# REPORT ON THE 2016-17 DIAMOND DRILLING PROGRAM AT THE LUNDMARK-AKOW LAKE PROPERTY OF ROMIOS GOLD RESOURCES INC.

Patricia Mining Division,

Northwestern Ontario.

NTS Map sheets 53B/15 and 53B/16

Ву

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# **CERTIFICATE** of Author

I, John L. Biczok, P.Geo., do hereby certify that:

1. I am an independent consulting geologist employed by:

Romios Gold Resources Inc. Suite 500, 2 Toronto St., Toronto, ON, M5C 2B6

- 2. I graduated with an Honours B.Sc. degree in Geology from Lakehead University in Thunder Bay, Ontario in 1976 and have practiced my profession continuously since 1979.
- 3. I am a member of the Association of Professional Geoscientists of Ontario (#1493).
- 4. I have worked as a geologist for a total of 38 years since my graduation from university. I was employed as an exploration geologist by several major mining companies on a full-time basis from 1979 to 2003 throughout central and western Canada and much of India. *My relevant experience for the purpose of the Technical Report includes:* From 2003 to March 2015 I was employed as a geologist at the Musselwhite gold mine, initially as a project geologist, followed by a senior exploration geologist position and then as senior research geologist. During my career I have gained experience in a variety of deposit deposits relevant to the Lundmark-Akow Lake project including VMS (volcanogenic massive sulphides), shear-hosted gold, iron formation hosted gold, and various exhalative-type deposits (copper, lead-zinc, barite, etc.).
- 5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the

requirements to be a "qualified person" for the purposes of NI 43-101.

6. I am responsible for the preparation of all sections of the technical report titled

"REPORT ON THE 2016-17 DIAMOND DRILLING PROGRAM AT THE LUNDMARK-AKOW LAKE PROPERTY OF ROMIOS GOLD RESOURCES INC."

(the "Technical Report") dated October 16, 2017, with an effective date of September 15, 2017, relating to the Lundmark-Akow Lake property owned by Romios Gold Resources Inc. I initially visited the Lundmark-Akow Lake property on August 16-17, 2016 for 1.5 days. I worked in the field on the Lundmark-Akow Lake property from September 9<sup>th</sup> to October 6th, 2016 for 28 days and then again from July 25<sup>th</sup> to August 5<sup>th</sup>, 2017 for 12 days.

- 7. I have not had prior involvement with the property that is the subject of the Technical Report.
- 8. As at October 16, 2017, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- 9. I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
- 10. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
- 11.<sup>1</sup> I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 16<sup>th</sup> Day of October, 2017.

### (Signed and Sealed) "John L. Biczok"

Signature of Qualified Person (John L. Biczok, P.Geo.)

[Seal or Stamp of Qualified Person]

<sup>1</sup> If an issuer is using this certificate to accompany a technical report that it will file only with the exchange, then the exchange recommends that this paragraph is included in the certificate.

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# **1 SUMMARY**

Romios Gold Resources Inc. is the owner of 13 mining claims covering 2,720 Ha in the Lundmark-Akow Lake area of northwestern Ontario, located 18 km north of Goldcorp's Musselwhite gold mine. There is no known economic mineral deposit on these claims and the work described herein is exploratory in nature. The purpose of this report is to present the results of Romios' 2016 four-hole diamond drilling project on the Akow Lake grid, provide a significantly revised geological model for the previously discovered copper-(gold) zone, and to present the encouraging results of one drill hole completed in 2017 that discovered a Cu-Au-Ag massive sulphide horizon by utilising this revised model.

The Lundmark-Akow Lake claims were originally staked by Romios Estates Ltd. in 1994-97 to cover the northern extension of the same banded iron formation (BIF) that hosts the gold mineralization at Musselwhite. However, following the discovery in 1998-9 of high-grade gold showings in the adjacent basalts and thin intraformational sulphidic BIFs (Spence and Bishop showings respectively), and outcrops of a gossanous schist (the "Romios Shear Zone"), the majority of work has been focussed on targets outside the main BIF. Beginning in 1996, Romios undertook a substantial number of ground and airborne surveys, which led to the identification of several prominent EM conductors, followed by 2 diamond drilling programs in 1998 and 1999 to test the known showings, various conductors and selected portions of the BIF.

The feature of most interest identified by these early drilling programs is a ~100 m wide gossanous, north-trending schistose zone termed the "Romios Shear Zone" by Zhang (1998) and Spence (1998b). It contains broad zones of low-grade copper-(gold) mineralization with short, sporadic higher-grade intervals, within a package of coarse-grained garnet-staurolite-biotitesericite schists (Zhang, 1999). This zone has been the focus of several geophysical surveys since those drilling programs including local IP and gravity surveys, large-loop Transient EM (TEM) survey, and a VTEM survey flown in 2014. These surveys delineated 2 parallel formational-type conductors flanking the copper-(gold) zone as well as an intermittent conductor coincident with this zone for several hundred metres. This copper-(gold) zone (within the "Romios Shear Zone" of Zhang and Spence) was the primary target of a 4-hole, 1.826.4 m drilling program conducted from September 7<sup>th</sup> to October 6<sup>th</sup>, 2016. The "Romios Shear Zone/copper-(gold) zone" was intersected by three of the 2016 drill holes over a strike length of ~1.5 km and all returned similar Cu-(Au) mineralization to that of the previous drill programs, i.e. approximately 0.2% Cu and 0.1 g/t Au over estimated true widths of 8.1-11.4 m +/- smaller zones of similar grades across a corridor ~100-160 m wide. The mineralized host rocks consist predominantly of steeply dipping staurolite-garnet schist and lesser sericite-biotite-staurolite-garnet schist flanked by relatively unaltered fine-grained clastic metasediments and minor mafic volcanics.

The 2016 drill holes provided an opportunity to observe the mineralized, altered lithologies grading into the adjacent fresh metasediments and metavolcanics. This transition and other geological features observed in the core, along with lithogeochemical analyses, suggests that the

"Copper-(Gold) Zone" is not a true shear zone *per se* but rather a laterally extensive hydrothermal alteration zone such as those found beneath many volcanogenic (base metal) massive sulphide (VMS) deposits and termed a "lower semi-conformable alteration zone". It is now considered less likely that a significant ore zone will be found within such an alteration zone itself, however, it was considered quite possible that this alteration zone exhaled base metal sulphides onto the paleo-seafloor and a deposit could be found nearby in the adjacent lithologies. Given this new understanding of the copper-(gold) zone and the potential for VMS deposits in the area, a review of the existing geophysical data was undertaken in order to locate any significant EM conductor flanking the copper-(gold) zone / alteration zone and a series of three adjacent EM conductors at Atim Lake North were selected as a high-priority target for follow-up drill testing in 2017.

Drill hole RGR-17-1 was drilled in late July-early August 2017 and intersected an unusual tourmalinite-rich Cu-Au-Ag massive sulphide style horizon, the first base metal discovery in the Lundmark-Akow Lake – Musselwhite area. This horizon corresponded to the first of the targeted conductors and assayed 2.35% copper, 1.4 g/t gold and 68.2 g/t silver over a drilled length of 1.9 m and an estimated true width of 1.4 m. In addition to this notable massive sulphide horizon, copper-(gold) mineralization was discovered in three intervals of hydrothermally altered, quartz veined/flooded staurolite-garnet-biotite-sericite schists similar to those encountered in past drilling of the copper-(gold) enriched alteration zone approximately 1.5 to 3 km to the southeast; these intercepts range from 1.6 m to 3.9 m in true width with 0.28 to 0.58% Cu and nil to 0.34 g/t Au. The second conductor corresponded to a 40 cm thick horizon of semi-massive barren pyrrhotite. Due to timing, logistical and budgetary constraints the hole was terminated before reaching the third conductor.

There seems little doubt that the massive sulphide horizon discovered at Atim Lake North in 2017 is associated with the extensive copper-(gold) enriched alteration zone and that additional massive sulphide occurrences might be found at other sites along this zone. A review of the existing geophysical data covering the full extent of the "Copper-(Gold) Zone" is recommended in an effort to locate additional conductors that may reflect massive sulphide horizons, and additional ground surveys (Mag and EM) should be undertaken to delineate the extent of the discovery zone at Atim Lake North and any on-strike repetitions. Follow-up drilling with at least nine drill holes is recommended to scope out the size potential of the massive sulphide deposit with additional holes as needed to test any nearby EM conductors of interest. A down-hole geophysical survey is recommended for hole RGR-17-1 to provide an additional vector towards potentially thicker portions of the mineralized horizon, as well as for hole RGR-16-2 in an effort to locate any sulphide accumulations near this potential vent site. A geophysical review of surveys over a ~4 km long untested portion of the BIF is also recommended, to be followed by humus sampling and potential diamond drilling of any areas with anomalous gold levels.

The recommended work programs are discussed briefly below and in Section 26.

#### Volcanogenic Massive Sulphide (VMS) Targets. Total Budget: \$982,700

#### Phase One: Winter Camp Set-up, Line-cutting, Geophysics. Budget: \$191,400

Now that a massive sulphide horizon has been located at Atim Lake North, a combined HLEM-Magnetic survey is recommended in order to trace this prospective horizon along strike, in particular to the 6-700 m long conductor that begins about 600 m north of the discovery hole. Line-cutting in the forested areas and establishment of picketed grids on the winter ice of Atim Lake North will be required for this geophysical survey. In addition, a down-hole geophysical survey is recommended on DDH RGR-16-2 to look for possible sulphide deposits near this possible vent site, and on DDH RGR-17-1 to provide a vector towards the potentially thickest portions of the massive sulphide horizon. In order to undertake this work and to prepare for the proposed follow-up drill program, a winterised tent camp will have to be established. At this point the estimated costs for the camp establishment and work program(s) are quite uncertain due to a high number of variables affecting the access to the site. At this time it is assumed that mobilisation will be by fixed wing aircraft.

#### Phase Two: Diamond Drilling of the Atim Lake North Massive Sulphide Horizon and Other Targets.

#### <u>Budget</u>: \$763,800

An initial program of nine drill holes is recommended to scope out the size potential of the Atim Lake North massive sulphide horizon. Although the grades intersected in hole RGR-17-1 are potentially economic, the 1.4 m true width of the zone at this point appears insufficient. Consequently the first five drill holes should be widely spaced at 100 m intervals along strike from the discovery hole, testing the -100 m and -200 m levels, followed by holes at 50 m spacing in the most promising areas. This preliminary plan could be affected by the results of the geophysical surveys. The nine initial holes would be 175 m and 350 m long, totalling ~2,300 m of drilling.

At this stage there appears to be at least one (6-700 m) long conductor located 600 m north along strike to the north of the discovery hole that should be drilled. Two additional drill targets are included in the proposal at this time including an EM conductor near Lundmark Lake and a follow-up hole near RGR-16-2 assuming that the down-hole EM survey detects a sulphide accumulation.

#### SUMMER GEOLOGICAL FIELD WORK: Budget \$27,500

A small summer program is also included in the VMS program in an attempt to answer some important questions about the fold patterns on this property.

#### Gold-in-Banded Iron Formation (BIF) Targets. Budget: \$448,140

Large sections of the regional BIF that hosts the Musselwhite gold mine 18 km to the south are untested on the Romios claims. A program of geological mapping, prospecting, re-examination of historic drill core, humus sampling and geophysical surveys is recommended to be followed by a series of short drill holes in the most promising areas as determined by these surveys.

