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MINERAL OCCURRENCE DATABASE, GREAT BEAR MAGMATIC ZONE

R.E. Bretzlaff and J.A. Kerswill

FOREWORD: About this database by L.B. Chorlton

The substance of this publication is the mineral occurrence database for the Great Bear magmatic zone in Access® 2000 format, plus shallow export products derived from this database and mineral occurrence reports. The purpose of this foreword is to provide a brief history of the database, plus information about the database schema itself and the tools created to support it. The database schema and tools were developed for the World Minerals Geoscience Database project (WMGDP: 1998-2004)[1].

The mineral occurrence database for the Great Bear magmatic zone was compiled between 2004 and 2010 with two objectives: (1) recorded locations would be accurate enough that known mineral occurrences could be easily located by helicopter or ground mapping; and (2) data would be suitable for mineral prospectivity modelling, involving geospatial data integration of geophysical and geochemical data, satellite imagery, geological map data, and lineament analysis. The initial data source was the NORMIN database (Northwest Territories Geoscience Office, 2004). Data was then added from then unpublished databases: World Fe oxide +/- Cu-Au-U deposits (Gandhi, 2015) and the Canadian U-Th-REE deposits and occurrences (Gandhi et al., 2015). Specific data sources for each occurrence have been linked from the Reference module included in the database.

Many occurrence locations were corrected and their information updated based on company reports downloaded from SEDAR, company news releases, and geoscience literature research under the Multiple Metals - Great Bear Region Project, Geomapping for Energy and Minerals Program (2009-2013). New locations were compiled using ESRI® ArcMap™ with the aid of geological and topographical maps in GIS format, georeferenced scanned property maps and grids, and satellite imagery. It was possible to insert revised positions from ArcMap directly into the database using a custom add-in application developed by David Viljoen and Robert Laramée through the WMGDP GlobalDBSystem data entry interface (included with this publication). When locations were sequentially re-adjusted based on superior georeferenced layers, the new projected digitization record was added to the top of the digitization table and the geographical coordinates of the latest record were updated in the parent table for the mineral occurrence. The previous projected digitization record was retained with an incremented rank and pushed down in the table. The data entry interface time-stamps and initials each record, which will clarify the digitization sequence. The default behavior of the interface for other attributes such as commodity or mineralization style is to add new records below older records.

Although the object of the exercise was to improve the mineral occurrence locations to reflect exactly where mineralization was observed on the surface, source references may have been unavailable or inadequately detailed to accomplish this for some occurrences. The locations for the latter may therefore remain unverified and projected digitization coordinates will be missing from the database. It must also be emphasized that resource figures in this database are not current and do not comply with current standards for resource reporting [2]. They should be classified as historical resources and the original data source cited if they are re-reported. None of the resource figures fit the current definition of economic reserve.

The database schema (Chorlton et al, 2007) used for this database was developed for the WMGDP, and used to bring pre-existing but diversely structured mineral deposit and occurrence databases into a uniform structure for which the same database management tools could be used. The web-style **Documentation** folder, modified from Laramée (2004), contains a thorough description of the WMGDP schema and supporting data management interfaces 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 topics to be included in the schema. They also provided helpful feedback for the functionality of the data management interfaces. This resulted in incremental updates between releases to company sponsors. World and Canadian lode gold databases (Gosselin and Dubé, 2005a, b) were released in schema 3.19, the version used for the final release 3.6 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 Canadian compilations under the Northern Resource Development, Secure Energy Supply, and Northern Mineral Resource Development programs.

The GlobalDB System schema (diagram page 5) includes sets of tables that can be used to describe six entities: **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 data, 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 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 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. Laramée[3] (Laramée, 2015), enable a user with a 32 bit computer equipped with the Windows operating system to browse, filter, and obtain output from this database. These interfaces 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, and should for convenience be created in the folder that houses the application interfaces[4]. 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 who 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 on a 32 bit computer once the pre-requisite ADO connection file has been created.

There are three additional programs in GlobalDBSystem321: **GQ_ADO_XtraTables**, **Documenter**, and **GBDSTools**. 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 today[5].

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FOOTNOTES

[1]ACKNOWLEDGEMENTS

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. The contributions from the WMGDP made the final form of this database and its partially automated export products possible. To facilitate the use of GIS geo-locational capabilities, David Viljoen developed an ArcMap add-in application which sent GIS coordinates directly through the WMGDP GlobalDBSystem data entry interface which was modified by Robert Laramée to receive this information.

[2]DISCLAIMER – 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.

[3] DISCLAIMER – 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.

