associating a mine to a deposit, and entering ownership/operatorship data.

- **Production:** This module is used to enter production data by time period. A deposit may have one or more production record. Deposits with no production records are deposits which have never been in production, or for which the information was unavailable to the compilers.
- **Resource:** This module is used to enter reserves and resources figures. In ideal cases, a deposit has one reserve record and one to two resource records, but this may vary. Deposits with no records reflect the situation where either the deposit is exhausted or the resource data was unavailable to the compilers.
- **References:** This module is used to enter the complete data for a particular reference, which can later be used and linked to from other entities.
- **Lookup Tables:** This form is used to give and/or edit information available in the lookup tables in MS-Access®. Entries in the Lookup tables are used as picklists in the **Deposit**, **Mine**, **Production**, **Resource**, and **Reference** forms.



Figure 1: Opening window of the GShell program with WGD selected

For a complete description of how the GShell program works, the reader should refer to the accompanying Documentation modified from Laramée (2004). For more complete information about the MS-Access tables, the reader can use the Documentor program developed by Robert Laramée and included in the GlobalDBSystem321.

2.1. Deposit Module

A general information section fills the upper half of the Deposit module window (Figure 2). It is static and used for every deposit. Most fields in the general information section serve to document both the geological and geographic position of the deposit. There are 11 fields in this section:

- **DepClan:** (Deposit Clan): The Deposit Clan is a broad way of classifying deposits on the basis of tectonic environments and crustal depth represented by the host rocks (epithermal, intrusion- related, greenstone and slate belt). These terms refer to a group of deposit types, possibly genetically related, that reflect a particular geological and metallogenic environment (Figure 3; see Poulsen et al., 2000).

- **DepType**: (Deposit Type): This field is grayed out, and the tabbed page Deposit Type is used to fill it in (see the Deposit Type section next page).
- **GeolProv**: (Geological Province): This field is used to enter the high level geotectonic domain in which the deposit is located (such as Superior Province, Cordillera, etc.).
- **GSubProv**: (Geological Sub-Province): This field is used to enter the regional-scale geotectonic environment in which the deposit is located (such as Abitibi belt, Uchi subprovince, etc.).
- **GDistrict**: (Geological District): This field is used to enter the name of the local mineral district the deposit is part of, and often bears either the name of the most important deposit in the area or the name of the area itself (such as Timmins or Val d'Or).
- **ObjLoc**: (Object Located): This field describes the corresponding object of which the position was measured and given in the Longitude and Latitude fields (such as a mine shaft).
- **Longitude**: Longitude coordinates of the deposit or of the object specified in the ObjLoc field.
- **Latitude**: Latitude coordinates of the deposit or of the object specified in the ObjLoc field.
- **HowLoc**: (How Located): Method used for derivation of the Longitude and Latitude coordinates.
- **Accuracy**: Exactitude of the Longitude and Latitude coordinates relative to degree (D), minute (M) or second (S), but this field is seldom used. Please note that data may not be accurate enough for plotting at large scale (1:100,000 and larger).
- **Calc. Nearest City**: (Calculated from the nearest city): This checkbox indicates if the Longitude and Latitude coordinates are calculated using the coordinates of the nearest city to the deposit and the distance from this city to the deposit. This field is seldom used.
- **Datum**: The datum or reference spheroid used for the geographic coordinates is shown, if available. The concept of a geographical datum was not understood or felt to be important during the early stages of data compilation, considering the low level of positional accuracy. This field is empty for many deposits, but is populated for deposit locations derived from "other digital database"s for which datums are reported, or for deposit locations obtained using Google Earth ("spheroid-WGS1984") to locate a deposit plotted on a satellite image in a data source.

The lower half of the Deposit form window is separated into tabbed pages which can be navigated through using the arrows at the right end of the tab bar (Figure 2). The order in which these tabbed pages appear can be modified using the Customize Tabs option in the Edit menu accessible through the opening form of Gshell. Each of the 19 tabs (currently 26 tabs: see Afterword: About this database as well as the schema diagram at the end of this document) allows for precise description of a characteristic of the deposit, and are listed as follows:

- **Deposit Names**: The first name entered in the DepName field is usually the name of the deposit most commonly used in recent literature. Additional entries are used to enter previous or alternative names that might have been used in the past, or may represent different ways of writing the deposit name. Russian deposit names often end in the suffix "-skoye".
- **Country/Province**: This page is used to further characterize the geographical location at Country, state/province (ProvState field) and district/county/subprovince scale (SubProv field). The last four fields are used to describe the distance (HowFar and FarUnits fields) and direction (DirFrom) of the deposit from the nearest and/or largest and/or most known city or landmark (NearCity field) in the area. Additional entries are sometimes used to give the user another city which is situated closer but may be less known, or to the contrary, to illustrate the distance from a well-known city.

