Assessment report drillhole database: Data update

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Front cover:
Core from Shovelnose project, 2023 (Westhaven Gold Corp.). Photo by Cary Pothorin.

Back cover
Logging core at the Mount Milligan mine, 2023 (Centerra Gold Inc.). Photo by Hassan Heidarian.

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Abstract

ARIS (Assessment Report Index System) is a collection of more than 41,500 reports that detail results from mineral exploration and development programs. Submitted by the exploration and mining industry to comply with Mineral Tenure Act Regulations and maintain titles in good standing, the reports become an open resource after a one-year confidentiality period. Although containing a wealth of information, the assessment reports are typically submitted in a form (e.g., paper or PDF file) that makes working with the data cumbersome. To address this problem, we have developed databases that contain information extracted and digitized from assessment reports and released data in formats that are amenable to evaluation using geospatial and analytical software. This update builds upon the initial drillhole database released in 2025, which currently contains data from more than 200 assessment reports. The data structure from the first release was modified slightly for added clarity and consistency.

Keywords: Geochemical data, assessment reports, drillhole samples, digitization, compilation, database, data access, analytical methods, chemical element abundance, ARIS

1. Introduction

The British Columbia Geological Survey (BCGS) Assessment Report Indexing System (ARIS) is a collection of reports documenting mineral exploration and development work in the province dating back to 1947. Assessment reports provide results of geological, geochemical and geophysical studies and become an open resource for planning mineral exploration, investment, research, land use, and resource management. To date, ARIS contains more than 41,500 reports representing nearly $4 billion of reported exploration expenditures. Newly available assessment reports are released through the BCGS website monthly.

Although containing a wealth of information, the assessment reports are typically submitted in a form (e.g., paper or PDF file) that renders working with the data cumbersome. Specific data, such as sample location, sampling parameters, certificate metadata and analytical results, must be extracted into formats that are useable for detailed analysis and interpretation. To improve the usability of these data, the BCGS is creating open access databases by extracting and digitizing information from assessment reports. An initial data release of the database containing the assessment report drillhole data was presented in Fortin and Silva (2025). Herein we present an update to the drillhole database, which includes drillhole location and geometry, core lithological descriptions, sampling parameters, and geochemical assay certificates and results (Fig. 1). We provide digital data as a GeoPackage (BCGS_GF2026-11.zip), which can be imported directly into most GIS. Summary database statistics (Table 1) will be revised as new versions of the database are released. This update includes only drill collars with associated geochemical assay data.

Data Type	Entries
Assessment reports	205
Drill holes	2,034
Litholog entries	41,602
Samples	211,995
Certificates	2,874
Determinations	9,233,275

Table 1. Number of entries for each data type in the 2026 update.