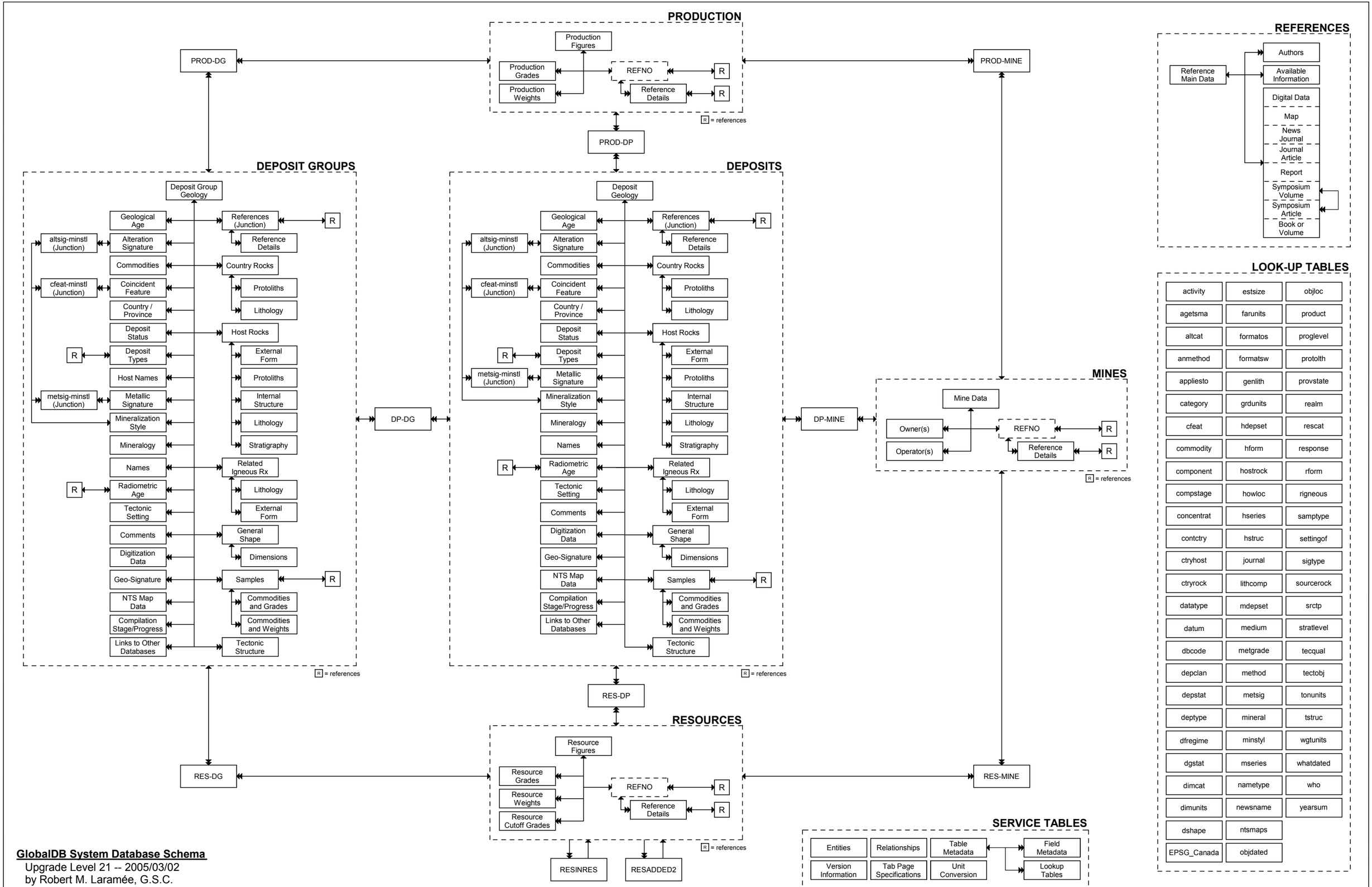
[4] CAUTION: UTILITIES MAY NOT WORK ON SOME WINDOWS COMPUTERS

While the WMGDP and successive projects have been successfully using Global DBSystem since the year 2000, there are now imitations 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 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, and only one insert script is supplied per database.

An additional 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, and were compiled on disconnected computers by compilers in many different places. In addition, the metadata file dbversion records different compilers and titles for each database. Thus, without substantial and careful re-indexing primary keys will clash between the different databases.



GlobalDB System Database Schema

Upgrade Level 21 -- 2005/03/02

by Robert M. Laramée, G.S.C.