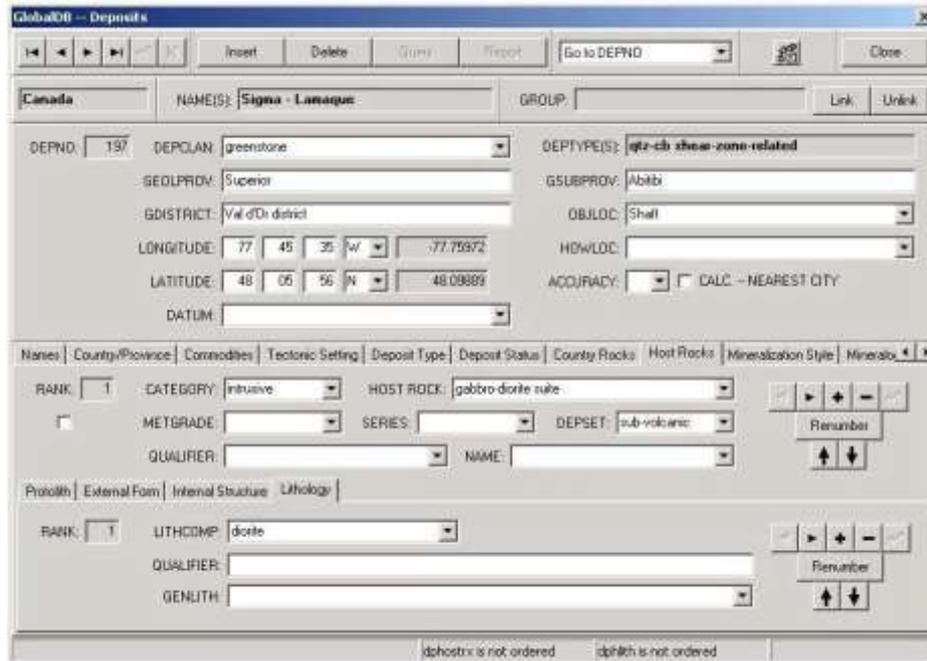


Figure 2: Deposit Module with Host Rocks tabbed page activated

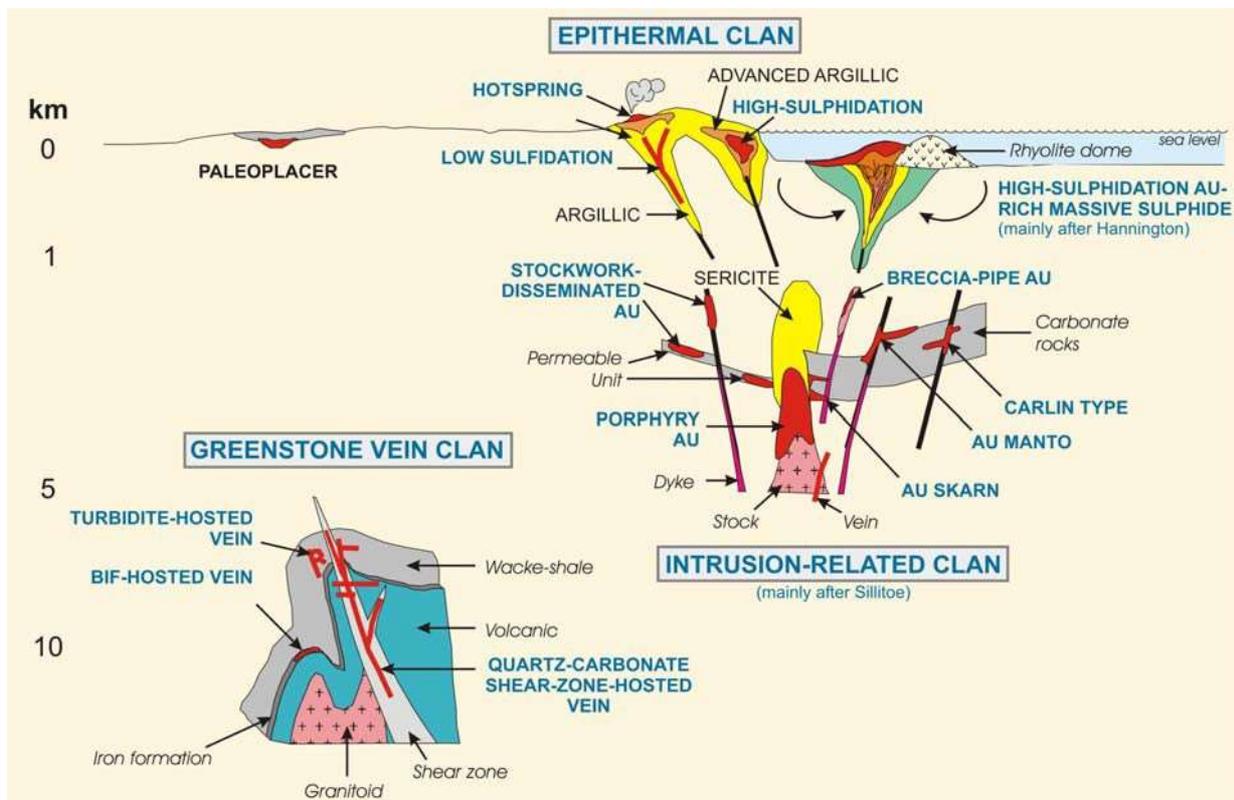


Figure 3: Inferred crustal levels of gold deposition, from Dubé et al. (2001), modified from Poulsen et al.(2000)

- **Commodities:** This page and the Commodity field detail which commodities or metals were exploited during the life of the deposit, though sometimes there are no corresponding production data. The most important commodity is ranked first, and subsequent entries are usually of lesser economic importance or by-products.
- **Deposit Type:** The DepType (Deposit Type) field is based on sixteen well-established gold deposit types described by Poulsen et al. (2000). A summary description of each type, as well as the classification parameters used can be found in Poulsen et al. (2000). The decision tree used for classification is illustrated in Figure 4. As some deposits may present ambiguous characteristics, a short comment may be entered in the Comments field. Also, when more than one type of ore is present, additional entries may be added, though the initial entry is the one type of mineralization that is predominant in the deposit. This classification should be used with caution, as some deposits may be transitional between two types, atypical or intensively deformed and metamorphosed, and consequently difficult to classify. Deposits classified as “mesothermal lode gold” (Lindgren, 1911, p. 600; Hodgson, 1993) have been reclassified as “greenstone-hosted quartz-carbonate vein” deposits by Poulsen et al. (2000), a classification reflected in this compilation as DepClan = “greenstone” and DepType = “qtz-cb shear-zone-related”. Groves et al. (1998) use the term “orogenic gold” deposits for the same deposit type, and include other deposits with no greenstone belt affiliation.
- **Tectonic Setting:** This page is used to describe the tectonic setting (TectObj field) of formation of various geological elements (SettingOf field), i.e. of the host rocks, mineralization, alteration, country rocks and related magmatic rocks. This section was enhanced with 4 new fields (Realm, DfRegime, TecQual and TectName) during mid-summer 2000; deposits entered prior to this date usually have less data. The Realm field defines location of the setting in relation to the continental and oceanic plates. The DfRegime field (Deformation Regime) characterizes the deformation regime associated with the tectonic setting of the geological element’s formation. The TecQual field (Tectonic Qualifier) further constrains, where necessary, the tectonic setting present in the TectObj field. The TectName field (Tectonic Name) specifies the name of the tectonic event specified in the TectObj field. Part of the most critical data to the WGD is the tectonic setting of the mineralization. This parameter however, may be different from the tectonic environment of host rock formation. Although the latter is generally well-known, the tectonic environment of the mineralization is often elusive, and interpretations may change as research advances and good radiometric dating improves the odds.
- **Deposit Status:** This page and the DepStat (Deposit Status) field serve to qualify the operational status of the deposit according to the CIMM (Canadian Institute of Mining and Metallurgy) recommendations. The Comment and EstSize (Estimated Size) fields were added in January 2001; deposits entered before this date have no data in those fields. The Comment field is used to enter useful information pertaining to the operational history of the deposit/mine, or to help complement the production or resource data present in the other forms. The EstSize field, used mostly for Chinese deposits, represents the estimated total content of gold, or productivity, (production + reserves) in metric tons according to the following categories:
 - Small: less than 7 metric tons Au
 - Medium: 7 to 29 metric tons Au
 - Large: 30 to 99 metric tons Au
 - Super-large: 100 metric tons and over
- **Country Rocks:** This page is used to describe the type of rocks around the deposit (on a local scale), or the mine stratigraphy. Only the Country Rock and MetGrade (Metamorphic Grade) fields are used on a constant basis even though other fields and sub-pages are available. For description of the other fields and pages, please refer to the Host Rocks page. The Country Rock field gives a list of the rocks present in the area of the deposit. The associated MetGrade field gives the metamorphic grade of the rocks associated in the Country Rock field. When this field is left blank, it means that the metamorphic grade is unknown or was not found in the available literature by the compiler. However, metamorphism is at times implied in the literature, especially in greenstone belt settings where most, if not all rocks are of greenschist grade. Also, intrusive rocks in some cases have no accompanying metamorphic grade when all other rocks have one ascribed. This reflects the fact that it is difficult to establish clearly whether the intrusive rocks were emplaced pre-, syn-, or post-metamorphism. A checkbox near the grayed-out Rank field indicates whether this entry has a corresponding radiometric age in the Radiometric Age page. No importance has been assigned to Rank in this category.