# 2 INTRODUCTION

Romios Gold Resources Inc. ("Romios" or "the company") is the owner of 13 mining claims in the Lundmark-Akow Lake area (the "property") of northwestern Ontario (Figure 1). This report was prepared on behalf of Romios following the 2016 and 2017 diamond drilling programs on the property in order to document the significantly revised geological interpretation of a historic subeconomic "Copper-(Gold) Zone" and the subsequent discovery of a Cu-Au-Ag massive sulphide horizon, and to present recommendations for further exploration based on this new discovery.

Three holes were drilled in the fall of 2016 to test the copper-(gold) zone discovered in 1998-99 within the "Romios Shear Zone" which is hosted by various coarse-grained garnet-staurolitebiotite-sericite schists and one hole tested a partially defined electromagnetic conductor nearby. Based on the geological evidence from these holes, the author re-interpreted the copper-(gold) zone/shear zone as a "lower semi-conformable alteration zone" that served as a pathway for metal-enriched hydrothermal fluids that may have exhaled massive sulphides onto the paleoseafloor. This revised model led directly to the selection of a cluster of EM conductors 200 m west of the copper-(gold) zone for drilling in 2017.

The author, John L. Biczok, P.Geo., an independent consulting geologist, was retained in early August 2016 by Mr. Tom Drivas, President and CEO of Romios, to organise and supervise the drill programs, log the drill core, provide recommendations, and prepare report on the programs.

Romios supplied all available reports and maps documenting the historic line-cutting, geological, geochemical and geophysical work as well as the two earlier diamond drilling programs (1998 and 1999). The author initially visited the property on August 16th and 17<sup>th</sup>, 2016 to locate the proposed 2016 drill sites in the field with the local trapper (Mr. Geordie Apetawakeesic of Round Lake, Ontario) and then worked on the property co-ordinating the drill program and logging the core from September 9th to October 6th. During this time the author also measured GPS co-ordinates for all of the historic drill sites in the vicinity of the 2016 sites as well as various points on the Akow Lake grid. The recorded co-ordinates of two historic drill sites, 98-8 and 98-9, were known to be suspect and these were indeed found to be in error; new co-ordinates have been measured and the holes are plotted in the correct positions on all maps in this report. The location of the Akow Lake grid was found to be generally accurate and reliable on the historic maps.

Following the completion of the 2016 drilling and the recognition of certain key geological features in the core, a revised geological model of the copper-(gold) zone was put forth by the author and drill testing of a high-priority set of three EM conductors flanking the copper-(gold) zone at Atim Lake North was approved by Romios. This one-hole drill program commenced July 26<sup>th</sup> and was completed August 5<sup>th</sup>, 2017.

# **3 RELIANCE ON OTHER EXPERTS**

The author did not rely on any other individuals in presenting the geological results of the 2016-17 programs, however, the results of drill core logging in 1999 by another geologist and several geophysical images prepared by a professional geophysicist are included. The cross-section of DDH-RGR-16-1 (Figure 7) includes graphical logs of drill holes 99-2 and 99-3 which were logged and interpreted by Mr. Guowei Zhang, Ph.D., (now a P.Geo. and considered a Qualified Person under National Instrument 43-101) and found to be in good agreement with the rock types logged by the author in hole RGR-16-1. Some terms of the claim option agreement between Romios Gold Resources Inc. and Romios Estates Ltd. presented in Section 4.2 were reproduced from an internal company report by Zhang (2015) who apparently had access to a 1996 prospectus that outlined this agreement.

The author has benefited from examination of various geophysical images prepared from historic surveys and Maxwell Plate Modelling of VTEM conductors by consulting geophysicist Mr. Bob Lo, P.Eng., as well as discussions with Mr. Lo. Figures 11, 12 and 20 were prepared by Mr. Lo.



Figure 1: Regional location map

# 4 PROPERTY DESCRIPTION AND LOCATION

#### 4.1 Location

The Lundmark-Akow Lake property held by Romios is located 493 km north of Thunder Bay, Ontario and 146 km north of Pickle Lake, Ontario (Fig. 1). It lies within the Patricia Mining Division on NTS map sheets 53B/15 and 16. The area of interest in this program is centred at about 52° 46′ 33″ N and 90° 29′ 00″ W. The property is about 18 km north-northwest of Goldcorp's Musselwhite gold mine on Opapimiskan Lake. The nearest settlement is the First Nation community of Round Lake (a.k.a. Weagamow Lake) which is 61 km to the north-northwest of Akow Lake.

#### 4.2 Property Holdings and Underlying Agreements

The Lundmark-Akow Lake property consists of 13 mining claims (170 units) covering 2,720 Ha (see Table 1, Fig. 2). The claims were originally staked on behalf of Romios Estates Ltd. in 1994-97 and then transferred to Romios Gold Resources Inc. Romios Estates Ltd. retains a 3% Net Smelter Return Royalty (NSR) on any precious or base metal production from the property (Romios Gold Resources Inc., 1996 prospectus described in Zhang, 2015). Romios Gold Resources Inc. (the "Company") has the right to purchase up to a 2% NSR in return for the payment of \$1,000,000 for each NSR %. In the event that the Company decides to abandon some or all of the property, the claims abandoned shall revert back to Romios Estates Ltd.

### 4.3 Permits and Community Agreements

As the property consists of mining claims and not leases, there are no surface rights inherent in the claims. Any substantial work program such as those involving drilling with a large (>150 kg) rig, trenching >3 cubic metres, or other appreciable disturbance to the land requires an exploration permit from the Ontario Ministry of Northern Development and Mines as well as consultation with the local First Nation community (ies), in this case - the North Caribou Lake First Nation (see the Mining Act of Ontario at https://www.ontario.ca/laws/statute/90m14 ). In 2014 Romios was granted an exploration permit (#PR-13-10449) for the Lundmark-Akow Lake property by the Ontario Ministry of Northern Development and Mines (MNDM). In 2015 Romios then signed a Memorandum of Understanding (MoU) with the North Caribou Lake First Nation (the NCLFN) within whose traditional territories the property is situated. Under the terms of the MoU Romios undertook to provide opportunities for the employment of community members and utilization of local businesses during any work program whenever feasible and cost-effective, abide by certain environmental and cultural safeguards, etc. The NCLFN in turn agreed to support Romios' exploration efforts. With these permits and agreements in place, Romios began planning a diamond drill program to follow-up on the previous results from the copper-(gold) zone drilled in 1999 and this program began in September, 2016. Both the MoU and the Exploration Permit expired in early 2017. A new 3-year MoU was signed with the NCLFN in May 2017 and a new 3year Exploration Permit, #PR-17-11089 was granted by the MNDM on June 19, 2017.

TOWNSHIP/AREA	CLAIM #	UNITS	HECTARES	STAKED	DUE DATE
Akow Lake Area	1208559	16	256	1994-05-20	2018-05-27
Akow Lake Area	1208561	16	256	1994-05-20	2018-05-27
Akow Lake Area	1208991	8	128	1994-08-02	2019-05-27
Akow Lake Area	1208992	15	240	1994-08-02	2019-05-27
Akow Lake Area	1208993	16	256	1994-08-02	2018-05-27
Akow Lake Area	1208994	12	192	1994-08-02	2018-05-27
Akow Lake Area	1209235	9	144	1994-06-16	2019-05-27
Akow Lake Area	1209237	16	256	1994-06-16	2019-05-27
Akow Lake Area	1209252	6	96	1994-06-16	2019-05-27
Akow Lake Area	1215802	16	256	1997-06-17	2018-05-27
Akow Lake Area	1216798	16	256	1997-06-17	2018-05-27
Akow Lake Area	1217216	8	128	1997-06-26	2019-05-27
Akow Lake Area	1215222	16	256	1996-06-24	2018-05-27
	TOTALS	170 units	2720 Ha		

Table 1: Mining claims held by Romios Gold Resources Inc.

### 4.4 Environmental Liabilities

There are no significant environmental liabilities on the property that the author is aware of. A number of old wooden platforms from 1998-99 (?) remained at the old camp site on the southeastern shore of Akow Lake when this program began in 2016, however, these were demolished and the rotting wood piled up in heaps for later burning in the winter (by the local trapper). The diamond drill rig and all related equipment and supplies were removed from the property at the end of the 2017 drilling except for two wooden drilling platforms. It is expected that these platforms will be re-used during a future drill program but if they are not, the wood will be gifted to the local trappers for their use.



Figure 2: Claim holdings and 2016-17 diamond drilling

# 5 ACCESSIBILTY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

# 5.1 Topography, Elevation and Vegetation:

The topography of the Lundmark-Akow Lake area features the subdued relief typical of most of the Canadian Shield in northwestern Ontario. The terrain is relatively flat with numerous small lakes (See Fig. 2) and low-lying, somewhat boggy areas interrupted by several north-trending low ridges and rows of outcrops. Several lakes 1-2 km across and a few small ponds occur throughout the claims west of Akow Lake. The area north and northwest of Lundmark Lake, including the two northernmost claims, is dominated by a prominent SSW-trending linear glacial dispersion pattern that extends westward across much of North Caribou Lake.

The elevation of the lakes is about 300 m ASL +/-6 m and the land on the claims rarely rises more than ten metres above the lake levels.

The majority of the region is thickly forested with spruce, tamarack and jack pine with minor birch or poplar dominant areas.

# 5.2 Access and Nearest Population Centres

The Lundmark-Akow Lake property is located 493 km north of the city of Thunder Bay, Ontario and 146 km north of the town of Pickle Lake, Ontario (Fig. 1). The nearest settlement is the First Nation community of Round Lake (a.k.a. Weagamow Lake) which is 61 km to the north-northwest of Akow Lake (Fig.1). Both Pickle Lake and Round Lake are serviced by regular scheduled air service from Thunder Bay and charter float plane service is available from both communities. A paved road leads to Pickle Lake from the Trans-Canada highway, 300 km to the south, and an all-weather gravel road, the "North Road", leads from Pickle Lake to the southern shore of Round Lake, with a branch road to the Musselwhite mine.

Access to the Akow Lake property for the 2016-17 program was by float plane and helicopter from a staging area at Mawley Lake on the North Road, 53 km SSW from Akow Lake. A float-equipped Otter aircraft chartered from Osnaburgh Airways of Pickle Lake and an A-Star B2 helicopter chartered from Forest Helicopters of Kenora, Ontario were used to move the drill equipment and fuel to the site from Mawley Lake. Float-equipped Cessna 185 and Beaver aircraft chartered from Weagamow Air of Round Lake were also utilised to move personnel and some gear. During the 2016 drill program, the crew stayed at North Caribou Camp fishing lodge on Cemetery Island in North Caribou Lake, 13 km west of Akow Lake, and during the 2017 program they stayed at the Skinner Lake fishing lodge which is 16.5 km southeast of the Atim Lake North drill site. In both years the crew commuted to the drill site each day by helicopter.

The property is about 18 km north-northwest of Goldcorp's Musselwhite gold mine on Opapimiskan Lake which is served by an all-weather gravel road. An old drill trail leads from the north shore of Opapimiskan Lake northwards towards Akow Lake at least 9 km, however, this

trail is not currently in use. Access for any future development might be possible overland from the Musselwhite mine road network if permission was granted by the mine owners.

