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GEOLOGICAL SURVEY OF CANADA
OPEN FILE 7764

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2015

Canada

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World Sediment-hosted Copper Deposit Database

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2015

doi:10.4095/296422

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).

Recommended citation

Kirkham, R.V., Carrière, J.J., Rafer, A.B., and Born, P., 2015. World sediment-hosted copper deposit database; Geological Survey of Canada, Open File 7764, 1 .zip file. doi:10.4095/296422

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WORLD SEDIMENT-HOSTED COPPER DEPOSIT DATABASE

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FOREWORD: About this database by L.B. Chorlton

This publication contains a database in Microsoft® Access® format that houses index level information for sediment-hosted copper deposits worldwide, plus derivative reports, transfer formats and geospatial data. Data compilation started in the 1980's by Rod Kirkham, the commodity expert in copper and molybdenum. It was entered into a database by Janet Carrière, supported by Robert Laramée and David Garson of the Geological Survey of Canada (GSC) Mineral Resource Division data bank. The ongoing data compilation formed an information resource for numerous review papers (Boyle et al., 1989; Kirkham, 1989; Kirkham, 1996; Hitzman et al., 2005) which should be consulted for the database's geoscience context. Because most of the original records were compiled before 1993 when locations were read from small scale paper maps, it is cautioned that they are geographically imprecise and compilers adopted the convention of rounding them to the nearest minute. This would preclude locating an individual mine or pit in Google Earth, but might only be a small drawback on a global scale because well-developed sediment-hosted copper systems tend to be exceptionally extensive laterally, and mineralization occurs in multiple zones. It also should be cautioned that resource estimates[1] captured in this database are historical and do not conform to Securities Commission National Instrument 43-101 standards, regardless of how they are classified in the database.

The sediment-hosted copper database was first released as a paper world deposit–geology map (Kirkham et al.,1994) and the digital database was released in full (Kirkham et al., 1995) on the multicomponent Generalized geology of the world and linked databases CD-ROM. At this point in time and during the industry sponsored World Map Project (1996–1997) which followed, the structure of each specialized GSC mineral deposit database was unique to individual geoscientific working groups, as exemplified by the contrasts among the databases of Kirkham et al. (1995), Jenkins et al. (1997), Kirkham and Dunne (2000), and Jenkins and Lydon (2002). A common format was subsequently developed for all deposit databases, so that the same data management utilities could be used, under the World Minerals Geoscience Database Project (WMGDP: 1998–2004), a project sponsored jointly by the GSC and exploration companies[2]. Pre-existing deposit databases, including the sediment-hosted copper database, were converted to the common format. This database was then updated sequentially on contract by Peter Born and Antonio Rafer using the common utilities, and has subsequently undergone minor revisions. After the WMGDP, all deposit databases were made accessible through the World and Canadian Mineral Deposits web map portal as agreed to by project sponsors. However, this portal was decommissioned in 2014 under new Government of Canada internet guidelines. The aim of this Open File is to make the full sediment-hosted copper database and its supporting database management utilities available to any client who can use them, and to provide simple attributed derivative ESRI® Shape and Google Earth™ files, and folders of full deposit and deposit group reports, accompanied by Tables of Contents files index.html, that can be read by anyone using an Internet browser.

The rationale for the common WMGDP database schema was described by Chorlton et al. (2007). The web-style **Documentation** folder, modified from Laramée (2004), contains a thorough description of the WMGDP schema and supporting data management utilities, and can be read with an Internet browser by clicking on the file **default.htm**. During the WMGDP, compilers (deposit specialists) and company sponsors iteratively 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 compilations under the Northern Resource Development and Northern Mineral Resource Development programs.

The **GlobalDB System schema** (last page of this document) 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 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], 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 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 be created in the same folder that houses the application interfaces[4]. GlobalDBSystem321 folder and files can be saved anywhere and can be used directly without an installation step. 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 provides 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]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.

[2]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.