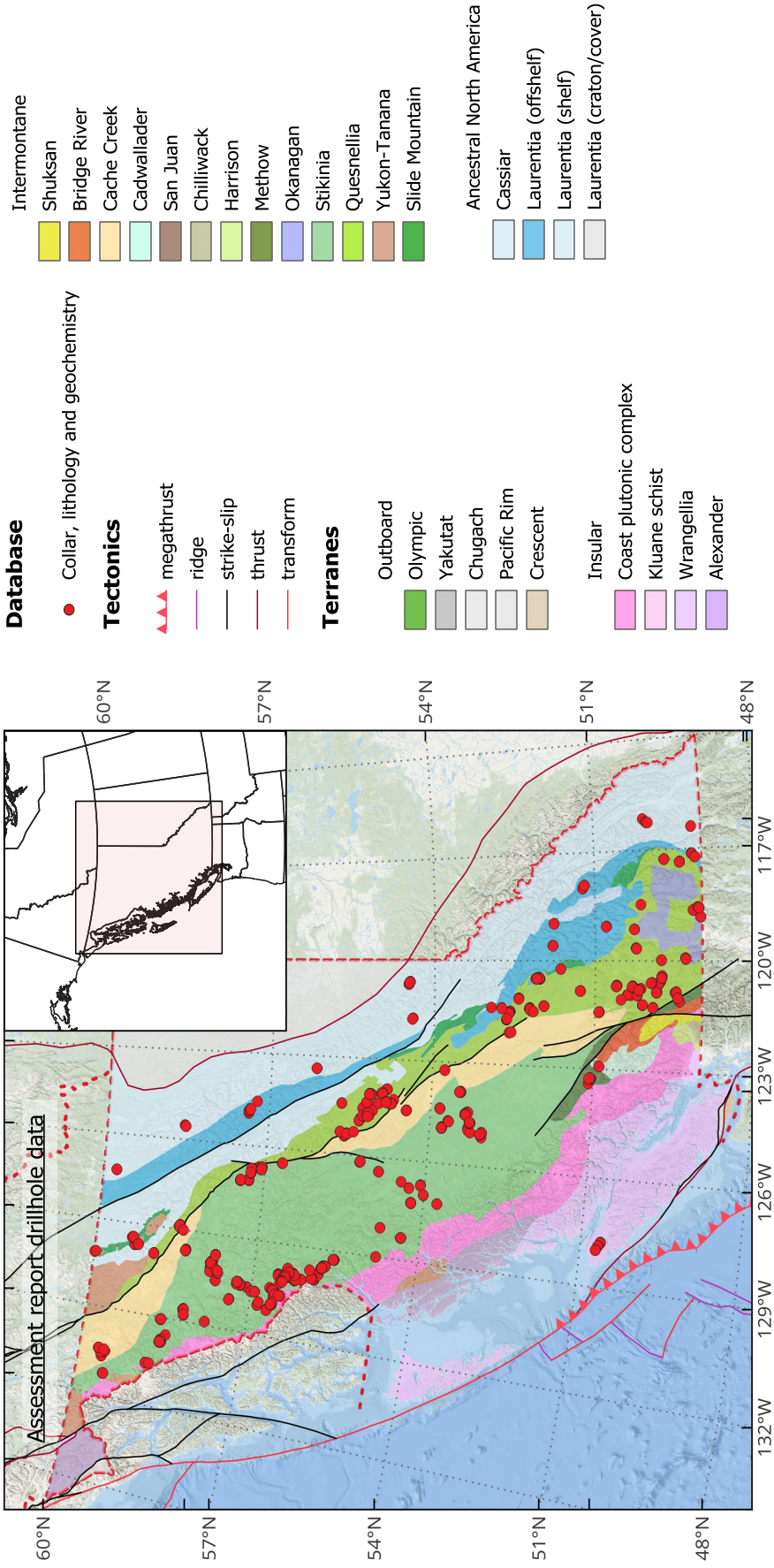

Fig.1. Assessment report drillhole data. Datum: WGS84

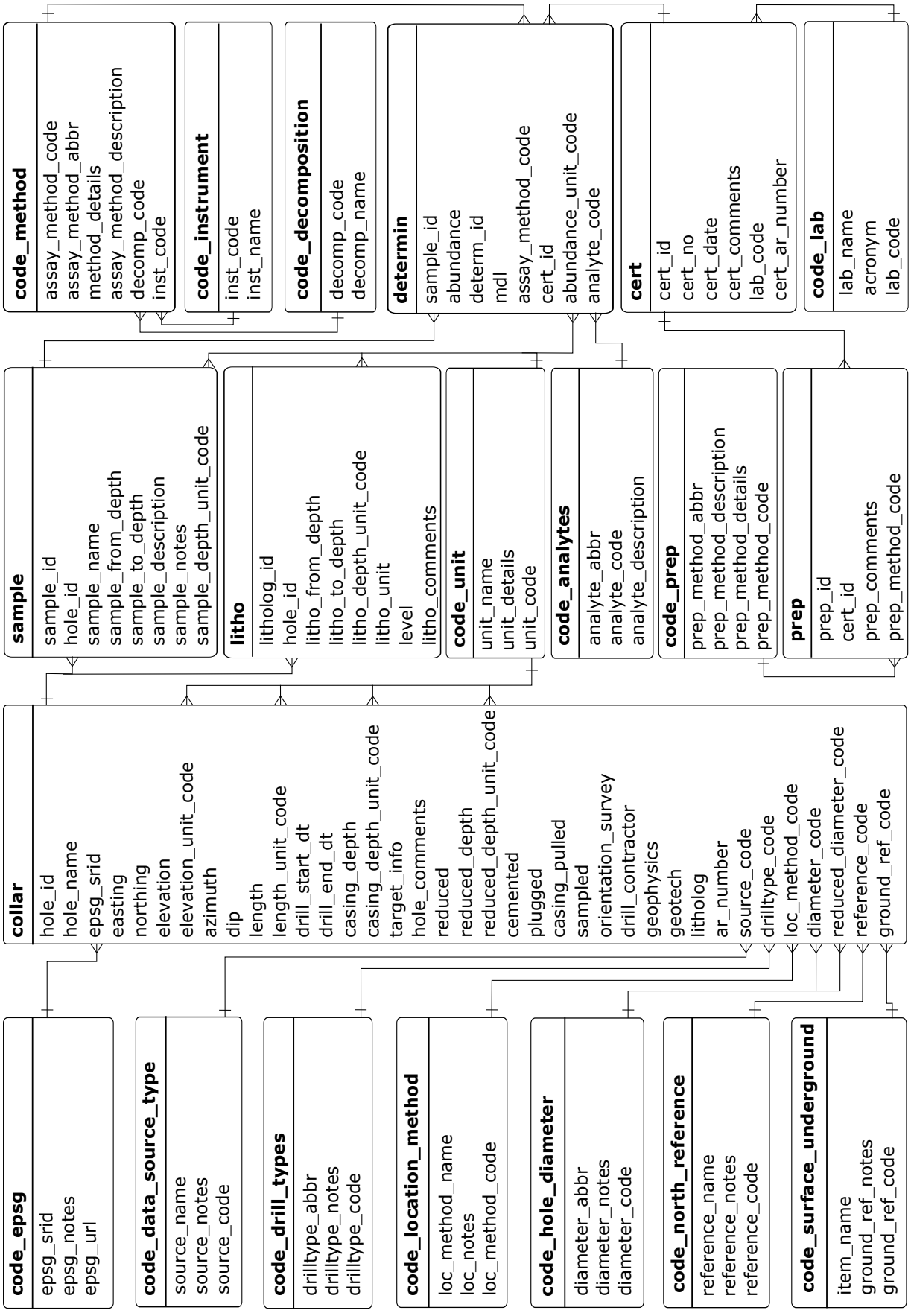

Fig.2. Database structure: ARDH data model using crowfoot's notation.

Field Name	Type	Description
hole_id	bigint	Sequential unique identifier for every drillhole
hole_name	text	Unique drillhole name within each assessment report
easting	numeric	Drillhole longitude in the original coordinate reference system of the assessment report
northing	numeric	Drillhole latitude in the original coordinate reference system of the assessment report
epsg_srid	bigint	Unique EPSG (European Petroleum Survey Group) code of geodetic datum for the drillhole location original coordinates
azimuth	numeric	Azimuth of drillhole direction relative to specified north reference
dip	numeric	Dip angle of drillhole relative to the horizontal plane
drill_start_dt	date	Start date of drilling operations
drill_end_dt	date	End date of drilling operations
target_info	text	Feature targeted by the drillhole
hole_comments	text	Any additional remarks on the drillhole
drill_contractor	text	Name of drilling contractor responsible for the drilling of the drillhole
ar_number	text	Number of assessment report in ARIS to which drillhole belongs
source_code	bigint	Unique code for type of source for drillhole data
drilltype_code	bigint	Unique code for drilling method used in drillhole
loc_method_code	bigint	Unique code for method of determining the drillhole surface location
diameter_code	bigint	Unique code for drillhole diameter
reference_code	bigint	Unique code for type of north reference of drillhole azimuth