## 5.3 Climate

The property experiences the typical continental climate of northern Ontario with average historic temperatures for the nearest town (Pickle Lake) below freezing from November to March. Daily average temperatures there range from about -20° C in January to +17° C in July. Snow depths range from about 30 to 90 cm during the winter months. In terms of the climate's effect on exploration, summer programs currently require float-equipped fixed-wing aircraft or helicopters for access to the property, whereas winter programs require ski-equipped fixed-wing aircraft or helicopters. Typically work during the spring-thaw or fall freeze-up would be suspended barring any pressing need to continue.

## 5.4 Local Resources and Infrastructure

As this program is at a very early-stage it is premature to speculate on the location of any future development other than to say that there are currently no obvious impediments in terms of the land holdings, once the claims are converted to mining leases if so warranted.

In terms of local resources, there is an almost unlimited amount of water available in the area and abundant sand and gravel resources. The nearby Musselwhite mine is currently serviced by a high-voltage electrical power transmission line from the Hydro One grid at Pickle Lake and efforts by a consortium of local First Nation communities (Wataynikaneyap Power) are underway to expand the northern power grid and extend service into the these communities as well as increasing the capacity of the power line into Musselwhite. There is a long history of mining in northwestern Ontario and many inhabitants of the region, including the First Nation communities, have work experience in the local mines.

# 6 **HISTORY**

# 6.1 Property Ownership

Romios currently holds 13 mining claims covering 2,720 Ha in the Lundmark-Akow Lake area (see Table 1, Fig. 2). The claims were originally staked on behalf of Romios Estates Ltd. in 1994-97 and then transferred to Romios Gold Resources Inc. with Romios Estates Ltd. still holding a 3% NSR on the claims.

### 6.2 Previous Exploration

The North Caribou Lake greenstone belt, which encompasses Romios' Akow – Lundmark Lake claims, has been the focus of extensive exploration work at various times since the discovery of the first significant gold-in-iron formation occurrence at Opapimiskan Lake by the Musselwhite brothers in 1973. This work culminated in the opening of the Musselwhite gold mine in 1997,

however, regional exploration in the belt peaked in the 1980s and has been sporadic and localised since that time. A great deal of work, including major diamond drilling programs, was undertaken by various companies between the south side of Akow Lake and the north shore of Opapimiskan Lake with no economic discoveries. To the north of the Romios claims, a number of large claims blocks have been held by other companies at various times but all of these claims have lapsed. Work on those claims included diamond drilling programs but only a small program of shallow packsack drilling (by INCO) extended onto the current Romios claims. Only the work relevant to the current Akow – Lundmark Lake claims held by Romios is summarised below.

1961-1963: Canadian Nickel (INCO) conducted the first recorded exploration work in the Akow Lake area (assessment report 53B09NW0012B1) which consisted of an airborne magneticelectromagnetic survey followed by packsack drilling of selected targets. Two holes were spotted between the south side of Akow Lake and Dinnick Lake, presumably targeting the iron formations in the North Rim volcanics. One hole reached bedrock and intersected minor Py-Po in brecciated quartz and schist. There is no record of any drilling on the current Romios claims at that time. Five shallow packsack drill holes were drilled later in the northwest part of the current Romios property but only two reached bedrock. One of these drill holes intersected 74 feet of chert-magnetite iron formation. No assays were reported (Inco Ltd., 1963).

1981-1982: Cominco Ltd. staked 80 claims covering an area similar to the current Romios land package. They carried out a 61 hole, 755 ft., overburden drilling program in the Akow Lake area (Szabo, 1982). The great majority of the 53 basal till samples collected were taken at shallow depths along a single NNW trending line parallel to the west shore of Akow Lake. The copper results were uniformly low and the gold values showed only minor variations. Given that most of the samples were collected east (up-ice) of the Romios "Copper-(Gold) Zone" the results are currently of little use in evaluating the potential of this zone as we now know it.

1983: Eldor Resources Ltd. drilled five diamond holes in the Doubtful Lake area between 2.5 and 6.5 km northwest of the current Romios claims NW limit (untitled series of drill logs by G. Williams, 1983. AFRI file # 53B15NE0009). One hole intersected ~70 m and another ~72 m of oxide and lesser sulphide iron formation with minor disseminated pyrrhotite, pyrite, and chalcopyrite. No significant gold assays were reported.

1985: Moss Resources conducted VLF-EM ground surveys (Hodge, 1986), geological mapping and sampling (Adams and North, 1985) on their 92 claim Akow Lake – North property which covers an area extending south from the southern portion of Akow Lake. The VLF survey delineated both the main iron formation along the western shore of Akow Lake and the formational conductor 200 m to the west of the BIF. The field work focussed on the iron formations extending north from Musselwhite and returned values less than 95ppb Au from these formations.

1985: A helicopter-borne magnetic and electromagnetic survey of the North Caribou Lake greenstone belt was conducted by Aerodat Limited on behalf of the Ontario Geological survey

(OGS, 1985). The line spacing was 200 m with a magnetometer height of 45 m and the EM bird height of 30 m above ground level. This survey clearly delineated the main BIF on the Romios claims as well as the nearby weak formational conductors which parallel the BIF on its west side and a cluster of weak magnetic highs and adjacent EM conductors along the west side of the claims.

1987: Claims covering the Akow-Lundmark Lake area were optioned from the Four Square syndicate by Power Exploration who conducted a program of line-cutting, VLF surveys, prospecting, stripping and trenching (Newman, 1987). Numerous samples of gossanous iron formation were sampled, returning a maximum gold value of 790 ppb.

1994-7: Romios Estates Ltd. stakes claims covering the Lundmark-Akow Lake area, including the claims held at present, and transfers them to Romios Gold Resources Inc.

1996: Magnum Explorations Inc. was contracted by Romios Gold Resources Inc. to establish a cut grid west of Akow Lake and carry out magnetometer and VLF/EM surveys over this grid (Magnum Explorations Inc., 1996). A total of 51.3 km of gridlines and baselines were cut and 45.7 km of Mag/VLF surveys conducted. The main BIF along the western side of Akow Lake was partially outlined by the magnetic survey, along with weaker features to the west, and numerous VLF/EM responses were detected. Without corresponding geological control there was no concerted effort made at this time to interpret the EM results.

1996: Under contract to Romios, Aero Surveys Inc. undertook a helicopter-borne magnetic survey of the Lundmark-Akow Lake area covering ~60 sq. km and a total of 1315 line km (Fiset, 1996). Flight lines were spaced 50 m apart and the sensor bird flown at a height of 33 m. The survey results were similar to those of the 1985 Aerodat survey but provided more detail of the magnetic features.

1997: Vytyl Exploration Services cut and chained 150 km of grid lines and baselines and then carried out 140 km of ground magnetometer and 80 km of Max-Min II Horizontal Loop EM survey (100 m cable) on behalf of Romios. The surveyed grid extended from the south end of Akow Lake past the north end of Lundmark Lake and clearly delineated the main iron formation along the west shore of Akow Lake on both the Max-Min and magnetic surveys. A prominent Max-Min response was identified between 5+00E and 6+00E in the Akow Lake area which appears to correlate with the pyritic sericite schist intersected in the 2016 drill holes RGR-16-1 and 2. A more complex but still quite persistent Max-Min response was also identified between the baseline and ~2+25W extending grid south from Atim Lake South and lying immediately east of the Spence showing. It appears that this conductive zone would have been missed by most of the past drilling in the Spence showing area, only holes 98-6 and 98-15 should have intersected it (see Figure 3). There is little in the available logs of these 2 holes to account for such a well-defined response other than a few scattered thin intraformational sulphidic sedimentary horizons which may have produced a combined response large enough to explain this conductor. A 1.5 km gap in coverage

exists from roughly the position of drill hole RGR-16-4 northwards and consequently the "Romios Shear Zone/Copper-Gold Zone" in this area was not surveyed and there is no discrete Max-Min response over the known locations of this zone.





1997 Geological Field Programs: Romios contracted geologist Ian Spence to undertake two field programs. A 9-day program in July focussed on mapping and prospecting around the Bishop showing where a 1996 grab sample returned 1.3 g/t Au from an intraformational iron formation (Spence, 1997a). Only two anomalous samples (max. 705 ppb Au) were returned from the Bishop showing area but a new zone to the NNW termed the "Spence Showing" returned gold values up to 2 ounces per ton. This new discovery was followed up by Mr. Spence in September-October 1997 and consisted of outcrop stripping, mapping and sampling over a 100x100 m area and a local humus sampling grid (Spence, 1997b). The Spence showing was described as a series of thin rusty shears with quartz veinlets at or near the contacts of the local basalts with quartz-feldspar porphyry intrusions (in both the basalts and QFP). Gold mineralization is accompanied by potassic (biotite) alteration and minor chalcopyrite. Selected grab samples of these thin shears assayed up to 38.6 oz/t Au. The local humus sampling program outlined several anomalous areas.

1998 Diamond Drilling: Under the supervision of Mr. Ian Spence, Romios undertook a winter drill program on the property and completed 2,182.5 m of drilling in 15 holes (Spence, 1998a). Holes in the Akow Lake area are depicted on Figure 3 whereas the remaining holes situated north of this map are shown on Figure 21. The primary goal of this program was to delineate the Spence gold showing (with 7 drill holes) as well as testing a number of geophysical conductors/possible iron formations across the property. This results suggested that the Spence showing had a limited continuity and that the majority of the conductors tested were due to sulphidic horizons with only sporadic and weakly elevated gold values. The results of one drill hole proved to be of considerable geological interest, however, and that was DDH 98-9. This hole intersected "30 metres of disseminated chalcopyrite (copper mineralization) in a garnetiferous, sericite schist" (Spence, 1998a). This was the first hole to intersect what became known as the "Copper-(Gold) Zone"). It led to follow-up drilling in 1999 and eventually to the 2016 drill program.

1998 Geophysics and Geology: Geologists Ian Spence and Dr. Guowei Zhang spent 3 weeks mapping the Akow-Lundmark Lake area and supervising geophysical surveys and line-cutting contracted to IPTEC. This work improved the company's understanding of the iron formation stratigraphy and the geophysical response of various targets (Spence, 1998; Zhang, 1998).

1998 Geophysics Phase 2: Under a contract with Romios Gold Resources Inc., IPTEC, a division of Lone Pine Exploration Services Ltd., extended the Lundmark Lake grid to the north, cutting a total of 11.5 km of new lines (Vickers, 1999). They then undertook a dipole-dipole IP/Resistivity survey of 2 areas: the Spence showing (Lines 1+00S to 3+00S) and the copper-(gold) zone discovered in drill hole 98-9 (covering a 500-700 m wide strip centred on 600E for 10 lines, 600S-1500S incl.). A 700x400 m gravity survey was also conducted in the vicinity of drill hole 98-9, as well as 11,172.5 m of total field magnetometer and VLF geophysical surveys in areas of the Lundmark Lake and Akow Lake grids not previously covered. The IP survey identified a prominent chargeability high trending grid north-south which appears to correlate with a pyritic formational horizon (the western TEM response) as well as a subsidiary high on the eastern edge of the major

response which might correlate with the copper-(gold) zone (this suggestion requires an evaluation by a trained geophysicist). A roughly linear residual gravity high, trending grid northsouth, was detected at ~6+50E from Line 10+00S to Line 14+00S. This high was later tested by drill holes RGR-16-1 and 2. Although sulphide mineralization was encountered in both holes it was insufficient to explain the gravity high. However, this anomaly does correlate with the thick sequences of garnet-staurolite rich metasediments that host the copper-(gold) mineralization. Both staurolite and almandine garnet are relatively dense minerals, the former having a density of 3.7-3.8 gm/cc and the latter 4.3 gm/cc, versus an average density of 2.7 to 2.9 gm/cc for metamorphic rocks. The combined percentage of these minerals is commonly >40-50% of these rocks and seems a likely explanation for the gravity high.