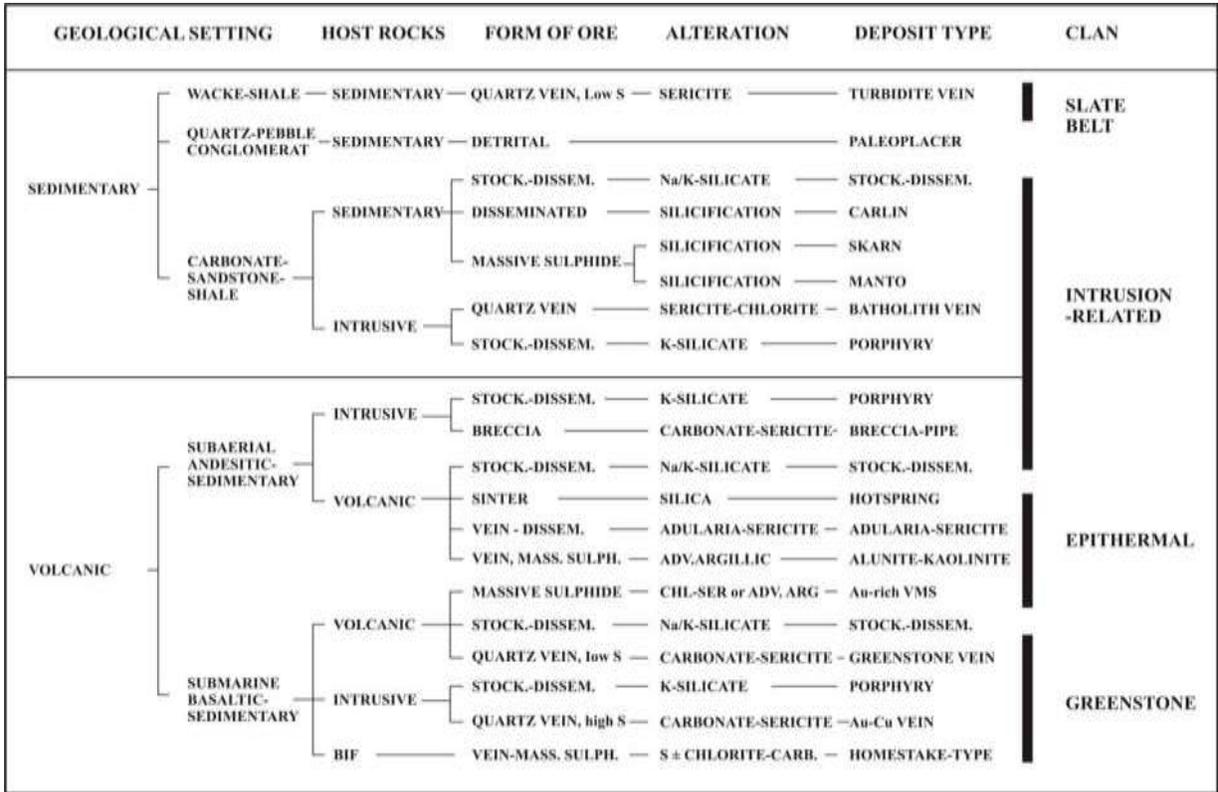


Figure 4: Decision tree showing how sixteen geological types of lode gold deposits can be distinguished from one another using selected geological parameters (adapted from Poulsen et al. (2000) and Robert and Poulsen (1997))

- Host Rocks:** The Host Rocks tab page (Figure 2) is used to give a detailed description of the rocks hosting the orebodies. It is separated into two sections: the top section accommodates general information, and the second section, with four sub-tab pages, accommodates more precise details. A checkbox on the left of this panel under the greyed-out Rank field indicates whether this entry has a corresponding radiometric age in the Radiometric Age page. Please note that, usually, the first host rocks are the most important hosts, whereas the last ones listed host significantly less ore. The first section consists of seven fields listed as follows:

 - The Category field is the first step in classifying the host rocks, and uses the broad classifications: intrusive, volcanic, sedimentary, metamorphic, tectonic, and hydrothermal-metasomatic.
 - The Host Rock field goes one step further in the classification of the host rocks using generalized sedimentary assemblages, intrusive suites, compositional volcanic packages, general metamorphic terms, and hydrothermal-metasomatic terms.
 - The MetGrade (Metamorphic Grade) gives the metamorphic grade of the rocks in the Host Rock field.
 - The Series field is used primarily to constrain further intrusive and extrusive rock types with appropriate magmatic affinity (igneous-rock series), or general sedimentary facies.
 - The DepSet (Depositional Setting) field is used to constrain the environment of formation of sedimentary rocks, and is also used to express the level (depth) of intrusive rocks within the crust.
 - The Qualifier field uses descriptive terms such as calcareous, silty, etc. The Qualifier applies in whole or in part to the rocks appearing in the Lithology page (see below), and it may reflect lateral changes and variations within the rock formation.
 - The Name field is used to give the proper stratigraphic or lithostratigraphic name used in the literature for a given rock formation. This field is now contained in a table exposed in a lower level sub-tab page in order to accommodate several lithostratigraphic levels (see Afterword and diagrams in the Documentation).
- The second part of the Host Rock tab comprises four sub-tab pages, each with their own fields, and listed as follows:

- Protolith: The protolith page and Protolith field are used to give a protolith in the context of a severely metamorphosed or deformed rock. The field Name is rarely used as it is redundant with the same field in the first section. The field Qualifier is used to enter a short comment of interest.
 - External Form: This page and the Hform (Host Rock Form) field are used to characterize the physical shape of the host rock (dyke, sill, etc.).
 - Internal Structure: This page and the HStruc (Host Rock Structure) field are used to characterize the internal structure of the rock (layering, banding, etc.) and any other noteworthy specific characteristic related to the host rock.
 - Lithology: This page and the Lithology field are used as the final classification step of the host rock and represent the rock itself. The Qualifier field is used to enter a short comment of interest. The Genlith field is not used in the WGD, but was meant to accommodate unique acceptable rock names determined by a national bedrock community under a discontinued project known as the Canadian Geoscience Knowledge Network.
- **Mineralization Style**: This tabbed page and the MinStyl field are used to characterize the physical form or shape of the orebodies (veins, stockworks, breccias, etc.). The first style listed is usually (subjectively) the most important in a particular deposit, and the subsequent styles are listed in order of importance.
 - **Mineralogy**: The Category field is used to select an element from which the mineralogy can be defined in the Mineral field. In most cases, minerals listed on this page are those of the gangue and ore. Mineralogy of the host rocks is rarely used, as it is mostly inferred from the type of rock shown in the Lithology field (see Host Rocks), and any specific mineralogical characteristic would be written down in the Qualifier field of the Lithology sub-tab page. Mineralogy of the alteration is also rarely used here as it is generally well-constrained in the AltSig field of the Alteration Signature page. A checkbox near the greyed-out Rank field indicates whether this entry has a corresponding radiometric age in the Radiometric Age page. The list of minerals by category is usually ranked by order of importance, i.e. the first (or the first few) ore mineral is a major ore constituent, with the last ones being minor to rare.
 - **Coincident Feature**: This tabbed page lists the structures which may control the mineralization and more certainly coincide with it. The CFeat (Coincident feature) field is used to broadly categorize the type of structure that exerts some degree of control over the mineralization. The Name field gives that structure its formal or informal name appearing in the literature. The Qualifier field is a free-text field used to enter a short description of the structure and the way it affects the orebody. A checkbox near the Rank field to the left of the text boxes indicates whether this entry has a corresponding radiometric age in the Radiometric Age page. Structures are usually ranked in such a way that the most important ore-controlling (coinciding) structure is ranked first. Structures affecting only the geometry and localization of the orebody and not its emplacement or genesis (such as post-mineral faults) are ranked last. Ore-controlling (coinciding) structures can be linked to the mineralization style that they are controlling or coinciding with.
 - **Tectonic Structure**: This page is used for major regional structures possibly related to, if sometimes distantly and distanced from, the deposit and its formation. The TStruc (Tectonic Structure) field serves as a broad classification of structure type. The Name field reports the name of the structure used in the literature. The Qualifier field is a free-text field used to enter a short description of the structure and the way it affects the deposit. Structures are usually ranked in order of interpreted importance.
 - **Alteration signature**: The AltCat (Alteration Category) field (Figure 5) serves as a broad alteration type classification with broad terms like propylitic alteration, and “mineralogic” terms such as carbonate alteration or sericite alteration. The WhatAlt (What is Altered) field is used to list the rock types affected by the alteration, the zonality of the alteration and any other short relevant comment. The AltSig (Alteration Signature) field serves to further characterize the alteration type mostly by specifying its mineralogy. A checkbox near the Rank field indicates whether this entry has a corresponding radiometric age in the Radiometric Age page.