ground_ref_code	bigint	Unique code for whether drillhole starts on the surface or underground
elevation	numeric	Elevation above mean sea level of drillhole surface location in specified unit
elevation_unit_code	bigint	Unique code for unit type of drillhole surface elevation above sea level
length	numeric	Total length of the drillhole in specified unit
length_unit_code	bigint	Unique code for unit type of total hole depth/length
casing_depth	numeric	Depth of casing shoe in specified unit
casing_depth_unit_code	bigint	Unique code for unit type of casing shoe depth
reduced_depth	numeric	Depth of diameter decrease if drillhole size was reduced during drilling
reduced_depth_unit_code	bigint	Unique code for unit type of hole diameter reduction depth
sampled	bool	Availability of sample geochemical analyses in the drillhole
plugged	bool	Information on whether the drillhole was plugged after completion
casing_pulled	bool	Information on whether the casing string has been pulled out of the drillhole
orientation_survey	bool	Availability of dip angle and azimuth measurements along the drillhole
geophysics	bool	Availability of geophysical surveys associated with the drillhole
geotech	bool	Availability of geotechnical surveys associated with the drillhole
litholog	bool	Availability of lithological description for the drillhole
reduced	bool	Information on whether the drillhole size was reduced during drilling
cemented	bool	Information on whether the drillhole has been cemented
reduced_diameter_code	bigint	Unique code for new drillhole diameter if drillhole size was reduced during drilling