As noted previously, two of the 1998 drill holes, 98-8 and 98-9, were believed to have suspect co-ordinates and these were indeed found to be incorrect by 150 to 250 m when located in the field. They have been plotted in the correct locations on the maps in this report.

1998: J.B. Boniwell reviewed and interpreted existing geophysical survey data on the claims.

1999: A five-hole diamond drilling program totalling 944 m was undertaken by Romios in January-February 1999 targeting the copper-(gold) zone in the "Romios Shear Zone" (Fig. 3). Four holes successfully intersected the target copper-(gold) zone and provided good information about its width, grade, strike and host rocks (Zhang, 1999). Hole 99-4 was lost before reaching the target.

2003: A large-loop Transient EM survey (TEM) was undertaken on the Akow Lake claims by Discovery Int'l Geophysics Inc. on behalf of Romios (Woods, 2003). The survey covered ~2.8 km from the south side of Atim Lake South to the southern edge of Akow Lake. A prominent conductor was detected over the iron formation near the western shore of Akow Lake along with 2 long, formational–type, parallel conductors ~150-200 m and 350 m to the west. Of more interest was a 400 m long conductor between the 2 aforementioned formational conductors and several scattered, partially defined short conductors including two near the baseline on Line 9+00S. These 2 latter conductors were the target of drill hole RGR-16-3 while holes RGR-16-1, 2 and 4 targeted the 2 formational conductors and the area between them, including the 400 m conductor (holes RGR-16-1 and 2).

2014: Geotech Ltd. undertook an airborne geophysical survey of the Lundmark-Akow Lake property on behalf of Romios using a versatile time domain electromagnetic (VTEMplus) system and a horizontal magnetic gradiometer (Geotech, 2014). A total of 262 line km were flown at a line spacing of 100 m with the EM bird 40 m above the ground and the magnetometers 48 m above the ground. This survey outlined the main iron formation along the western side of Akow Lake and a weak-moderate magnetic high with flanking EM conductors roughly 750-1,000 m to the west. It has been suggested by some workers that this western magnetic high is a folded repetition of the main BIF horizon, however, there is no evidence for this as yet. Only one drill hole, 98-7, was drilled close to this magnetic feature and it intersected 33 m of a magnetic

ultramafic and a few thin intraformational BIFs. The nearby EM conductors are likely caused by more of these conductive intraformational sulphidic BIFs. Of more interest in the Geotech survey data is a shorter conductor in the area west of Akow Lake and 2-300 m west of the main BIF. This response is coincident with the Cu-Au zone identified in the 1998-9 and 2016 drill programs.

# 7 GEOLOGICAL SETTING AND MINERALIZATION

## 7.1 Regional Geology

## 7.1.1 Lithologies

The Lundmark-Akow Lake area lies within the central portion of the Archean North Caribou Lake greenstone belt (NCGB), one of the northernmost belts in the North Caribou Superterrane adjacent to its internal contact with the Schade Lake Gneissic Complex of the Island Lake Domain (Fig. 4). The belt was mapped in detail by the Ontario Geological Survey over a 3 year period in the 1980's (Breaks et al., 2001 and references therein). These workers divided the belt into 8 groups which were modified somewhat by Thurston, (1991) and Hollings and Kerrich (1999). Only those units of relevance to the Romios property will be discussed in any detail here. For information on the other units see Breaks et al. (2001) and Biczok et al. (2012).

The central portion of the NCGB and the adjacent part of the northwestern arm are dominated by three assemblages designated by Breaks et al. (1986, 2001) as the South Rim Volcanics, along the southern and western margins of the belt, the Eyapamikama metasediments along the axial centre of the belt, and the North Rim volcanic assemblage, along the northern and eastern margins of the belt (Fig. 4).

The South Rim volcanic assemblage (SRV) is dominated by fine- to medium grained, massive to pillowed basalt flows with lesser intercalated felsic to intermediate volcanics, including a major felsic pile structurally overlying the iron formation at Musselwhite, rare ultramafic flows (Breaks et al., 1986), as well as locally prominent packages of intercalated clastic metasediments and banded iron formations (Newman, 1987). Age-dating of the felsic-intermediate units has returned ages of 2982 Ma (Davis and Stott, 2001) and 2980 and 2978 Ma (V. McNicoll et al, 2013) with one felsic horizon NW of Musselwhite returning an age of 3053 Ma (oral presentation by McNicoll et al, 2013). The complex iron formation that hosts the Musselwhite deposit has historically been assigned to the Opapimiskan-Markop assemblage (the OMU) in the mine area. However, the OMU is known from the OGS mapping and various airborne geophysical surveys to continue north of Musselwhite and beyond the Romios claims into the South Rim assemblage, suggesting that these two assemblages are gradational into each other and largely age-equivalent along strike.

The Eyapamikama assemblage (ELS) is described by Breaks et al. (2001) as "a fining-upward sequence in which basal alluvium and fan delta conglomeratic cycles grade vertically and laterally into finer grained metasedimentary rocks". It occupies the centre of the belt for tens of

kilometres. The ELS was dated at between <2846 Ma and <2880 Ma by Davis and Stott (2001) and Kelly and Schneider (2015) report a minimum U-Pb zircon core age of 2800 Ma from eleven samples with younger overgrowths of 2788-2703 Ma (due to a regional hydrothermal event).

The North Rim volcanic assemblage (NRV) occupies the eastern margin of the belt in the claims area and is clipped by the easternmost corners of several Romios claims. It is very similar to the South Rim as it is dominated by basalt flows with lesser felsic to intermediate volcanic centres and at least one banded iron formation. It has been suggested by various workers over the years that the entire greenstone belt is a synform and that the North Rim unit is the folded equivalent of the South Rim. However, this is not supported by the age dates of the two volcanic assemblages. Age dating work on the North Rim returned an age of 2870 Ma from the McGruer Lake (Davis and Stott, 2001) and work contracted by Musselwhite returned an age of 2868 Ma from a felsic horizon NE of Doubtful Lake (Biczok, 2012). These ages indicate that the North Rim volcanics are >100 Ma younger than the South Rim and cannot be their folded equivalent.



Figure 4: General geology of the North Caribou Greenstone Belt and surrounding area.

The greenstone belt is cut off along the western edge of the claims by the large North Caribou Lake composite batholith which has been dated at between 2880 and 2830 million years (Ma) (Davis and Stott, 2001; Van Lankvelt, 2013). To the east, the belt is in fault contact with the Schade Lake Gneiss Complex, dated at 2860 to 2840 Ma (Biczok et al., 2012; Van Lankvelt, 2013). Where observed by the author, the fault contact between the Schade Lake complex and the North Rim volcanics is marked by a well-developed L-tectonite plunging very shallowly to the south and dipping shallowly to the east; elsewhere the fault contact is reported to be closer to vertical.

#### 7.1.2 Structure

Three periods of deformation have been mapped in the North Caribou greenstone belt by Hall and Rigg (1986) and Breaks et al. (2001 and references therein) and supported by subsequent workers.

The earliest event, D<sub>1</sub>, was until recently recognized almost exclusively only in iron formations as tight isoclinal folds with a penetrative foliation. Mapping by the author in the Musselwhite mine area combined with high-precision age-dating by the GSC, revealed a major F1 fold that has completely overturned the stratigraphy in the mine area (Oswald et al., 2014). It is unclear how far north this fold extends towards Akow Lake and what form it takes as it progresses northward. D<sub>2</sub> is the strongest phase of deformation and is evidenced by northwest-plunging folds, often with a steeply dipping axial planar foliation. The intersection of D<sub>1</sub> and D<sub>2</sub> locally creates well developed fold-interference patterns such as the "dome and basin" on Grunerite Island in Opapimiskan Lake and a similar pattern evident in the aeromagnetic pattern on the NW side of the same lake. D<sub>3</sub> appears to have been a relatively minor, heterogeneous event that produced small-scale, asymmetric, broad to open or chevron folds with a steep southwest trending crenulation cleavage (Oswald et al., 2014).

Mineral lineations throughout the NCGB exhibit a well-developed and somewhat unusual pattern in that they are quite shallow plunging and reverse plunge directions at several points along the belt, but their axes remain roughly parallel to the axis of the belt overall. The reason for this flip in the lineation plunge is uncertain but may in part be due to the intrusion of the crescent shaped North Caribou pluton (Stott and Biczok, 2010) or perhaps a large-scale  $F_3$  effect. In the central part of the belt, in the region of the Romios claims, the intensity of deformation appears to increase eastward towards the contact with the Schade Lake gneiss complex, a contact marked locally by a highly lineated L-tectonite plunging very shallowly (<5°) to the southeast. Examination of the aeromagnetic pattern of the Schade Lake gneiss suggest that it underwent a pronounced south-directed movement adjacent to the central part of the greenstone belt and this deformation event likely induced a dextral strain throughout much of the adjacent belt. Dextral offsets on fault structures of all scales are the norm throughout the central NCGB.

#### 7.1.3 Metamorphism

The metamorphic grade of the NCGB exhibits an overall increase from low grade (chlorite and biotite bearing assemblages) in the western arm to medium grade assemblages east and south of Doubtful Lake where index minerals such as garnet, staurolite, cordierite, grunerite and rarely, sillimanite are found (Beaks et al. 2001). Work by Kelly and Schneider (2015) suggests that some of the higher-grade assemblages are produced by contact metamorphism from small intrusions throughout the belt. Assemblages in metasedimentary rocks at Akow Lake include garnet, staurolite and grunerite indicative of medium grade (amphibolite) conditions.

#### 7.2 PROPERTY GEOLOGY

The current Romios claims are underlain primarily by two lithological groups, the South Rim Volcanics on the west side and the Eyapamikama Metasediments to the east. The contact between these two assemblages trends north along the western shore of Akow Lake (Fig. 5).

The area of the Romios claims at Lundmark-Akow Lake was mapped by the Ontario Geological Survey at various times and levels of detail but most recently and in the greatest detail by Breaks et al. (1986). Localised mapping was conducted in detail by various exploration company geologists including Moss Resources (Adams and North, 1985) and Romios (Zhang, 1998). The overall setting is as previously described, i.e. a north-trending ~1 km wide belt of South Rim volcanic rocks dominates the claims and is intruded along the western margin by the North Caribous Lake batholith and is in fault contact along the eastern edge with the younger Eyapamikama clastic sediments (Fig. 5) (this fault contact is assumed from one evident at Musselwhite (Oswald et al., 2014)). A major regional iron formation occurs in the South Rim Volcanics less than ~100 m west of its contact with the Eyapamikama assemblage. The North Rim volcanics occur east of the Eyapamikama sediments in the easternmost margins of several claims. Results of Romios drilling programs and detailed mapping has revealed a somewhat more complicated picture, particularly when it comes to the South Rim volcanics. The general stratigraphy of the SRV and adjacent lithologies will be described from west to east across the Akow Lake grid taking into account the results of the work by Romios in the Akow Lake area and using the terminology of Zhang (2015) where appropriate.