Figure 5: Deposit Form with Alteration Signature tabbed page activated

The link between a specific alteration and related mineralization style, enabled along the bottom of the data entry screen, was requested in an internal database review by Poulsen (2001). It is often subjective. Where possible, the link was restricted to the exact mineralization which can be found in one specific altered zone. However, most of the time the link is more of a “genetic” kind, implying that the alteration and hydrothermal activity are broadly related to the mineralization emplacement. For example, it is difficult (if not stated clearly in the reference) to say if any mineralization is found within the distal propylitic alteration of a deposit. As a rule of thumb, if all mineralization styles are attached to an alteration, it usually means the link is “genetic”.

- **Radiometric Age:** This page (Figure 6) is used to enter radiometric age data for rocks and/or minerals which have a special meaning to the ore deposit and serve to constrain events in a given time frame. This page consists of 14 fields listed as follows:
 - The ObjDated (Object Dated) serves to illustrate to which element of the database the age applies to (host rock, alteration signature, etc.)
 - The Link button is used to link the element chosen in the Objdated field to a specific item such as a rock, mineralization style, alteration signature, etc. The lack of linked item means that this degree of precision was unavailable.
 - The ObjRank (Object Rank) field is used to select a more specific element of the database to which the age applies, i.e. a specific rock type from the country rocks listing.
 - AgeMa (Age in Million Years) gives the radiometric age in Ma.
 - The +Err field is used for the upper error limit.
 - The -Err field is used for the lower error limit.
 - The RefNo (Reference Number) field and Link button are used to assign a specific reference from which the age was taken. Efforts were made to assign the most specific reference where the date was used for the first time and not a paper where reference is made to such a date; however this was not always possible.
 - The 2-Sigma field is rarely used, as it is rarely mentioned if the error on the date is a 2-sigma error.
 - The Method field states which method was used for dating.
 - The Concentrate field is used to specify which mineral was dated.
 - The SourceRock field specifies the rock from which the mineral fraction was extracted.
 - The NameDated field is used to enter a stratigraphic or lithostratigraphic name for the source rock.
 - The WhatDated field is used to express which element or event was dated and what is the element’s or event’s relationship to the mineralization.
 - The InterpCom (Interpreter’s Comment) is a free-text field used to specify any comment of interest pertaining to the determination of the age or source rock, etc.

Figure 6: Deposit Form with Radiometric Age tabbed page activated

It is to be noted that ages are also sometimes entered as a “bracket age” without method and concentrate being specified. Such ages give the minimum and maximum ages and are often inferred from the radiometric ages of the rocks overlying and underlying the specified geological element, or from the age of the lowermost and topmost members of a Formation, or from pre-ore and post-ore intrusions.

- **Related Igneous Rocks**: This page (Figure 7) is used for entering intrusive rocks having a link to the deposit, whether spatial or genetic. A checkbox near the greyed-out Rank field indicates whether this entry has a corresponding radiometric age in the Radiometric Age page. There are 6 fields and one sub-page with 2 fields, listed as follows:
 - The Category field is the first step in classifying the related magmatic rocks, and uses a broad classification such as intrusive or volcanic. In some cases, only intrusive rocks are entered in this field.
 - The RIgneous (Related Igneous Rock) field specifies the type of intrusive suite the rocks belong to.
 - The MSeries (Magmatic Series) field is used to relate the intrusive rock to the appropriate magmatic affinity (igneous-rock series or geochemical classification).
 - The DepSet (Depositional Setting) is used to express the level (depth) of intrusive rocks within the crust (near surface, mid-level, etc.).
 - The Qualifier field is a free-text field used for a short comment describing the relationship of the intrusive rocks to the deposit.
 - The Name field is used to give the proper lithostratigraphic name used in the literature for the intrusive rocks.
 - The Lithology sub-page has three fields: the LithComp field is used as the final classification step of the intrusive rocks and gives a precise rock name. The Qualifier field is a free-text field used for entering a short comment about any specific characteristics (mineralogy, texture, etc.) of the intrusive rocks. The Genlith field is not used in the WGD, but was meant to accommodate unique acceptable rock names determined by a national bedrock community under a discontinued project known as the Canadian Geoscience Knowledge Network.

Figure 7: Deposit Form with the Related Igneous Rocks tabbed page activated

- **General Shape**: This tabbed page is not used in the WGD.
- **Geological Age**: This tabbed page is used to give the geological or stratigraphic age of an element of the database. It is mostly used to give a stratigraphic age to the host rocks and to the mineralization. The first four fields (StartAge, StartAge Qualifier, EndAge, EndAge Qualifier) are greyed out and serve only to show the values chosen using the Startage and Endage pick boxes in the lower right hand corner of the panel. The CtryHost field is used to determinate which element of the database the stratigraphic age refers to. The StartAge and Endage pick boxes are used to assign an age to the chosen CtryHost element. In some cases, only the StartAge or the EndAge is entered. This means that the age is unconstrained in one direction, and gives the maximum or the minimum age of the element.
- **Metallic Signature**: This page and the MetSig (Metallic Signature) field describe the suite of metallic elements which can be found associated with the mineralization. A checkbox near the greyed-out Rank field indicates whether this entry has a corresponding radiometric age in the Radiometric Age page. Systematic ranking of the elements of a signature by decreasing order of abundance was attempted but proved difficult, so the actual order of the elements should so not reflect any importance of one element over another. When no geochemical data was available, the suite was inferred from the gangue and ore minerals. The metallic signature can be linked to the mineralization style with which they are associated.
- **References**: References entered through the References Form can be linked (or unlinked) to a specific deposit with the use of the Link Ref./Unlink Ref. buttons in the top right of the Reference tab page, and the first part of the citation will be listed in the left to centre greyed-out text boxes (Figure 8). The references are not linked in order of importance. The + button allows the compiler to specify which information was taken from the selected reference by providing a number of checkboxes labelled by topic. Note that if two different references have checkmarks in the same boxes, this means that either both references gave the same information or that, more likely, the data used is a combination of the two references. Also, for a listed reference that has no checkmarks in any boxes, this means that the reference was added as an additional reference of interest although no specific data was extracted from that reference, or it may mean that the compiler did not specify what was obtained. Additional information on the exact location of the data in a reference may be available from the Chapter, StartPage and EndPage fields, although these are rarely, if at all, used in the Deposit module.

