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**GEOLOGICAL SURVEY OF CANADA
OPEN FILE 8708**

**Whole-rock lithogeochemistry along drill core through the
gold-bearing Whale Tail zone, Amaruq deposit,
Churchill Province, Nunavut**

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Foreword/Context

The Targeted Geoscience Initiative (TGI) is a Government of Canada-led collaborative geoscience research program directed towards providing next generation knowledge and methods that will facilitate more effective targeting of mineral deposits. The objective of the program is to improve the effectiveness of exploration for Canada's major mineral systems by resolving foundational geoscience problems to constrain the geological processes that liberate metals from their source region, transport these ore metals and control their eventual deposition.

Through TGI5 (2015-2020), five of Canada's major ore systems were studied, including a major project on Gold. Two complementary research themes define the Gold project: 1) System controls on gold through space and time (source to trap); and 2) Tectonic influences on gold (tectonic drivers and conduits). These two subprojects are complementary and divided into a series of thematic and/or regional activities in many of the gold-bearing Canadian geological provinces (Mercier-Langevin et al., 2017).

Summary

This report releases whole-rock geochemical and assay results of 19 samples from drill core ddh IVR14-158 that cuts across the Whale Tail zone of the Amaruq gold deposit in Nunavut. These samples were collected in 2015 as part of a GSC- and Agnico Eagle Mines-supported B.Sc. thesis study (Lauzon, 2017) at the Université Laval, Quebec. Research on the Whale Tail Gold zone was conducted under subproject 2 of the Gold project. The litho geochemical data is presented in a format easily importable into a geographic information system (GIS) application. Samples were collected from one drill core interval to document the chemistry of the host units and alteration zones, and to document ore mineralogy and chemistry. Sample information and geochemical results are presented in Appendices 1 and 2 (worksheet "Results"), respectively. The results worksheet is from one data report from 2016.

Analytical Methods

Whole-rock analyses were performed at Activation Laboratories Ltd. in Ancaster, Ontario, using a combination of their standard preparation and analytical packages, the details of which can be found at <https://actlabs.com/geochemistry/>. Methods and detection limits are reported for oxides and elements in Appendix2-worksheet "DetectionLimit" while method abbreviations appear in *italic* below.

Samples were initially dried (60°C) and crushed to at least 90% (<2mm) in a steel jaw crusher. A mechanically split fraction was pulverized in a chromium-free steel mill until 95% of the sample material passed through a 74 µm mesh. Major elements were determined by lithium metaborate-tetraborate fusion followed by inductively coupled plasma mass spectrometry (FUS-ICP; *FUS-MS*). Trace and rare earth elements were determined by a combination of lithium metaborate-tetraborate and total digestion (four acids) followed by inductively coupled plasma mass spectrometry (*FUS-MS*; *TD-MS*) and inductively coupled plasma atomic emission spectrometry (*FUS-ICP*). FeO was determined by titration using a cold acid digestion (ammonium metavanadate and hydrofluoric acid) in an open system (*TITR*).

For chalcophile elements, a four-acid digestion ICP-MS (*TD-MS*) method was preferred. Aqua regia (*AR-MS*) digestion coupled with ICP-MS was chosen to analyze As, Sb, Bi, Se and Te.

Boron was determined by gamma neutron activation analysis (*PGNAA*).

Preferred method for Au included the combination of fire assay with an atomic absorption (*FA-AA*) finish. High-grade ore zone samples were re-analyzed with a combination of fire assay and gravimetry (*FA-GRAV*). Silver was measured by using lithium metaborate-tetraborate fusion (*FUS-MS*) or near total four-acid digestion (*TD-MS*) combined with ICP-MS.

CO₂ and Total (S) were determined by combustion infrared analysis (*IR*).

Mercury was measured by cold vapor-atomic absorption using a flow injection mercury system (*FIMS*) after aqua regia digestion.

Actlabs reports LOI, LOI2, Total and Total 2. LOI is determined by weighing a small amount of the sample before and after ignition. However because FeO was measured, it was possible to adjust LOI to take into account the weight gain resulting from oxidation of FeO to Fe₂O₃. This adjusted value of LOI is LOI2.

Reported Total is the total of all major oxides using Fe₂O₃(T) and LOI, whereas Total2 includes LOI2.

Quality assurance and quality control (QA/QC)

Activation Laboratories internal QA/QC system under ISO 17025 or ISO 9001:2008 accreditation, quality control materials (certified standards and duplicates and Blanks) are reported in Appendix 2 in worksheets “LabStandards”, “Duplicates” and “Blanks” .

Precision estimated from duplicates are within 10% of the mean standard value. Limitations include insufficient material for analysis of some standards. Blank sample analyses show no contamination between samples.

References

Lauzon, M.-C., 2017. Empreinte minéralogique et géochimique des minéralisations aurifères de la zone Whale Tail du projet Amaruq; unpublished B.Sc. thesis, Université Laval, Quebec, Canada, 48 p.

Mercier-Langevin, P., Rogers, N., Dubé, B., Bleeker, W., Castonguay, S., McNicoll, V.J., Chapman, J.B., Lawley, C.J.M., Bellefleur, G., Houlé, M.G., Pinet, N., Jackson, S.E., Davis, W.J., Bécu, V., Peter, J.M., Paradis, S., Potter, E.G., Bjerkelund, C., Villeneuve, M.E., and Evans, R., 2017. Targeted Geoscience Initiative: 2016 Report of Activities – An Overview; in Targeted Geoscience Initiative – 2016 Report of Activities, (ed.) N. Rogers; Geological Survey of Canada, Open File 8199, p. 7-16. doi:10.4095/299573