#### 7.2.1 Lithologies

**The North Caribou Lake Batholith:** The western edge of the Akow Lake grid lies close to the margin of the North Caribou Lake batholith and several granite-tonalite outcrops occur in this area at ~9+00W.

#### The Lower Metavolcanic Unit:

**Basalts and Ultramafic Rocks:** The first (westernmost) outcrops of the greenstone belt are basalts of the South Rim assemblage (SRV) that occur at about 3+50W on lines 2+00S and



Figure 5: General geology of the claims area and 2016-17 drill holes

14+00S, near the Spence and Bishop showings, and outcrops of these basalts continue east to the baseline 0+00. These were termed the "Lower Metavolcanic Unit" by Zhang (2015). Based on the results of DDH RGR-16-3 and 98-7, these basalts can be mapped as far east as ~0+75E and as far west as 6+25W for a total thickness of at least 700 m. These appear to be typical tholeiitic basalts composed of ~equal amounts of fine-grained feldspar and amphibole. It varies from relatively massive and unaltered to moderately strained and overprinted by biotite alteration, particularly in the area of the Spence showing. Zhang (2015) reports the local presence of deformed pillows.

Drill hole 98-7 intersected 43 m of magnetic ultramafics within the volcanic sequence and the magnetic surveys indicate that this unit is semi-continuous to the south as well as north past Atim Lake South although it may pinch and swell significantly. Small gabbro dykes/sills are also noted throughout the basaltic sequence. Numerous thin intraformational horizons of clastic and chemical sediments (iron formations) occur throughout the basaltic sequence. Typically the iron formations are <2 m thick and the clastic metasediments (siltstone, mudstone, etc. +/- pyrrhotite pyrite) may be a few metres thick. These intraformational units are common throughout the belt and may contain significant amounts of syngenetic pyrrhotite-(pyrite) that make them quite conductive.

**Lower Siltstone:** This ~50 m thick fine-grained metasediment was intersected in drill hole RGR-16-3 from 128.7 to 133.3 m and again from 137.5 to 192.45 m. It separates the basaltic sequence described above from the dacitic volcanics to the east. It is composed of 30-40% fine grained biotite in a fine-grained matrix of quartz-feldspar with minor intervals of <5% medium-grained pale, anhedral garnets and local felsic volcanic (?) layers <30 cm thick. Minor intervals of 2-8% fine-grained disseminated pyrite are found scattered throughout. This siltstone appears to correlate with a Max-Min conductor that extends from the south end of Atim Lake South off the grid to the south.

**Dacitic Volcanics**: This is a newly discovered volcanic horizon that was intersected in drill hole RGR-16-3, the only hole drilled between the Akow Lake grid baseline and the TEM conductors to the east. The hole initially intersected about 80 m of dacite with lesser felsic tuffs followed by a band of siltstone about 50 m thick before ending in the aforementioned basalts. The eastern limit of the dacite is unknown as there is no drilling or outcrops between this hole at 2+07E and an outcrop at 4+50E. The magnetic and EM patterns in this gap are "quiet" and relatively flat in contrast to the basalts farther west and the mixed assemblage to the east. For this reason, the dacites have, for now, been assumed to extend from 1+20E to about 3+75E.

**Lower Clastic Metasediments**: Eastward from the dacitic volcanics is a package of finegrained clastic metasediments and lesser felsic volcaniclastics that host the copper-(gold) zone targeted by the 2016 drill program and intersected as well by the 2017 drill hole. This sequence was referred to as the "lower clastic metasediments" by Zhang (1998, 2015). Many of the horizons in this package are schistose and part of it was referred to as the "Romios Shear Zone" by Zhang (1998, 2015). The holes drilled in 2016 were longer than those from 1998 and 1999 and provide a better overall picture, especially when combined with the earlier drilling. Based on these drill sections it seems apparent that the least altered sections of the metasedimentary package consists predominantly of metasiltstones, +/- varying amounts of fine-grained garnet, staurolite and sericite, with lesser intervals of intercalated sericite schist +/- varying amounts of garnet-staurolite and biotite (NB: all of the schists contain anywhere from 10-40% fine-grained quartz and feldspar but this is generally omitted from the unit names in this text for the sake of brevity). These two lithologies are commonly hydrothermally altered to varying degrees over a ~100-160 m wide interval resulting in much more coarse-grained garnet-staurolite-biotite and/or sericite schists. This alteration can be pervasive over tens of metres as well as focussed in narrow veins of intense alteration, typically <0.5 m wide. These veins typically have a matrix of massive biotite +/- minor chlorite or sericite and are studded with up to 50% very coarsegrained garnets and/or medium grained staurolite. Both the pervasive and vein-type alteration are commonly accompanied by chalcopyrite+/- pyrrhotite mineralization in the form of thin seams along the foliation, discrete thin veinlets, and as fracture fillings in the coarse-grained garnets. This mineralization is locally accompanied by euhedral arsenopyrite crystals up to 3-4 mm across. Pyrite is relatively rare. Local intervals of the sericite schists up to a few metres wide contain <1% disseminated euhedral magnetite crystals 1-2 mm across. Typically there are no sulphides within these intervals.

While the aforementioned schists locally display shear fabrics, such fabrics are common throughout the NCGB, and in the author's opinion they do not mean that these schists were produced by shearing or that they represent a discrete shear zone *per se*. Rather, it now seems more likely that the most schistose rocks were strongly hydrothermally altered resulting in a significant increase in micaceous minerals and forming schists that were then more prone to the effects of the regional strain than their more massive counterparts.

Numerous small basaltic horizons occur throughout this metasedimentary package, e.g. there are ten in hole RGR-16-1 ranging from 0.4 to 5.7 m in width. These basalts are quite uniform within and between drill holes. They are fine-grained, a moderately bright green colour, composed of ~60:40 amphibole:plagioclase, weakly foliated and generally quite "fresh" with only minor local biotite alteration. Contacts are sharp. There are no obvious flow textures and given the setting and thinness of these horizons they are assumed to be sills or dykes. There is commonly a clear increase in the intensity of alteration and mineralization near these basalts suggesting that perhaps the hydrothermal fluids were locally focussed between these sills/dykes, and/or that the basalts were part of the heat source driving fluid circulation. Several of the basalt sills/dykes are themselves cut by thin dykes of olivine lamprophyre and some impressive clusters of these lamprophyre dykes locally cut the metasediments (e.g. 18 dykes, 1-40 cm wide, occur between 320 and 346 m

in hole RGR-16-4). A small number of gabbro and ultramafic dykes were also encountered within the metasedimentary package.

**Banded Iron Formation**: Immediately overlying the "Lower Clastic Metasediments" is the main banded iron formation (BIF) on the property, equivalent to the "Northern Iron Formation" at Musselwhite which hosts the great majority of gold mineralization in that area. It has been dated at <2967 Ma at Musselwhite (McNicoll et al., 2013). Past ground and airborne magnetic surveys of the Romios property indicate that the BIF pinches and swells on a scale of 2-4 km although the conductive portions of it still provide a continuous EM response. This was illustrated in hole RGR-16-2 which drilled through a "pinch-out" in the main BIF and intersected a thin layer of sulphidic mudstone (similar to the "4H" at Musselwhite) but no oxide or other facies of the BIF. This pinch and swell pattern has been ascribed to a regional boudinage effect by Zhang (2015) and while this may be the case, there remains the possibility that the original basin architecture control has had an effect as well.

The main BIF has been intersected in 5 drill holes by Romios (98-8, 10, 11, 12 and 13) and varies from 39 m to ~100 m in width. It is exposed in numerous outcrops over a 3 km interval from Atim Lake North to Lundmark Lake. A brief examination of the BIF east of Atim Lake North revealed that the iron formation there consists almost entirely of well banded chert > grunerite > magnetite. Very little of the magnetite-chert facies that dominates the BIF at Musselwhite, and none of the silicate facies which hosts the majority of the Musselwhite ore, crops out at Atim Lake North. Past mapping by the author north of Lundmark Lake revealed only this chert-rich facies as well. This chert-rich facies is rarely mineralized at Musselwhite; only in extremely tightly folded and fractured areas is it known to be mineralized. No such tight folding or fracturing was noted in the Atim Lake-Lundmark lake area in the author's brief visits. None of the drill holes that tested the BIF in the Lundmark Lake – Atim Lake North area went far enough west to be sure that no favourable silicate facies BIF was present. In fact, hole 98-13 ended in 4 m of "mafic volcanics with up to 50% garnets" (a common early description of the 4E by workers in this area) and even hole 98-8 ended in 17 m of "sediments with 2 cm garnets". Further work is needed to examine any core still available from these holes to see if the favourable silicate facies is present, and to determine if any sections of the BIF are dominated by magnetite-rich oxide facies rather than the chert-dominant facies exposed at Atim Lake North – Lundmark Lake.

East of the main BIF, drilling by Romios typically intersected mafic metavolcanics and gabbro for up to 50 m followed by fine-grained clastic metasediments. Presumably the volcanic rocks and some of the intercalated metasediments are part of the South Rim Assemblage (SRV) whereas the easternmost metasediments (in holes 98-8 and RGR16-2) may belong to the Eyapamikama assemblage.

**The Eyapamikama Clastic Metasediments:** The majority of this assemblage occurring on the Romios property lies beneath Akow Lake (Fig. 5) or in low-lying areas and it has not been examined in any detail by the author. The minor intervals of this unit intersected in drill core and exposed on the western shore of Akow Lake consist of a fine-grained siliciclastic metasediment, commonly well foliated and thinly bedded.

**The North Rim Volcanic Assemblage**: Basaltic rocks of the North Rim assemblage were mapped by Breaks et al (1985, 1986) on the eastern shores of Akow Lake and extending NW from there along the eastern edge of several Romios claims (Fig. 5). These were described as massive to medium-grained basalts, with local amphibolite and schistose varieties. They have not been observed by the author within the Romios claims.

Numerous small (Quartz)-Feldspar Porphyry (QFP) dykes occur throughout the area and cut all major members of the SRV. These dykes are generally weakly deformed, light to medium grey in colour, and contain ~20-40% seriate porphyritic feldspar phenocrysts, up to 2-3 mm in length, and rare quartz phenocrysts, within a fine-grained groundmass of quartz-feldspar and minor biotite. These dykes cross-cut the stratigraphy at Musselwhite as well and have been dated there at 2909 Ma (McNicoll et al., 2013).

#### 7.2.2 Structure

The presence or absence of major folds on the Romios claims remains an important and largely unresolved issue. The author has not located any reference to actual folds in any of the previous mapping on this property, other than local secondary folds in the iron formation. Some previous workers (e.g. Adams and North, 1985) have assumed the entire NCGB was a synform which repeated the volcanics and iron formations on the south rim onto the north rim. Recent agedating work has revealed that the South Rim and North Rim volcanics are roughly 100 million years different in age and therefore cannot be folded repetitions (Biczok et al. 2012; McNicoll et al., 2013). Similarly, a series of tight isoclinal folds have been assumed by some previous workers within the South Rim assemblage itself due to a series of parallel magnetic and conductive horizons and broad similarities in some exposed lithologies. Adams and North (1985) for example placed a tight synclinal axis about 130 m west of and parallel to the iron formation along the western side of Akow Lake but presented no supporting field evidence and Zhang (2015) reports that deformation has obliterated virtually all indicators of younging directions ("tops").