Figure 8: Deposit Form with References tabbed page activated

2.2. Mine Module

The Mine Form (Figure 9) accommodates ownership/operatorship and operational time span of a mine. A deposit may have one or more mines, each mine with one or more shaft. A mine thus mainly refers to the “company” sense of the word describing a facility, which may include a pit or pits and/or underground access which exploits parts of, or the totality of an orebody, and most of the time has installations (grinding/milling/leaching circuits) to treat the ore extracted from that orebody. In a few cases, a deposit will be broken down into zones, each zone entered as a separate mine in the Mine Form.

Figure 9: Mine Form with Owner(s) tabbed page activated

There are three general fields and 3 tabbed pages in the Mine Form:

The topmost right hand buttons are the Link and Unlink buttons which allow the linking (or unlinking) of a mine to a deposit. Mines should not be linked to more than one deposit.

- Mine Name: This field is used to enter the name of the mine. In (rare) special cases where historical production data of a deposit is particularly nebulous, an additional mine entry will be added (named “xxx-remaining”) and will cover the leftover unaccounted for, or unreferenced, production. Difficulties in separating production figures among several mines may also be solved by combining all mines into one record with all the names into the Mine Name field.
- Start Date: This field is used to specify the date of the first recorded production for a specific mine. A blank in the Start Date field means that either: 1) the data was not available, or 2) the mine has not come into production yet.
- End Date: This field is used to specify the date of the last recorded production for a specific mine. A blank in the End Date field means that the mine was still active and producing (in 2004).
- Owner(s): This page and the Owner field (Figure 9) are used to list the present owners of the mine. The Percent field represents the share of the listed owner in the mine. Three-digit numbers such as 38.5% in the Percent field were rounded to the nearest 2-digit numbers. Owners are listed in order of importance.
- Operator(s): This page and the Operator field specify which company actually operates the mine.
- References: This page is used to reference the data about the dates and owners and operators of the mine. The dates of production can sometimes be found within this reference, but some other times not; in the latter case the user is referred to the Production module in which the production period is specified. The Chapter (sometimes used for a Table), StartPage and EndPage fields can be used to further constrain the exact location of the data extracted from the reference.

2.3. Production Module

Production figures attributable to mines and deposits appear in this form. Wherever possible, production data is broken down into separate production periods (in the case of a deposit with multiple production periods) and each period has its own production numbers and specific references. The Production Form has 7 general fields in the top half of the window and 6 tab pages along the bottom (Figure 10). The fields in the top half are listed as follows:

- Start Date: This field is used to enter the start of a production period in the year/month/day format.
- End Date: This field is used to enter the end of a production period in the year/month/day format.
- Tonnage: The tonnage field is used to enter a number that is associated with the weight unit in the Tonnage Units field.
- TonUnits: (Tonnage Units): This field gives the unit associated with the tonnage figure entered in the Tonnage field.
- Product: This field is used to specify the type of product (i.e. ore, concentrate, metal, tailings) to which the tonnage applies.
- Provisional Entry: When a checkmark is present in the box, this means that the current production record is part of a another, larger production record. It is used in special cases only, e.g. production for the East Rand has one record as an overall figure covering up to year 2000, and several other records detailing production by mines up to year 2000 which are included in this overall figure. (Note: this field was checked in other WMGDP databases to indicate that the entry was of questionable reliability.)
- YearSum (Yearly or Summary): This field is used to specify if the production data of the current record is estimated, in which case the sources or reasons of the estimation are explained in the Deposit Form under the

Deposit Status page in the Comment field. (Note: this field was used to signify whether the production figures are cumulative or yearly figures in other WMGDP databases).

The screenshot shows the 'GlobalDB - Production' window with the 'Production Grades' tab selected. The form contains the following fields and values:

- DE: [Empty]
- DP: 0.0% Sigma - Lamaque
- MN: 100.0% Sigma
- PRODNO: 150
- START DATE (yyyy/mm/dd): 1937
- END DATE (yyyy/mm/dd): 1997 12 31
- TONNAGE: 26055000
- TONUNITS: metric ton
- PRODUCT: ore
- PROVISIONAL ENTRY:
- YEARSUM: [Empty]
- RANK: 1
- COMMODITY: Au
- GRADE: 5.49 grams/metric ton

At the bottom of the form, there are buttons for '+', '-', and 'Renumber', along with up and down arrow buttons. The status bar at the bottom indicates 'prodgrad is not ordered' and 'Filtered by DEPNO = 197'.

Figure 10: Production Form with Production Grades tabbed page activated

The six tab pages and their respective fields are listed as follows:

- Link to Deposit Groups: As Deposit Groups were not used in the WGD, this field is blank.
- Link to Deposits: This page and the Link/Unlink buttons allow a production record to be linked to a deposit. Production records should always be linked to one deposit, but never to more than one.
- Link to Mines: This page and the Link/Unlink buttons allow a production record to be linked to a specific mine. A blank in this field means that the production figure applies to the whole deposit (i.e. represents the overall production figure). Mine specific data always have a link established in this field.
- Production Grades: This page (Figure 10) is used to define the grade of the commodity exploited for the current production record. The Commodity field specifies the commodity to which the grade applies. The Grade field is the actual grade figure followed by the units in which the grade is reported. The most economically important commodity is usually ranked first.
- Production Weights: This is used to define the weights of the commodity exploited for the current production record. The Commodity field specifies the commodity to which the weight applies. The Weight field is for the actual weight figure followed by the units in which the weight is reported. The most economically important commodity is usually ranked first.
- Reference: This page is used to link (through the Link button) a specific reference to each figure entered for the current record. For a full description of how references are linked, the reader should refer to the Deposit Form section above. Additional information about where in the reference the production figures were found can be entered in a panel below the reference link panel.

2.4. Resource Module

These forms are used to store the latest reserves and resources figures available at the time of the compilation. The Resource Form consists of nine general fields in the top half of the main form and seven tabbed pages (Figure 11).

