

Release of data from exploration on terminated state metallic minerals leases (multiple areas) by AngloGold Ashanti Minnesota Inc.

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Exploration Data Set #003, Exploration Areas: Aegir, Freyja, Knarr, Magni, and Ran

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Background

AngloGold Ashanti Minnesota Inc. (AGAM) carried out a gold exploration campaign in northern Minnesota from 2016 through 2019. At its peak, AGAM held 271 state minerals leases covering more than 105,000 acres of state-managed mineral rights in Itasca, Koochiching, and Saint Louis Counties. AGAM organized its exploration program into six exploration areas: Aegir, Celina, Freyja, Knarr, Magni, and Ran. AGAM's exploration program included geophysical, geological (including drilling) and geochemical exploration methods.

The state of Minnesota issues nonferrous metallic minerals leases on state-managed mineral rights under the terms established in Minnesota Rules, parts 6125.0100 through 6125.0700. When a company terminates a state lease, the company is required to submit to Minnesota Department of Natural Resources (DNR) copies of all exploration data collected during the lease period, including (but not limited to) drill logs and records, geophysical surveys, geological maps, and laboratory test data.

AGAM concluded its exploration activities in the Celina exploration area and terminated the associated thirty-three (33) state mineral leases in December 2018. AGAM submitted exploration data associated with the Celina area to the DNR, and was released to the public under DNR Open File #001.

AGAM exploration activities in the other five project areas ended in 2019, with the remaining 238 state exploration leases terminated in December 2019. AGAM submitted the exploration data associated with these terminated exploration leases to the DNR in 2020. This data set, as it was submitted by AGAM, is released to the public in Open File #003. [See the disclaimer at the end of this document.]

Geographic coverage

The information included in this release covers exploration in parts of northeastern Itasca County, southeastern Koochiching County, and west central St. Louis County.

Scope of information

Information submitted includes data and results from field mapping, airborne electromagnetic and radiometric surveys, surface sampling of bedrock and soils, and samples collected from three archived public bedrock cores and 155 rotasonic borings. Laboratory results include age dating, gold grain counts, rock geochemistry, kimberlite indicators, and geochemistry of heavy mineral concentrates. Petrographic reports from the examination of bedrock thin-sections were also submitted. The AGAM data submission includes digital photographs of the drill samples (core) that were submitted to the DNR.

In late 2016, AGAM commissioned an airborne geophysical survey over both public and private lands within a large area of Northern Minnesota. AGAM used the results of this survey to focus on specific areas of state-managed mineral rights for exploration. The airborne survey was flown before the state mineral leases in all exploration areas, except Celina, were issued to AGAM, therefore the airborne geophysical data submitted by AGAM is voluntary. The data volunteered includes airborne geophysical survey results from state-owned and non-state lands within the five AGAM exploration areas (Aegir, Freyja, Knarr, Magni, and Ran). Airborne geophysical results gathered outside of these defined exploration areas were retained by AGAM. Airborne geophysical results for the Celina area are in Open File #001.

By Minnesota law, mineral explorers are required to submit to the state at least a one-quarter portion of the full length of every exploratory boring drilled anywhere in Minnesota. This sample, which can include both solid bedrock and overlying unconsolidated sediments, is boxed by the explorer and delivered at the end of their exploration program to the DNR's Drill Core Library in Hibbing. AGAM completed 155 exploratory borings using large-diameter rotasonic drilling methods that generated a large volume of sediment core. DNR determined that it was in the best interests of the State to direct AGAM to submit only the intervals with greatest exploration value for archival storage. Core intervals required to be submitted were the deepest intervals from every boring (typically Rainy lobe glacial sediments and bedrock), and entire core profiles from a smaller number of geographically representative locations. AGAM only used rotasonic drilling methods for exploration drilling.

In addition to boxed drill core, AGAM submitted other physical material collected during their exploration activities. This includes unused laboratory sample materials, and heavy mineral concentrates that were collected from selected drill core intervals. All of the physical material submitted by AGAM to the DNR is available for public viewing by appointment at the DNR Drill Core Library in Hibbing.

Summary of information in this release (available for download)

1. Reports (.pdf format).
 - a. Communications including topics on airborne geophysics, geochemical classification of tills.
 - b. Reports by consultants or contractors:
 - i. Age dating by Corey Wall (Boise State University)

- ii. Detailed mapping of bedrock for portions of Magni and Ran areas by Big Rock Exploration
 - iii. Final report for airborne geophysics by Sander Geophysics.
 - c. Map that outlines the exploration areas and a report that summarizes the company's exploration program.
- 2. Geophysics (airborne)
 - a. Map that shows the area where data were collected (.pdf and .shp) plus readme files (.txt) for airmag (aeromagnetic) and airrad (radiometric).
 - b. Shape file that outlines the extent of the geophysical data held by AGAM that are made public.
 - c. Images (georeferenced .tif files):
 - i. Magnetics: total magnetic intensity, first vertical derivative reduced to pole image
 - ii. Processed radiometric data
 - d. Raw data (.csv and .gdb files)
 - i. Aeromagnetic
 - ii. Radiometric
- 3. Geochemistry
 - a. Compiled data (.accdb file). Access database consisting of 13 tables with data for drilling and surface samples and samples from public core.
 - b. Certificate of Analysis from ALS (.csv and .pdf, 36 files)
 - c. Lab Data Report from ODM (.xls and .pdf, 37 files)
 - d. Certificate of Analysis from ActLabs (.xls and .pdf, 22 files)
 - e. Certificate of Analysis and methods from ALS for heavy mineral concentrates (.xls and .pdf, 6 files)
- 4. General Geology and Mineralogy
 - a. Spreadsheet (AGAM_Bedrock_SummaryKey.xlsx) with bedrock descriptions, abbreviation codes, and analytical results (.xls, 1 file)
 - b. Petrography reports by Big Rock Exploration (pdf, 6 files)
 - c. Report and spreadsheet on age-dating by Corey Wall (.pdf, xls, 2 files)
 - d. Detailed field mapping results by Big Rock Exploration contained in 6 shape files (alteration, field stops, glacial structures, outcrops, samples, structures)
 - e. Geologic maps for each exploration area (.pdf and .xls, 6 files)
- 5. Borings
 - a. Maps that summarize gold grain results and geochemistry from drilling (.pdf, 7 files)
 - b. Strip logs for borings including general stratigraphy for each exploration area and logs for each boring with gold grains and geochemistry indicated with a key (.pdf, 7 files)
 - c. Document that summarizes drilling statistics
 - d. Shape file and spreadsheet containing a summary of the geology, gold results, and analytical results of the bedrock for each boring (.shp, .xlsx, 2 files)
 - e. Shape file containing details of geographic location (.shp, 1 file)
 - f. Photos of core from borings (.jpg, many files)

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