While there remains the distinct possibility of major isoclinal folds being present on the Akow Lake grid, this cannot be assumed simply because of an apparent symmetry between various geophysical responses. Multiple stratigraphic horizons that may appear similar to each other occur within this same sequence of rocks in the Musselwhite area. The mixed sequence of metasediments and lesser felsic volcaniclastics that host the copper-(gold) zone at Akow Lake resembles the felsic wedge structurally overlying but stratigraphically younger than the BIF at Musselwhite. If this is the case, then the younging (tops) direction in the vicinity of the BIF-clastic metasediment contact at Akow Lake is to the east. However, there is a strong possibility that a

major isoclinal fold axis trends northward from Musselwhite into the Akow Lake grid area making the younging direction(s) uncertain. This issue is discussed further in section 25. A concerted effort to locate top indicators should be made to answer this important question in order to determine if the rocks hosting the copper-(gold) zone are repeated to the west and if the newly discovered massive sulphide horizon at Atim Lake North lies stratigraphically above or below it.

A fold nose was noted by the author on the SW shore of Akow Lake within the Eyapamikama metasediments. Bedding in these rocks trends approximately 250° and is cut at a high angle by a well-developed axial planar foliation striking 332°, dipping 88° east and plunging 15° SE. The high angle between foliation and bedding here, 82°, indicates that this outcrop occurs at a fold nose. Whether this folding pattern extends into the adjacent South Rim volcanics is unknown.

### 7.3 MINERALIZATION

Several styles of mineralization have been targeted on the Romios claims including two that were discovered prior to the 2016 program, as well as the copper-(gold) zone intersected and reinterpreted in 2016, and the massive sulphide style horizon discovered in the 2017 drilling. These are described below.

#### 7.3.1 Gold-in-Iron Formation

The target of the early exploration work on claims in the Akow Lake area that began in the early to mid-1980s was gold-in-iron formation mineralization like that found at the Musselwhite mine about 18 km to the south. Approximately 8 km of the same banded iron formation horizon that hosts the gold at Musselwhite is found on the current Romios claims. No appreciable mineralization has been found in outcrops or diamond drilling of the main BIF horizon to date. However, major intervals of this BIF, some up to 4 km long, do not crop out and have not been drill tested or explored by other means.

### 7.3.2 Auriferous Shear Zones in Basalt

The first appreciable gold mineralization discovered on the Romios claims was the Spence Showing (Fig. 3), a series of five thin shear zones occurring at or near the contact between mafic volcanics and a quartz-feldspar porphyry (QFP) intrusion (Spence, 1997 and 1998a, b). The shear zones are between 0.5 and 2.0 wide, pinch and swell along strike and do not exceed a few tens of metres in strike length (Zhang, 2015). High-grade gold values up to 38.6 oz/t were returned from selected grab samples (Spence, 1997) but subsequent close-spaced drilling of 7 holes in 1998 returned more modest values, typically in the range of 1-4 g/t Au over 0.5 to 3.2 m (Spence, 1998a). The mineralized shear zones in basalt commonly exhibited potassic alteration (biotite), minor to abundant quartz veinlets, and minor to 1% chalcopyrite and/or pyrrhotite. Mineralized fractures were also located in the numerous local small quartz-feldspar porphyry (QFP) dykes. Elevated gold values (>1 g/t Au) were found in 6 drill holes over a strike length of ~200 m, extending from drill hole 98-4 in the south to 98-14 in the north (Fig. 3). No further drilling, trenching or stripping has been done on this showing since 1998 and this author has not examined this showing or any related drill core.

## 7.3.3 Gold in Intraformational Sulphidic Iron Formations

A minor prospect named the "Bishop Showing" was discovered about 1 km grid south of the Spence showing in 1997 (Spence, 1997a) following the discovery of an old trench in the area in 1996. The showing is described as being within a "weak iron formation" but there is little description given as to the width of the BIF and there is no indication on the magnetic surveys that a significant BIF is present under cover here. Out of 32 samples collected in 1997 only 2 returned anomalous values, the best being 705 ppb Au (Spence, 1997a). This showing was tested with drill hole 98-15 which intersected two thin intraformational BIFs <2 m wide along with several thin sulphidic sedimentary horizons. The maximum gold value was 1.2 g/t Au from Po-Cp filled fractures in the volcanics. The BIFs returned a maximum value of only 544 ppb Au/0.6 m.

#### 7.3.4 Copper-(Gold) Mineralized Schist

One of the most unique (for this greenstone belt) and widespread style of mineralization discovered to date on the Romios claims, and the subject of the 2016 drill program described herein, is the "Romios Copper-(Gold) Zone" discovered by drilling in 1998 (hole 98-9). It lies within a package of various metasedimentary garnet-staurolite-biotite-sericite schists originally discovered in a rusty outcrop and subsequently partially tested by drill hole 98-9 which was targeting an adjacent EM conductor. Follow-up drilling in 1999 with 5 holes intersected broad zones of low-grade copper-(gold) mineralization (e.g. 185 m @ 0.06% Cu) which contained many narrow zones of higher grades of copper, gold +/- silver (e.g. 0.84 m @ 0.5% copper and 3.9 g/t Au in DDH 99-4 (Zhang, 1999 and 2015)). Typically the mineralization is concentrated in highly altered, moderately mineralized intervals. The alteration assemblage typically consists of up to 50-60% medium- to coarse-grained garnet and staurolite and 20-30% fine- to medium-grained biotite and/or sericite. These alteration minerals are concentrated in a ~100-160 m wide corridor overprinted on fine-grained metasediments, mainly siltstones and arenites, and felsic tuffs or volcaniclastics.

Drill hole RGR-16-2 intersected a particularly unusual and instructive interval of mineralized siliceous schist from 434.7 to 437.65 m. This unit contains ~30% streaky, discontinuous (sheared out) black layers ~0.5 cm thick composed of a hard, very fine grained tourmalinite. Within this are 4 massive tourmalinite veins/bands 5-20 cm wide containing 10-40% biotite, +/- chlorite which are themselves cut by veinlets of massive chalcopyrite and pyrrhotite with associated disseminated arsenopyrite. Four metres of the flanking schist below contain ~0.5% tourmalinite spots 1-2 mm across. Tourmalinite like this is typically produced by hydrothermal fluids that have circulated through a sedimentary pile and picked up high levels of boron from the sediments before venting at or near the paleo-seafloor. The association of significant copper and elevated silver values with this mineralized tourmalinite suggests that there could be a massive sulphide horizon close to this potential paleo-vent site.

The 1999 drilling traced the copper-(gold) zone from Line 2+00S to Line 11+00S, a distance of 900 m. The 2016 drilling further extended the known extent of this zone to about 1.5 km from

12+60S to 2+55N and to depths of 350 m. The intersection of similar mineralized schists at Atim Lake North in DDH RGR-17-1 suggests that this zone is >3.3 km long.

A particular section of the host package of schists was termed the "Romios Shear Zone" by Zhang (1999) who noted local dextral shear fabrics. While there is little doubt that these schists are strained to some degree (as are virtually all rocks in this belt), the implication that they were formed largely by shearing, or that the mineralization was generated by shearing, is not supported by the evidence observed in the recent drilling by this author. The setting and origin of these schists and the mineralization they host is discussed in more detail below in Section 8 (Deposit Types) as well as the Drilling and Interpretation sections.

### 7.3.5 Copper-Gold-Silver Tourmalinite-Massive Sulphide

Following the recognition of several key geological features in three holes drilled through the "Romios Copper-(Gold) Zone" in 2016, the deposit model for this zone was changed from that of a "mineralized shear zone" to a "lower semi-conformable alteration zone" that had the potential to have exhaled massive sulphide deposits onto the paleo-seafloor somewhere along its length. Drilling in 2017 targeted a cluster of EM conductors 200 m west of this hydrothermal fluid pathway and was successful in discovering a 1.4 m thick (estimated True Width) massive sulphide style Cu-Au-Ag horizon consisting of 5-7% each of chalcopyrite and pyrrhotite in a tourmaliniterich siliceous matrix. The abundance of tourmalinite is quite unusual in copper-rich sulphide deposits and implies that the mineralizing fluids mixed with fluids that had circulated through a thick sedimentary pile. This unusual aspect of the deposit creates some uncertainty at this point whether the deposit will have some of the main characteristics of typical VMS (volcanogenic massive sulphide) or SMS (sediment-hosted massive sulphide) deposits such as a central alteration pipe, vertical and lateral metal zoning, etc., that are commonly used to vector towards the thickest, richest portion of deposits. Nevertheless, the grades intersected in drill hole RGR-17-1 are economically significant and the two examples of copper deposits with associated tourmalinite known to the author (the Singhbhum Copper Belt in India and Bieluwutu mine in Inner Mongolia) both have large tonnages and good grades (see Section 25.2.2 for further discussion).

# 8 DEPOSIT TYPES

A variety of mineralization types occur on the Romios claims. Some of these have been the focus of exploration efforts at various times in the past and two were targeted in the 2016 and 2017 drilling. In brief these are:

# 8.1 Gold-in-Iron Formation.

The target of the early exploration work on claims in the Akow Lake area that began in the early to mid-1980s was gold-in-iron formation mineralization like that first found in the 1960's by the Musselwhite brothers at Opapimiskan Lake, about 18 km to the south. Work in that area
intensified during the period from 1972 to 1989 and culminated with the opening of the Musselwhite mine in 1997. Gold at Musselwhite is now believed to be largely confined to highstrain zones along the most steeply dipping limbs of F2 folds in the iron formation horizon(s), particularly in a silicate facies (known as "4EA") which is composed largely of garnets within a fine-grained grunerite matrix (Biczok et al., 2012, and references therein; Oswald et al., 2014). The mineralized zones are not considered to be "shear zones" per se as they do not cross-cut the stratigraphy and they developed as a result of differential movement between the various facies of the iron formation, the enclosing volcanic rocks, and even between different minerals (e.g. the brittle garnets versus the more ductile grunerite in the "4EA" facies) during tight isoclinal folding. Mineralization in the 4EA is accompanied by quartz flooding, pyrrhotite, coarsening of garnets, and alteration of the original grunerite to ferrotschermakite. Gold occurs largely as native gold within pyrrhotite filled fractures in the garnets. Lesser mineralization occurs with pyrrhotite within the oxide facies BIF in quartz flooded/veined high-strain zones, however, these zones tend to be smaller and less mineralized than those in the 4EA. Musselwhite is considered a "giant" gold deposit (>250 tonnes of contained gold) with past production plus reserves and resources totaling 6.4 million ounces to the end of 2015. Of particular note in terms of the potential on the Lundmark-Akow Lake property is that Musselwhite consists of multiple ore zones which may come and go along strike. Major ore bodies as much as 100-300 m in vertical extent and one kilometre or more in strike length may have relatively sharp boundaries and grade into significant strike lengths of barren BIF over short intervals of 50 m or less in some cases. Consequently, poor results from widely spaced drill holes should not be used to rule out the presence of mineralization in adjacent areas.

The iron formation at Lundmark-Akow Lake has a dip close to vertical, a favourable setting, and has received less attention than other targets on the Romios claims. Only five holes have been drilled through this BIF over a strike length of over 8 km and its potential remains largely unknown in major intervals.