The screenshot shows a software window titled "GlobalDE -- Resource". At the top, there are navigation buttons (Back, Forward, Home, Stop) and action buttons (Insert, Delete, Query, Refresh). A search field "Find by deposit" and a "Close" button are also present. Below this is a header section with dropdown menus for "DG:" (set to "100.0% Sigma - Lamaque") and "MN:". The main form area contains several input fields: "RESNO:" (168), "ESTIMATE DATE (yyyy/mm/dd):" (2002/12/31), "TONNAGE:" (1495000), "TONUNITS:" (Metric Ton), "PRODUCT:" (Ore), "CONTAINED:" (checkbox), "ADDED TO:" (checkbox), "PROVISIONAL ENTRY:" (checkbox), "COMBINED R+P ESTIMATE:" (checkbox), and "RESCAT:" (Reserves). A tabbed interface is visible with tabs for "Link to Deposit Groups", "Link to Deposits", "Link to Mines", "Resource Grades", "Resource Cutoff Grades", "Resource Weights" (which is active), and "Reference". The active tab shows "RANK:" (1), "COMMODITY:" (Au), and "WEIGHT:" (1258000 Troy ounce). At the bottom right of the active tab are "Remember" and arrow buttons. The status bar at the bottom indicates "reswgt is not ordered" and "Filtered by DCPNO = 197".

Figure 11: Resource Form with Resource Weights tabbed page activated

The fields are listed as follows:

- **Estimate Date**: This field gives the date (in year/month/day format) of the estimate (effective date if the information is available in the source).
- **Tonnage**: The tonnage field is used to enter a number that is associated with the weight unit in the Tonnage Units field.
- **TonUnits** (Tonnage Units): This field gives the unit associated with the tonnage figure entered in the Tonnage field.
- **Product**: This field is used to specify the type of product (i.e. ore, concentrate, metal, tailings) to which the tonnage applies.
- **Provisional Entry**: This checkbox was not used for most of this compilation.
- **Combined R+P Estimate** (Combined Resources and Production Estimate): This checkbox is not used in the WGD, but would signify that the data source provided combined figures.
- **ResCat** (Resource Category): This field is used to indicate whether the data corresponds to reserves or resources. The term reserves includes proven and probable reserves, whereas the term resources covers measured and indicated resources (these 4 terms were defined by the Canadian Institute of Mining and Metallurgy Ad Hoc Committee on Ore Reserves, September 1996: CIMM, 1996). Inferred resources are also routinely entered. Other resource terms and categories that are unclear or unfamiliar to the compiler were entered using the term used by the author of the source reference.
- **Contained**: A checkmark in this box means that the resource data entered for the current record are contained within another, larger resource record and linked to it using the Link button.
- **Added To**: This checkbox is not used in the WGD.

The seven tabbed pages and their respective fields are listed as follows:

- **Link to Deposit Groups**: As **Deposit Groups** were not used in the WGD, this page is unused.
- **Link to Deposits**: This page and the Link/Unlink buttons allow a resource record to be linked to a deposit. Resources records should always be linked to one deposit, but not to more than one in this database. (Note: resource records may be linked to more than one deposit in other WMGDP databases, reflecting how some resource data are reported.)
- **Link to Mines**: This page and the Link/Unlink buttons allow a resource record to be linked to a specific mine. A blank on this page means that the resource figure represents an overall figure that applies to a whole deposit. Mine specific data always have a link in this field for data compiled in 2004 and earlier.
- **Resource Grades**: This page is used to define the grade of the commodity exploited for the current resources record. The Commodity field specifies the commodity to which the grade applies; the Grade field is for the actual grade figure followed by the units in which the grade is reported. The most economically important commodity is usually ranked first.
- **Resource Cutoff Grades**: This page is used to indicate the cutoff grade used to calculate the corresponding resource figure. The Commodity field specifies the commodity to which the cutoff grade applies; the Grade field is for the actual cutoff grade figure followed by the units in which the cutoff grade is reported. A cutoff grade usually refers to one commodity or a commodity “equivalent”.
- **Resource Weights**: This is used to indicate the weight of the commodity exploited for the corresponding resources record. The Commodity field (Figure 7) specifies the commodity to which the weight applies; the Weight field is for the actual weight figure followed by the units in which the weight is reported. The most economically important commodity is usually ranked first
- **Reference**: This page is used to link (through the Link button) a specific reference to each figure entered for the current record. For a full description of how references are linked, the reader should refer to the **Deposit Form** section above. Additional information about where in the reference the resources figures were extracted from in the data source can be entered in a panel below the reference link panel. This was used mainly in post-2004 data entry.

2.5. Reference Module

The **Reference Form** (Figure 12) is used to enter complete reference data that can be linked to the other forms. Most of the fields in this form are intuitive. The Preview field allows the compiler to select the type of reference (journal article, map, report, etc.), which will in turn bring various sets of pre-determined fields in the lower part of the form. These styles were inspired by the capabilities of Endnotes™, but are not customizable.

A note on deposits of the People’s Republic of China

Dr. Lu and Dr. Guo provided a significant amount of data for 45 Chinese gold deposits compiled in this database, hence many of the references in the Chinese gold deposits refer to Dr. Lu’s and Dr. Guo’s database. As each individual geological element is not specifically referenced to a single reference, papers and references used by Dr. Lu and Guo are included in the References module, but the REFX checkboxes are left blank.

Figure 12: Reference Form

2.6. Lookup Tables Module

This form is used to access the lookup tables that contain value selections (pick lists) for many fields throughout the database (Figure 13). The upper half of the interface allows for table selection, whereas the lower half presents the list of values available. A short description is associated with each value, along with the name of the person who entered or revised the value and the date of latest revision and release.

TABLERNAME	DESCRIPTION
conctry	Country names and appropriate continents
ctyhost	Country rock, host rocks, or mineralization
ctyrock	Country rock classes and descriptions
delatype	Delatype field for lithic table
datum	Datum and/or spheroid applicable to geographic coordinates
depcan	General deposit type (or clan)
depmat	Exploration and/or exploitation status (based on CIMM recommendations)
deptype	Deposit subtype (or type) and description

DEPSTAT	LONGDESC
closed	mine is closed, deposit is not necessarily exhausted
deposit	resource data are known but deposit has never been a producer.
exhausted	deposit has been mined out
feasibility study	deposit is undergoing a feasibility study to determine if it is economically feasible to mine
occurrence	geologically interesting or unexplored occurrence
past producer	deposit is a past producer, current status (closed, exhausted, abandoned, maintenance) is unknown
producer	deposit is a currently producing mine
suspended	operations are suspended, reserves not exhausted
under development	deposit is undergoing pre-production development work

Figure 13: Lookup Tables Form with a look at the DepStat field (Deposit Status page) value list

3. Deposit Summaries

Short free-text paragraphs providing summaries of the geological characteristics of each deposit were presented in Appendix 2 of Open Files 4895 and 4896 (Gosselin and Dubé, 2005a and 2005b). These summaries were transferred to the Comments table of each database after they were upgraded to Version 3.21 for corporate use (see Afterword). The purpose of these paragraphs was to provide the user with a concise description of the main characteristics of each deposit.