[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

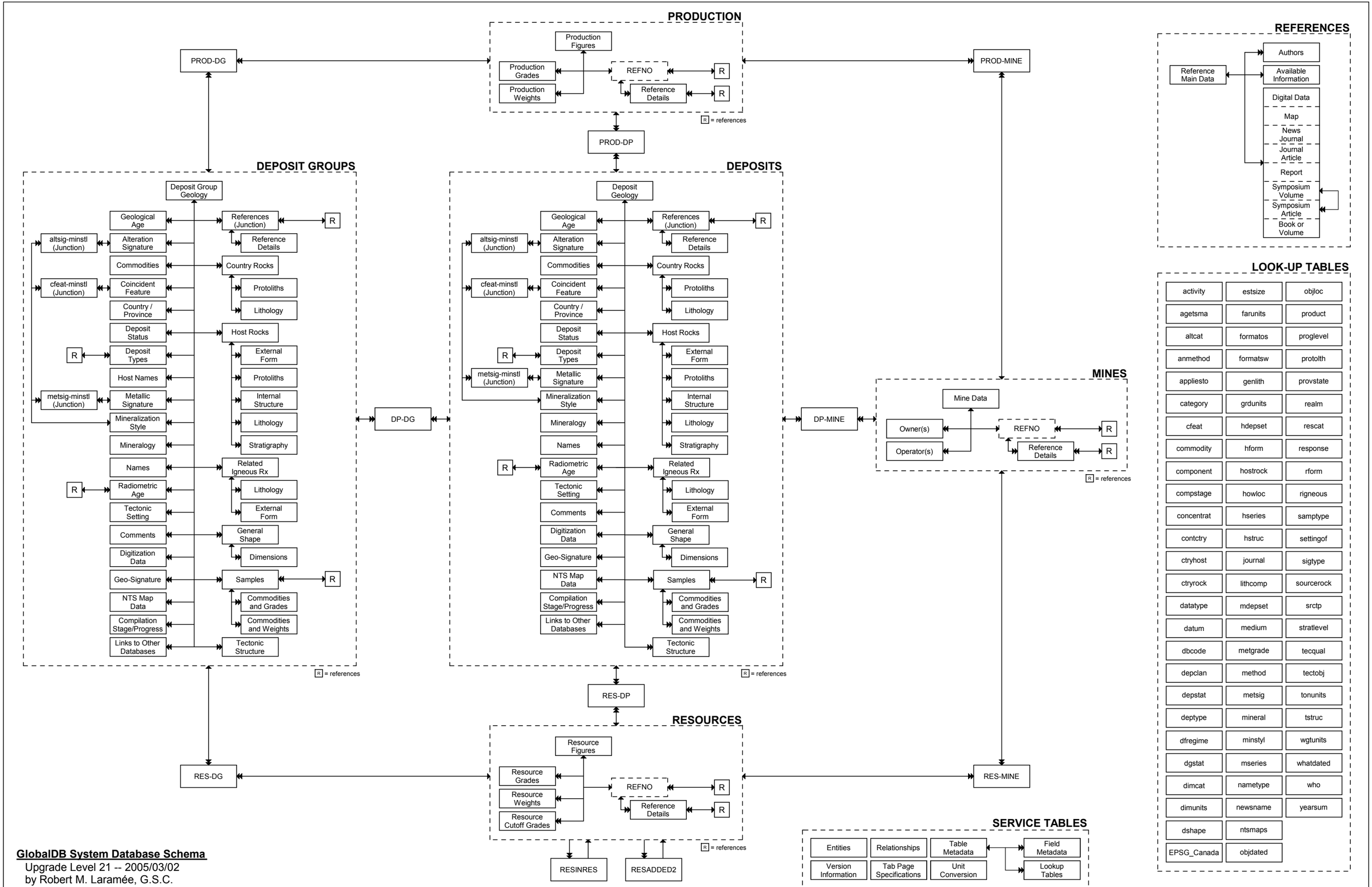
While the WMGDP and successive projects have been successfully using Global DBSystem since the year 2000, there are now imitations due to the evolution of the Windows operating system and the introduction of 64 bit computers. In order to use GShellBrowser.exe, GQueryADO.exe, GQ_ADO_XtraTables.exe, Documenter.exe,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

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, but 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 also 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.