# 8.2 Shear Zone Hosted Gold

The earliest exploration success on the Romios claims was the discovery of a gold showing in sheared basalt and quartz-feldspar porphyry (QFP) (i.e. the Spence showing). High-grade grab and composite samples were returned from this showing as well as more modest values in drill holes through it. Typically, mineralized shear zones of any consequence in the Canadian Shield are most commonly associated with strong hydrothermal alteration manifested by an abundance of Mg and Fe-dominant phases of carbonate (dolomite, siderite), quartz veining and flooding, and potassic alteration in the form of biotite or more rarely K-feldspar. This alteration is often accompanied by minor amounts of sulphide minerals like pyrite, pyrrhotite and chalcopyrite. The size of the shear zones varies from regional scale "breaks" like the Destor-Porcupine fault in the Timmins region, to localised structures related to various structural features like the competency contrast between adjacent units, the noses of tight folds, etc. At this point there is no evidence of a major, through-going fault or "break" on the Romios claims but small scale mineralized faults

are present at the Spence showing at or near the contacts between brittle quartz-feldspar porphyry intrusions and the less brittle basaltic rocks. Gold mineralization here is accompanied by potassic (biotite) alteration and minor chalcopyrite. Although the past diamond drilling beneath the showing area returned modest values of 1-4 g/t Au over narrow widths, there remains the possibility that larger related structures exist beneath overburden cover in this area. This prospect should be re-evaluated in light of the overall improved understanding of mineralization in the region.

# 8.3 Gold in Intraformational Sulphidic Iron Formations

One minor example of this type of mineralization has been found on the Romios claims and that is the Bishop showing. The intraformational sulphidic iron formations in the North Caribou belt are typically <1-2 m thick and consist largely of pyrrhotite. These horizons are believed to be syngenetic, deposited from hydrothermal vents on the ocean floor between periods of basaltic volcanism. They may have originally consisted of pyrite, now metamorphosed to pyrrhotite. Under the right circumstances, gold-bearing fluids channeled by a fault zone may have interacted with the sulphides and deposited gold within them. The author has observed a number of these occurrences in other areas (e.g. the NWT). The thinness of these horizons makes it unlikely that they could ever host a stand-alone deposit and the poor results to date make them a low-priority target at this time.

# 8.4 Copper-(Gold) Mineralized Schist

The Romios Cu-(Au) bearing schist discovered in 1998-99 was interpreted at that time and until recently as a mineralized shear zone based on the abundance of schists in the mineralized corridor as well as the presence of local shear sense indicators (Zhang, 1999). However, drilling in 2016 provided a broader section across this area and led to a revised model for these mineralized schists - that of a "lower semi-conformable alteration zone" like those found beneath many massive sulphide deposits (e.g. Mattabi and the Geco deposits in Ontario and the Snow Lake camp in Manitoba, etc.) (Biczok, 2016). These alteration zones are essentially the aquifer that channeled metal-enriched hydrothermal fluids along a particular stratigraphic horizon below the sea-floor for several kilometres before they broke through and rose upwards to the sea-floor where they deposited the massive sulphides. These alteration zones may have served as the source of some of the metals and are commonly depleted in metals but can be locally weakly mineralized and are typically highly altered with major sodium depletion and variable enrichment in Mg, Fe, Ca, etc. Initial lithogeochemical analyses of core from the 2016 drilling indicates that the schists have experienced significant hydrothermal fluid flow and sodium depletion, supporting the VMS alteration zone model (see Section 10.7). Once metamorphosed to amphibolite conditions these altered rocks commonly contain coarse-grained garnets, staurolite, biotite, etc. and can been mistaken for the "pipes" beneath VMS deposits. In this case, the mineralized alteration zone is ~100-160 m wide and likely >3.3 km long, and like the Snow Lake system, has the potential to have 'vented" massive sulphides at multiple sites anywhere along its length. The discovery of massive sulphides at Atim Lake North with essentially the same unusual

mineralogy and mineralization type as portions of the nearby alteration zone/mineralized schists gives considerable credence to this deposit model. In terms of the economic potential of the Romios Cu-(Au) mineralized schist/alteration zone itself, it is unlikely that a stand-alone deposit would occur within this alteration pathway. However, the locally unusual mineralogy of these schists (tourmalinite with Cu-Au-Ag) indicates that this is not like most known VMS systems and therefore the possibility of broader zones of low to moderate grade mineralization in some areas cannot be ruled out. Any near-surface occurrence amenable to open-pit mining might become a worthwhile satellite target if an economic VMS deposit is found nearby.

## 8.5 Volcanogenic Massive Sulphide Deposit(s)

As noted above in Section 8.4, the re-interpretation of the "Romios Copper-(Gold) Zone" as the "lower semi-conformable alteration zone" of a VMS system and the subsequent discovery of a massive sulphide horizon with similar mineralogy at Atim Lake North in 2017 has given credence to the VMS deposit model and an added impetus to explore for this deposit type. VMS deposits are the most common base metal deposits in the Canadian Shield and have a multitude of variations depending on tectonic setting, metal association, composition and type of associated volcanism, alteration system, etc. The main features of the system consist of a sub-volcanic (i.e. located at some depth below a volcanic centre and below the paleo-seafloor) magma chamber that serves as a heat source, an influx of seawater that is heated by the magma and strips metals from the enclosing rocks, a pathway for these metal-enriched fluids to reach the sea-floor, and a favourable deposition setting. In some cases (e.g. the Mattabi mine, ~325 km south of Akow Lake and the Snow Lake camp in northern Manitoba), the alteration pathway is sub-horizontal, rising very slightly upwards through a porous horizon for several kilometres before breaking through in a pipe-like manner to vent sulphides at the paleo-seafloor. One alteration pathway can vent multiple deposits at various points along its length.

In the case of the Romios claims, we have good evidence of an extensive pathway for hot, mineralized fluids (i.e. the "Romios Cu-(Au) Zone" mineralized schists/alteration zone) and a favourable deposition setting (the Atim Lake North massive sulphide horizon). There is no obvious granitoid pluton in the adjacent stratigraphy that may have served as the heat source, however, there is a large, overburden covered magnetic "quiet zone" nearby at Lundmark Lake with no known outcrops that might conceal such a pluton. Alternatively, there are extensive ultramafic bodies west of Akow Lake that might have provided the necessary heat flow. Further work is needed to determine what intrusion served as the heat source since any VMS deposit will not be far from this.

The most unusual feature of the Atim Lake North Cu-Au-Ag massive sulphide horizon is the abundance of tourmalinite. Similar tourmalinite was found within the "alteration pathway" in drill hole RGR-16-2. Tourmalinite is typically formed by hydrothermal fluids circulating through thick sedimentary piles whereas the copper mineralization is most commonly derived from volcanism. This pairing suggests that the Atim Lake massive sulphides may have formed from the

mixing of two fluids and this introduces some additional variables into the deposit model. Nevertheless there are at least two major copper deposits known to the author which have associated tourmalinite and similar geological settings, the Singhbhum Copper Belt in India and the Bieluwutu deposit in Inner Mongolia. See 25.2.2 for further discussion.

# 9 EXPLORATION

Exploration of the Lundmark-Akow Lake Project area by various companies since the early 1960's has involved a variety of methodologies. These are described below and previously in Section 6. In brief, these techniques included:

- Line-cutting
- Geological mapping and Prospecting
- Geochemical sampling.
- Rock Sampling
- Airborne and Ground Geophysical Surveys
- Diamond Drilling

# 9.1 Previous Operators Exploration Work

The known work by previous operators in the Lundmark-Akow Lake area included basic prospecting, trenching, geological mapping, basal till sampling, VLF and magnetometer surveys and several shallow packsack drill holes. None of this exploration was focussed on the target of the 2016 program (i.e. the copper-(gold) zone) or the EM conductors targeted in 2017. This work was described in Section 6 of this report.

# 9.2 Romios' Previous Exploration Work

# 9.2.1 Line-cutting

Romios undertook several programs of line-cutting on the Lundmark-Akow Lake property from 1996 to 1999 as an aid for geological mapping and ground geophysical surveys. Typically the grid section lines were established every 100 m along the baselines and then chained and picketed every 25 m. Many of these lines are still apparent in the bush and would require only a modest amount of brushing out as well as re-chaining/picketing to be used again.

The line cutting programs were as follows:

1996: This was the first line-cutting program contracted by Romios and it was completed by Magnum Explorations Ltd. who cut 51.3 km of gridlines and baselines to form the "Akow Lake (Southwest) grid" and then carried out geophysical surveys. The baseline orientation is not stated in Magnum's report but measuring the baseline on Magnum's maps gives a trend of 342 degrees.

1997: Vytyl Exploration Services cut and chained 150 km of grid lines and baselines with a bearing of 342 degrees prior to carrying out geophysical surveys in the winter of 1997. Vytyl expanded the Akow Lake (Southwest) grid, including a large area on the ice of Akow Lake, and extended the grid past the north end of Lundmark Lake.

1998: IPTEC/Lone Pine Exploration Services established the Lundmark Lake North Grid Extension by cutting a baseline 1,270 m long at 330° with grid section lines every 100 m totalling 11.5 km.

A compilation map of the grid modified from Spence (1998) is presented in Figure 6. The author has no familiarity with the grids other than the Akow Lake grid. GPS measurements taken by the author at various grid points and drill collars on this grid indicate that it is accurately located on past exploration maps. One section line of the Lundmark-Akow Lake grid was located near the collar of DDH RGR-17-1, most likely line 16+00N or 17+00N. No pickets were found in a brief examination of this line and the orientation as measured by compass appeared to be ten degrees off the expected value. There is also an apparent discrepancy in the orientation of this grid when compared with the 2014 airborne survey maps. It is recommended that GPS co-ordinates be measured at several points on all of the grids in order to properly geo-reference these grids and the various maps based upon them.

# 9.2.2 Geological Mapping

The property has been mapped at various times by Ontario government and mining industry geologists at a variety of scales including a detailed 1:5,000 map by Zhang (1998) (see Section 6). This work has proved valuable in outlining the major lithologies, including the BIF, locating surface gold showings, and discovering the rusty schist exposures that helped lead to the discovery of the copper-(gold) zone. Unfortunately there are very few outcrops in many key areas (e.g. there is only one known outcrop of the schists hosting the copper-gold zone) and other techniques are required to delineate the main exploration targets. One important aspect of the geology that has not been determined in the field as yet is the younging direction of the strata (i.e. "tops"). No top indicators have been located by past mapping efforts but this is a key piece of information required to answer the questions of whether there are tight isoclinal folds affecting the target areas and which way was "up" for the postulated hydrothermal system. Locating top indicators in the field should be a priority of any future geological mapping.

The first geological investigation of the Lundmark-Akow Lake property by Romios' contract personnel was by Chris Bishop of Clark-Eveleigh Consulting of Thunder Bay, Ontario in 1996 (Bishop, 1996). Mr. Bishop conducted prospecting and reconnaissance mapping of the property at the same time as the company's initial grid was being cut by Magnum Explorations Ltd. He collected 11 rock grab samples from various outcrops including rusty shears and BIFs but apparently did not provide a map of this work or sample co-ordinates. Although the analyses filed in his report did not include gold values, one sample was elevated in silver and it is assumed that this may have been the sample that later returned an elevated gold value (1.3 g/t Au) and became

known as the Bishop showing (Spence, 1997a). This initial work was followed by Mr. Ian Spence and Dr. G. Zhang in 1997 who spent 21 days mapping and prospecting the property. Mr. Spence and Mr. Frank Glass then spent 9 days mapping the Bishop showing and prospecting the claims. They discovered what became known as the Spence Showing where initial grab samples returned gold values up to 2 oz/t. Mr. Spence spent a further 2 weeks on the property in late summer of 1997 mapping and sampling the Spence showing and undertaking a soil (humus) sampling program over that area (Spence, 1997b).