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AFTERWORD: ABOUT THIS DATABASE

L.B. Chorlton

History and Scope

As indicated in the main body of this document, a precursor to the current database was compiled at the Geological Survey of Canada (GSC) with the support of INMET Mining Corporation and published in Open File 3490 (Jenkins et al., 1997), and was based on pre-existing data files of contributing scientists. The compilation period coincided with, but was independent of, the World Map Project (WMP: 1996-1997). The WMP was an industry sponsored project to develop databases for porphyry and related deposits (Kirkham and Dunne, 2000a, b), nickel deposits (Eckstrand and Good, 2000a, b), and Sedex-VMS deposits (Jenkins and Lydon, 2002), and to upgrade the world bedrock geology database (Geological Survey of Canada, 1995) to provide new world geology backdrops depicting magmatic domains. The WMP was followed by the World Minerals Geoscience Database Project (WMGDP: 1998-2004), another project sponsored jointly by industry and government¹. The selection of deposit types was broadened at the request of sponsors to include lode gold, Sedex, MVT, and IOCG deposits, and the scope of the nickel database was broadened to include platinum group elements and chrome. All databases were transferred into a new, generic mineral deposit database schema (Chorlton et al., 2007) so that they could be managed using a common set of interfaces and tools. The schema and tools, described below and in the folder Documentation, are known collectively as GlobalDBSystem.

The scope of geological attribute data for many important deposits in the lode gold database was substantially expanded during the WMGDP. Lode gold deposits occur in a wide variety of host rocks and tectonic settings, exhibit a wide variety of physical, chemical, and mineralogical characteristics, and classification of these deposits has been a longstanding, often controversial, work in progress (e.g., Poulsen, 1996a; Poulsen et al.; 2000; Groves et al., 2003; Goldfarb et al., 2005; Simmons et al., 2005; Cline et al., 2005; Dubé and Gosselin, 2007; Hart, 2007; Taylor, 2007; Dubé et al., 2015, among others). Compilers adhered largely to the classification scheme proposed by Poulsen et al. (2000). However, many deposits for which the information found was inadequate are unclassified, only partly classified, or sub-classified based on an auxiliary attribute such as dominant mineralization style, which is commonly true for deposits published in Jenkins et al. (1997) that were not re-researched. Consumers or new custodians of this database should be aware that many current classifications will be subject to revision as knowledge increases, new classifications are realized or deposit-types new to a district are discovered, and as new data such as geochronology, geochemistry and geophysics collected and analyzed using new methods are obtained (e.g. Groves et al., 2003; Goldfarb et al., 2005; Allen et al., 2013; Dubé et al.; 2015). A case in point was the prediction by Poulsen (1996b) that Carlin-type mineralization, for which Nevada is famous, might be found in the Yukon Cordillera where it was at that time unknown, has now been realized in a cluster of occurrences called the Nadaleen Trend (Tucker, 2015; Tucker et al., 2013).

The compilers attempted to limit deposits included in the database to those of a certain threshold gold content (for the world in general: 1 M oz Au; for Canadian deposits 250,000 oz Au). To obtain the original total gold contents, production and reserve figures were compiled into a special table which is an addition to the production and resource sections of the WMGDP GlobalDBSystem schema, and geological grade and tonnage totals were calculated for each deposit. The database was further split into a world database which includes the main Canadian deposits (Gosselin and Dubé, 2005a) and a Canada-only data database (Gosselin and Dubé, 2005b), to reflect the lower cut-off values for Canada and for creating corresponding map posters (Gosselin and Dubé, 2005 c, d).

After the publication of Gosselin and Dubé (2005 a, b, c, d), the databases were inherited corporately by the GSC. The database schema was expanded to include the following attributes: NTS area, long comments, sample geochemistry, links to other databases, geochemical-geophysical response, digitization coordinates, and compilation stage and progress to meet the needs of the Canada-based Consolidating Canada's Geoscience Knowledge, Northern Resource Development, Northern Mineral Resource Development, and Geo-mapping for Energy and Minerals programs. The Canadian database was updated as needed, particularly for development projects in Nunavut. This resulted in some deposits in the north being included without meeting the strict criteria for total production plus reserve thresholds. Estimated resource figures were added from new National Instrument 43-101 technical reports to the GlobalDBSystem resource module, but there has been no attempt to update the extra production and reserve compilation table.

The evolving databases were made available to the public on-line through the NRCan Canadian and World Mineral Deposits web map portal from 2007 to 2014. NRCan now plans to limit data access to points and very shallow attributes through Web Map Services (WMS), which can be used by external web map portals for geospatial data mashups. The aim of this Open File is to make the full database and its supporting database management utilities available to those who can use

them, and to provide simple attributed derivative ESRI® Shape and Google Earth™ files, and folders of deposit and deposit group reports in html format with index.html files serving as Tables of Contents.

The compilation of data source references and the ease of linking them to individual deposits, resource and production figures has been a strength of the GlobalDBSystem. The references themselves can be consulted to enlarge on information for individual deposit entries. In addition, review papers such as Robert and Poulsen (1997), Goldfarb et al. (2005), Cline et al. (2005), Simmons et al. (2005), Dubé and Gosselin (2007), Dubé et al. (2007), and Taylor (2007), and related scientific literature add valuable context to the existing database, and may provide hints at how it could evolve in the future. As warned in several places in this multi-part publication, deposit locations are approximate and in many cases represent more than one deposit or zone of mineralization. Finally, it is emphasized that resource estimates² captured in this database are historical and may conform to the Securities Commission National Instrument 43-101 standards, regardless of how they have been classified.

For this publication and for ease of future archiving the Canadian and World lode gold databases were remerged. First, the Deposit Syntheses from Appendix II of Gosselin and Dubé (2005a, 2005b) were inserted directly into the Comments table in the two MS-Access databases. Secondly, the extra tables of production and reserve data, with total grade, tonnage and gold content (not included in other WMGDP databases) were exported to Excel spreadsheets and dropped from the databases. Then, the databases were merged. The database merge operation included: (a) detecting and resolving overlaps in indices for references, deposits, mines, production, and resource figures for the World and Canadian databases; (b) ensuring that the references in the World database included all of those added to the Canadian database after the databases were separated; (c) removing all Canadian deposits, mines, production and resource figures from the World database; (d) appending all data from the Canadian database to the World database; and (e) dropping entries for the extra compilation tables in the metadata service tables: tabledoc, columndoc and links.

GlobalDBSystem

The database schema used for this database (Chorlton et al, 2007) was developed for the WMGDP, but has been in use since the end of the WMGDP for this and other deposit and occurrence databases. The web-style **Documentation** folder, modified from Laramée (2004), contains a thorough description of the WMGDP schema and supporting data management interfaces included with it in the folder **GlobalDBSystem321**, and can be read using an Internet browser by clicking on the file **default.htm**. During the WMGDP, compilers (deposit specialists) and company sponsors suggested extra topics, and thus extra detail tables, to be included in the schema. They also provided helpful feedback for the functionality of the data management interfaces. This resulted in incremental updates to both tools and schema between releases to company sponsors. The World and Canadian lode gold databases (Gosselin and Dubé, 2005a, b) were released in schema version 3.19, which was used for the final release 3.6 given to company sponsors in 2004. The schema, now at version 3.21, release 3.7, is a major update of version 3.19, with the addition of extra tables required for the Northern Resource Development, Northern Mineral Resource Development, and Geo-mapping for Energy and Minerals programs.