Table 2 collar: location and metadata for each drillhole.

Field Name	Type	Description
epsg_srid	bigint	Unique EPSG (European Petroleum Survey Group) code of geodetic datum for the drillhole location original coordinates
epsg_notes	varchar	Name of EPSG (European Petroleum Survey Group) of geodetic datum for the drillhole location original coordinates
epsg_url	varchar	Spatial reference URL of EPSG (European Petroleum Survey Group) of geodetic datum for the drillhole location original coordinates

Table 3. code_epsg: drillhole location original geodetic datum list.

Field Name	Type	Description
drilltype_abbr	text	Abbreviation of drilling method used in drillhole
drilltype_code	bigint	Unique code for drilling method used in drillhole
drilltype_notes	text	Name of drilling method used in drillhole

Table 4. code_drill_types: drillhole drilling methods list.

Field Name	Type	Description
loc_method_code	bigint	Unique code for method of determining the drillhole surface location
loc_method_name	text	Method used for determining the drillhole surface location
loc_notes	text	Additional remarks on the method for determining the drillhole surface location

Table 5. code_location_method: drillhole surface location methods list.

Field Name	Type	Description
diameter_abbr	text	Abbreviation of drillhole diameter
diameter_code	bigint	Unique code of drillhole diameter
diameter_notes	text	Description of drillhole diameter

Table 6. code_hole_diameter: drillhole diameters list.

Field Name	Type	Description
reference_name	text	Type of north reference of drillhole azimuth
reference_ notes	text	Additional remarks on the type of north reference of drillhole azimuth
reference_code	bigint	Unique code for type of north reference of drillhole azimuth

Table 7. code_north_reference: drillhole north reference types list.

Field Name	Type	Description
item_name	text	Description of whether the drillhole starting location is on the surface or underground
ground_ref_code	bigint	Unique code for whether the drillhole starting location is on the surface or underground
ground_ref_notes	text	Additional remarks on the drillhole starting location

Table 8. code_surface_underground: drillhole ground reference types list.

Field Name	Type	Description
source_code	bigint	Unique code for type of source for drillhole data
source_name	text	Type of source type for drillhole data
source_notes	text	Additional remarks on the source type of drillhole data

Table 9. code_data_source_type: data sources list.

Field Name	Type	Description
hole_id	bigint	Sequential unique identifier for every drillhole
litho_unit	text	Lithological description of the interval
level	bigint	Hierarchical level of interval (1 = highest)
litholog_id	bigint	Sequential unique identifier for every lithological interval logged in every drillhole
litho_comments	text	Detailed lithological description and additional remarks of the interval
litho_from_depth	numeric	Start depth of the lithological description interval
litho_to_depth	numeric	End depth of the lithological description interval
litho_depth_unit_code	bigint	Unique code for interval depth unit type

Table 10. litho: lithological description for each drillhole.

Field Name	Type	Description
sample_id	bigint	Sequential unique identifier for every sample from every drillhole
sample_name	text	Unique sample name within each assessment report
sample_to_depth	numeric	End depth of the sampled interval
sample_from_depth	numeric	Start depth of the sampled interval
sample_to_depth	numeric	End depth of the sampled interval
hole_id	bigint	Sequential unique identifier for every drillhole
sample_notes	text	Additional remarks on the sample or interval
sample_description	text	Description of the sample or interval
sample_depth_unit_code	bigint	Unique code for sample depth unit type

Table 11. sample: sample information for each drillhole.