The GlobalDBSystem schema (diagram page 25) includes sets of tables that can be used to describe six entities (things): deposits/occurrences, deposit groups, mines, production figures, resource figures, and references. The deposits and deposit groups modules describe locations, deposit type and subtype, names, country and province, commodities, geological ages, host rocks, related igneous rocks, mineralization styles, coincident features, radiometric dates, tectonic settings, shape and dimensions, NTS areas, qualified comments, links to other databases, geophysical /geochemical signature, sample geochemistry, and compilation stage and progress. The service tables: entities, tabledoc, links, columndoc, tabpages, and lookup explicitly define the entities, tables, links between tables, fields, interface tab pages, and the lookup tables, to completely define the schema. Two additional service tables: dbversion and unitcvsn, provide the title, version and authors of the current database, and conversion factors (to metric) for the production and resource figures, respectively. The service tables, described above, should be consulted before transferring this data across database management programs and platforms, or before rebuilding the data management applications when the application interfaces supplied with this Open File can no longer be used because of changes to the Windows® operating system.

Standalone custom Windows® application interfaces, developed by Robert M. Laramée³, enable a user with a 32 bit computer equipped with the Windows operating system to browse/update, filter, and obtain output from this database. They are included in this Open File in the folder **GlobalDBSystem321**. All applications require an ADO connection file, or Microsoft® data link, to each database for which they are to be used, created in the folder under the same folder that houses the application interfaces⁴. By convention, WMGDP compilers installed a folder GlobalDBSystem under Program Files on the local C: drive, but the GlobalDBSystem321 folder and files can be saved anywhere and no installation is required. Instructions for creating the mandatory Microsoft data link file are included under “**Defining database aliases**” in the **Documentation\default.htm** and in the standalone file **HowtoADO.rtf**.

GShellBrowser allows a user to browse the database record by record, and offers the same tab page view of the data offered by the original data entry interface, GShellADO, known in short form as **GShell**. The latter only works under the Windows® XP and earlier Windows operating systems, and has been included in this package for users that still have a Windows XP computer (disconnected from the Internet because Microsoft no longer supports it by supplying security updates), or have an XP emulator installed. GQueryADO, known as **GQuery** for short, provides a user the means to filter the occurrences based on attribute values, to build a template for a custom spreadsheet and export this spreadsheet or a default summary spreadsheet, and to create folders of occurrence reports for the full set or subsets of the deposits in the database. Both GShellBrowser and GQuery work under Windows 7 once the pre-requisite ADO connection file has been created.

There are three additional programs in GlobalDBSystem321: **GQ_ADO_XtraTables**, **Documenter**, and **GDBSTools**. The program GQ_ADO_XtraTables builds or rebuilds summary tables for the use of GQuery, which improved performance over an older method of creating these summary tables on the fly. The program Documenter allows users to examine each table and field of each category of table (Data, Junction, Lookup, and Service depending on their roles), which complements the more general web page style documentation. Finally, GDBSTools provides a database manager with utilities that can check the internal integrity of the database, time stamp a new release and export SQL data scripts of the contents of the connected database. These SQL scripts can be used to populate a new database created with GlobalDBSchema321.sql in one of many SQL-enabled relational database management systems available today⁵.

FOOTNOTES

¹ACKNOWLEDGEMENTS

The World Minerals Geoscience Database Project (WMGDP) was carried out by the former Mineral Resources Division, Geological Survey of Canada (now Ore Systems, Central Canada Division, Geological Survey of Canada), with the support of the following industry sponsors: Anglo American plc, Barrick Gold Corporation, BHP Billiton Group, Cyprus Amax Minerals Company, Inco Ltd., Metal Mining Agency of Japan, North Ltd., Phelps Dodge Exploration Corporation, Placer Dome Exploration Inc., Randgold Resources Ltd., Rio Tinto Mining and Exploration Limited, Teck Cominco Limited and Western Mining Corporation. W. D. Sinclair managed this project on behalf of the Geological Survey of Canada, L. B. Chorlton coordinated schema, tool development, and compilation, and R. M. Laramée implemented the schema, developed the applications for GlobalDBSystem, and provided technical support to compilers. Beth Hillary imported the data from Open File 3490 into the WMGDP schema to initiate the new compilation.

²DISCLAIMER – RESOURCE/RESERVES DATA

Her Majesty the Queen in Right of Canada, represented by the Minister of Natural Resources (NRCan), does not warrant or guarantee the accuracy, completeness or fitness for any purpose of Reserve and Resource information (Data) contained in this database, including whether the Data is compliant with any securities regulations or standards, and NRCan does not assume any liability with respect to any damage or loss incurred as a result of the use made of the Data.

Resource and reserve figures are historical in nature. The Data source provided with each set of figures should be cited if the Data are re-reported.

³DISCLAIMER – APPLICATIONS AND DATABASE

The Geological Survey of Canada (GSC) has endeavored to develop and produce this product with a minimum of errors. GSC does not, however, warrant that the product is error free nor will GSC or its Minister and officials accept liability for any loss of profits or revenue, or any other form of loss or damage relating to the use of this product.

⁴ CAUTION: UTILITIES MAY NOT WORK ON SOME WINDOWS COMPUTERS

While the WMGDP and successive projects have been successfully using Global DBSystem since the year 2000, there are now limitations due to the evolution of the Windows operating system and the introduction of 64 bit computers. In order to

use GShellBrowser.exe, GQueryADO.exe, GQ_ADO_XtraTables.exe, Documenter.exe, and GDBSTools.exe, you must first create a data link file to allow connection between the program and the database (see “Defining database aliases” under Documentation). It is known that these instructions will not work on Windows 64 bit computers, and the interfaces will not work on computers with operating systems other than Windows®. At present, the data entry and browsing program GShellADO (GShell) will not work under Windows Operating Systems greater than XP, but is included here for anyone who might have an older operating system on a computer disconnected from the Internet or who has an XP emulator.

⁵ LOADING A WMGDP DATABASE USING SQL SCRIPTS

SQL scripts are provided here for anyone with an SQL-enabled database management system (DBMS) and the technical skill to modify the scripts according to the requirements of their software. We have loaded the data onto InterBase and PostgreSQL for the use of applications that emulate GQuery for the Internet (GqueryClient), and the contents of folders for loading the schema reflect our own processes. There are subtle differences in the scripts for loading the database schema among DBMSs, and some tweaks applied to the schemas supplied in this publication were specific to the Query applications. The scripts for inserting the data into the empty database schema are standard for all databases, and each thematic database has its own INSERT_DATA script that can be used once the empty GlobalDBSystem database has been created.

A note of caution: it would be tempting to try to import the SQL contents of all of the mineral deposit databases in this Open File series (e.g. 7686, 7688, 7708, 7764, 7773, 7775 and so on) into one big database. This will not work because the entities of each separate database are indexed independently from each other, having been compiled on disconnected personal computers at many different localities. In addition, the metadata file dbversion records different compilers and titles for each deposit database. Thus, without substantial and careful re-indexing primary keys will clash between the different databases.

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