Field Name	Type	Description
determ_id	bigint	Sequential unique identifier for every assay determination from every drillhole
abundance	varchar	Concentration of analyte in specified unit
analyte_code	bigint	Unique code for analyte type
cert_id	bigint	Sequential unique identifier for every geochemical assay certificate from every drillhole
mdl	varchar	Minimum detection limit for the specified analyte and method
assay_method_code	bigint	Unique code for every geochemical assay method
sample_id	bigint	Sequential unique identifier for every sample from every drillhole
abundance_unit_code	bigint	Unique code for determination unit type

Table 12. determin: geochemical assay determinations metadata.

Field Name	Type	Description
analyte_abbr	text	Abbreviation of analyte
analyte_code	bigint	Unique code for analyte type
analyte_description	text	Description of analyte

Table 13. code_analytes: geochemical assay analytes list.

Field Name	Type	Description
assay_method_abbr	varchar	Abbreviation of geochemical assay method
assay_method_description	varchar	Description of geochemical assay method
method_details	text	Name of geochemical assay method
assay_method_code	bigint	Unique code for every geochemical assay method
decomp_code	bigint	Unique code for type of sample decomposition technique
inst_code	bigint	Unique code for type of analysis instrumentation technique

Table 14. code_method: geochemical assay methods list.

Field Name	Type	Description
decomp_code	bigint	Unique code for every sample decomposition technique
decomp_name	varchar	Name of sample decomposition technique

Table 15. code_decomposition: sample decomposition techniques list.

Field Name	Type	Description
inst_code	bigint	Unique code for every analysis instrumentation technique
inst_name	varchar	Name of analysis instrumentation technique

Table 16. code_instrument: analysis instrumentation techniques list.

Field Name	Type	Description
cert_id	bigint	Sequential unique identifier for every geochemical assay certificate from every assay certificate
cert_no	varchar	Certificate number of geochemical assay report
cert_date	date	Date of geochemical assay report certificate
cert_comments	text	Remarks on the geochemical assay report certificate
lab_code	bigint	Unique code for geochemical assay laboratory
cert_ar_number	bigint	Number of assessment report in ARIS to which each instance of certificate number belongs to; used as a disambiguation criterion for certificates containing samples from more than one assessment report

Table 17. cert: geochemical assay certificate metadata.

Field Name	Type	Description
lab_name	varchar	Name of geochemical assay laboratory
acronym	varchar	Acronym of geochemical assay laboratory
lab_code	bigint	Unique code for geochemical assay laboratory

Table 18. code_lab: geochemical assay laboratories list.

Field Name	Type	Description
prep_id	bigint	Sequential unique identifier for every sample preparation routine used
cert_id	bigint	Sequential unique identifier for every geochemical assay certificate from every assay report
prep_comments	text	Additional remarks on the method of sample preparation
prep_method_code	bigint	Unique code for type of sample preparation method

Table 19. prep: geochemical assay preparation method information.

Field Name	Type	Description
prep_method_abbr	varchar	Abbreviation of sample preparation method
prep_method_description	varchar	Additional notes on lab preparation method
prep_method_details	text	Description of lab preparation method
prep_method_code	bigint	Unique code for type of sample preparation method

Table 20. code_prep: geochemical assay preparation methods list.

Field Name	Type	Description
unit_name	varchar	Abbreviation of measurement unit
unit_details	text	Name of measurement unit
unit_code	bigint	Unique code for unit type

Table 21. code_unit: measurement units list.

2. Database structure

The present data model modifies the data structure from Fortin and Silva (2025) and consists of twenty tables (Fig. 2; Tables 2-21). Tables are of two types: 1) those containing drill collar, lithologic, and geochemical data extracted from assessment reports, which include discrete attributes following a standardized nomenclature; 2) those prefixed by 'code' containing expanded information and metadata regarding the various discrete attributes captured in the data tables.

The collars table (Table 2) is the central table of the database; it contains drill collar locations and metadata. The code_epsg table (Table 3) links to collars through the epsg_srid and contains details on the original geodetic datum. The code_drill_types table (Table 4) links to collars through the drilltype_code and contains details on the drilling method. The code_location_method table (Table 5) links to collars through the loc_method_code, and contains details on the method for determining drillhole surface location. The code_hole_diameter (Table 6) table links to collars through the diameter_code, which is connected in collars to both diameter_code and reduced_diameter_code, containing details on drill collar diameter. The code_north_reference table (Table 7) links to collars through the reference_code and contains details on the type of north reference for directional surveying. The code_surface_underground table (Table 8) links to collars through the ground_ref_code and contains information on whether the drillhole starts on the surface or underground. The code_data_source_type table (Table 9) links to collars through the source_code and contains details on the type of source from which the data were obtained.

Both the litho (Table 10) and the sample (Table 11) tables link to collars through the hole_id. The litho table contains lithological depth logs, while the sample table contains sample information and their respective depth intervals. The determin (Table 12) table links to sample through the sample_id and contains the results of geochemical assays. The code_analytes table (Table 13) links to determin through the analyte_code and contains details on the measured analyte. The code_method table (Table 14) links to determinations through the assay_method_codeand contains details on the assaying method. The code_decomposition table (Table 15) links to code_method through the decomp_code and contains details on the assaying method sample decomposition technique. The code_instrument table (Table 16) links to code_method through the inst_code and contains details on the assaying method instrumentation technique. The cert table (Table 17) links to determinations through the cert_id and contains details on the assay certificate. The code_lab table (Table 18) links to cert through the lab_code and contains details on the assay laboratory. The prep table (Table 19) links to cert through the cert_id and contains information about sample preparation methods. The code_prep table (Table 20) links to prep through the prep_method_code and contains details on sample preparation methods.

The code_unit table (Table 21) links to determinations through the unit_code and abundance_unit_code relation, and contains details on the measurement unit. The code_unit column in the code_unit table also links to the elevation_unit_code, length_unit_code, casing_depth_unit_code, reduced_depth_unit_code columns in the collars table.

3. Data compilation process description

Data compilation follows the same process as in Norris and Fortin (2019) and Fortin and Silva (2025) and consists of three steps: 1) data extraction; 2) data screening (QA/QC); and 3) data loading. In the present release, changes made to the validation scripts improved the accuracy and consistency of the database.

4. Data 'product' description

Data products were generated from the database using SQL queries. The GeoPackage contains five spatial tables, which are SQL views generated by joining the various data and code tables. Most field names were kept consistent with the original tables, whereas others were slightly modified by spelling out abbreviations for clarity and disambiguation. The vw_collars_geom_sp_ll83 view is hard-coded in the GeoPackage and only contains a geometry field with collar location and the hole_id from the collar table. The vw_collars_sp_ll83, vw_litho_sp_ll83, vw_samples_sp_ll83 and vw_determin_sp_ll83 are dynamically generated. The vw_collars_sp_ll83 view contains collar metadata; vw_litho_sp_ll83 adds lithological information to the collar metadata; vw_samples_sp_ll83 adds sample information to the collar metadata; and vw_determin_sp_ll83 combines analytical results, including determinations,

certificate information, and analytical methods, with the collar metadata. These can be brought directly into most GIS applications. These views may be filtered according to specific needs (e.g., assessment report, geographic areas, drill hole, analyte). The tables containing raw data and the corresponding codes can be joined in different ways, through hole_id in the vw_collars_geom_sp_ll83 view, which contains a geometry field with collar locations, in addition to the relations described in Fig. 1. Using record attributes or locations, collars may also be linked to other BCGS databases.

5. Conclusion

The assessment report drillhole database makes information locked in PDF or paper copy reports more accessible. Data extracted and digitized from these reports are released as a GeoPackage (BCGS_GF2026-11.zip), which can be imported directly into most GIS. The database continues to grow as more data from additional assessment reports are compiled and validated. Field descriptions have been incorporated into the tables as metadata, so future data updates may be released without the need for an accompanying stand-alone documentation package. The BCGS invites submission of data in raw and tabular format to ARIS.digital@gov.bc.ca. We would appreciate being notified of errors in the database.

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