Figure 6: Compilation of Lundmark-Akow Lake grids modified from Spence (1996)

In 1998, Mr. Spence and Dr. Guowei Zhang spent 3 weeks on the property (Spence, 1998). Mr. Spence examined the main BIF for evidence of deformation, mineralization, facies changes, etc. His assessment report does not contain a geological map of that work. Dr. Zhang mapped the geology and structure across much of the property at a scale of 1:5,000 and produced a large map (Zhang, 1998).

## 9.2.3 Surface Geochemistry

A lake-sediment survey undertaken by Romios in 2003 (Zhang, 2003) did not detect any gold anomalies but showed modest variations in copper values across the property. There is some indication that the element values are reflecting the underlying rock types (e.g. all samples from Akow Lake are appreciably higher in chromium than any other samples, possibly due to ultramafic rocks in this area?). The brief report on this sampling program did not include any description of the individual samples, the analytical method, or an in-depth statistical analysis of the data so it is difficult to infer too much from the results or the suitability of this exploration technique without a more detailed study of those results.

The possibility of using stream sediments as an exploration tool was investigated in 1996 by C. Bishop (Bishop, 1996). He examined a number of streams draining the Akow Lake area and concluded that the low-energy regime of the local streams as well as the often poorly defined boundaries of streams (that grade into bogs, wet swamps, etc.) made them unsuitable for effective sampling. This author would concur with Mr. Bishop's conclusion.

The most promising surface geochemical survey undertaken by Romios was the soil (humus) sampling conducted over the Spence showing and along the projected strike of this deformation zone in 1997 (Spence, 1997b). This survey returned several areas of anomalous gold and arsenic levels close to and along strike from the discovery outcrop. The analytical method used at that time unfortunately did not measure copper values; copper has one of the best correlations with gold of any element within the Musselwhite ore zones and copper staining is reported at the Spence showing. This survey, and the success of humus sampling programs directed by the author elsewhere in this belt, indicate that this may be an effective exploration technique in this region given the right conditions (e.g. thin soil cover over bedrock) and may be of further use at Akow Lake. Any future analytical package should be tailored to include copper.

## 9.2.4 Rock Samples

Romios' contract geologists and prospectors have collected numerous rock samples for analysis from outcrops on the property including 11 in 1996 by (Bishop, 1996), 53 samples in June 1997 (Spence, 1997a), 165 samples from detailed work on the Spence showing in September-October 1997 (Spence, 1997b) and 55 samples, primarily of the main BIF and adjacent outcrops, by Spence in 1998. Many of the samples taken during the 1997 work on the Spence showing were composite grab or chip samples and can be considered at least partially representative of the sample width (typically these were 10-60 cm wide). Samples from the other programs were described in the

corresponding reports as grab samples, consequently their values cannot be considered representative of any particular width. They were, however, instrumental in the initial discovery of gold mineralization at the Spence and Bishop showings.

## 9.2.5 Geophysical Surveys

Airborne magnetic and electromagnetic surveys, combined with ground surveys such as TEM, HLEM, Magnetometer, and IP, have been invaluable in defining exploration targets on the property and tracing the stratigraphy. The airborne surveys conducted by Romios have covered the current claim block with relatively closely-spaced survey lines (e.g. 50 m to 100 m) and provided high-quality data (see Section 6). The ground surveys included a variety of different EM techniques such as HLEM (Max-Min) and the more powerful TEM large-loop surveys. Again the quality of these data is considered very good overall and the variety of techniques used provided a range of useful results for assessing the depth and strength of the conductive horizons. These surveys have been less useful in determining the thickness of the conductive horizons. Further ground EM surveys with shorter cable lengths and more closely spaced readings will be required in any attempt to determine the thickness of targets such as the Atim Lake North massive sulphide horizon.

## 9.2.6 Diamond Drilling

Given the lack of outcrops in so many key areas including geophysical targets (e.g. the copper-(gold) zone and the BIF) as well as the projections of surface showings, diamond drilling was required to effectively characterise and assess the various targets on this property. The only deep diamond drilling undertaken on the current claim block has been the four programs by Romios consisting of fifteen holes drilled in 1998, five holes drilled in 1999, four holes drilled in 2016 and one hole drilled in 2017 (see Section 6 for details). These programs evaluated a number of targets including the Spence showing, portions of the main regional BIF, and several EM conductors and eventually led to the discovery of the copper-(gold) zone that was the focus of the 2016 program. The 2016 program provided three cross-sections through the copper-(gold) zone and led to the realisation that it represented the "plumbing system" to potential massive sulphide deposits nearby. This revised model led to drill testing of the Atim Lake North conductors in 2017 and the first discovery of a base metal deposit in the area.

# **10 DRILLING**

The 2016 diamond drilling program described herein was carried out on claims 1209235, 1209237 and 1208993 west of Akow Lake and the 2017 drilling was on claim 1208561 at Atim Lake North.

The 2016-17 diamond drilling was contracted to Orbit Garant Drilling Inc. of Val d'Or, Quebec. The drill utilised was a helicopter-portable rig manufactured by Orbit Garant, model YHS-1000. As noted previously, the drill was mobilised from Val d'Or, Quebec to a staging area at Mawley Lake on the "North Road" about 11 km past (northwest of) the turnoff to the Musselwhite mine and 53 km SSW of Akow Lake. The drill and most of the related equipment was slung from

Mawley Lake to Akow Lake in 2016 with an A-Star B2 helicopter chartered from Forest Helicopters of Kenora, Ontario. Drill rods, core boxes, and some other items were flown in with a float-equipped Otter aircraft chartered from Osnaburgh Airways of Pickle Lake, Ontario. The better part of two days was required to move in the bulk of this equipment and the initial loads of diesel fuel. Thereafter, supply trips with fuel and core boxes were made with the Otter roughly every week. In 2017 the drill and relate equipment was moved from the site of DDH RGR-16-4 to the site of RGR-17-1 also with an A-Star B2 helicopter chartered from Forest Helicopters of Kenora, Ontario. Atim Lake North, adjacent to the site of RGR-17-1, is too small to safely take off from with float-equipped aircraft consequently all fuel and other supplies were slung to and from the site by helicopter.

The target area west of Akow Lake and east of Atim Lake North is for the most part heavily forested and drill pads were prepared in advance of moves by a two to three-man crew with chain saws. Typically the drill was shut down, prepared for the move, moved by helicopter in 2-4 hours, and resumed drilling at the new site within a 24 hour period.

Four NQ size (47.6 mm or 1 7/8" diameter core) holes totalling 1,826.4 m were completed in 2016 and one hole, 513 m long, was completed in 2017. The casing was left in all holes in the event that down-hole geophysical surveys are required in future. Three of the holes are marked with wooden tripods and at this point two of them are capped with steel caps and flag poles; the wooden drill platforms have been left in place at the site of RGR-16-4 and RGR-17-1.

The inclination of the drill hole was measured with an inclinometer at the collar and thereafter with a Reflex instrument, typically once below the casing and thereafter every 50 or 100 metres. Due to the largely reconnaissance nature of this and previous drill programs at this site, as well as the limited budget, no down-hole azimuth surveys were conducted (e.g. Maxibor, Gyro, etc.) on any of the drill holes in this or earlier programs. In the case of the 2016-17 program, the drill was lined up visually on the collar using front sights established along the cut grid lines where present and/or with a GPS (co-ordinates averaged over several minutes), consequently there is possibility that the azimuth is off from that stated by a few degrees. Even though a stabilized core barrel and long reaming shells were used in order to minimise down-hole deviation, there is always the possibility that the hole deviated somewhat on azimuth more and more the deeper it went. However, if this was the case the foliation angles measured from the core should have become lower with depth and this was not the case in any hole (see cross-sections of the holes below). The near vertical foliation angles suggest that the holes were drilled at an angle to the stratigraphy approaching perpendicular and that the holes did not deviate substantially on azimuth. Nevertheless, due to the inherent uncertainty in non-surveyed holes, the estimated true widths of the mineralized intercepts reported in the tables below were calculated with a conservative factor, typically in the range of 73% to 88% depending on the core angles.

Analytical techniques, the QAQC protocols and sampling procedures are presented in Section 11 and the data verification procedures and results are presented in Section 12; no significant issues

were found with the quality of the analyses. Core recovery was essentially 100% and no issues with the drilling were noted that would affect the recovery or any data derived from the core.

The target and results of each hole are discussed individually below. Cross-sections of each hole follow their descriptions below. Lithology names given to the various schists are based on their dominant mineralogy (most abundant and significant minerals first) followed by a probable protolith name in brackets in some cases. A summary of the drill hole collar information and lengths is given in Table 2 below and detailed co-ordinates of the 2016 diamond drill holes as well as the earlier drilling in the "copper-gold zone" are given in Table 3 below. In the case of drill hole RGR-17-1, no grid co-ordinates are given as the hole was spotted with a GPS using UTM (NAD 83) co-ordinates. The nearest grid line appears to be ten degrees off of the expected orientation and some geo-referencing of this grid is required before accurate grid co-ordinates can be given.

The focus of the 2016 diamond drilling program was the copper-(gold) zone within the "Romios Shear Zone" previously described. Based on the prior interpretation of this mineralization by Zhang (1999) as part of a mineralized shear zone it was expected that higher-grade, potentially economic copper-gold zones could occur anywhere along this structure. As noted before, the copper-(gold) zone is reflected in a coincident TEM response for several hundred metres and is flanked on the east and west sides by more persistent formational-type conductors (Fig. 3). To help resolve the precise location and characteristics of the source conductors, Geotech Airborne Geophysical Surveys of Aurora, Ontario was contracted to undertake EMIT Maxwell Plate Modeling of selected survey lines across the VTEM anomalies. This modeling provided information about the location, thickness, depth and conductivity of the conductive horizons and was utilised when selecting drill hole collar locations and planned lengths. Similarly, in 2017, three adjacent VTEM conductors were targeted at Atim Lake North with DDH RGR-17-1 and Mr. Bob Lo, P. Eng., was contracted to undertake Maxwell Plate Modelling of these conductors to improve their definition prior to spotting the hole.

Hole #	Grid or UTM Co-ords	Length (m)	Collar Dip	Bearing	Comments
RGR-16-1	10+00S, 8+70E	479.4	-60°	250°	Casing left, capped
RGR-16-2	12+60S, 9+50E	528.0	-57°	252°	Casing left, capped
RGR-16-3	9+00S, 2+07E	399.0	-45°	252°	Casing left.
RGR-16-4	2+55N, 8+80E	420.0	-45°	252°	Casing left & wooden drill platform in place.
RGR-17-1	668645E 5852713N	513.0	-45 °	252°	Casing left & wooden drill platform in place.
	Total Metres	2,339.4			

Table 2: Summary of 2016-17 DDH collar information

Drill	NAD 27	DATUM	JM NAD 83 DATUM Grid Co- Correct		Correct	_	
Hole	Zor	ne 15	Zor	ne 15	ords (as	Grid Co-	Comments
	Easting	Northing	Easting	Northing	per map)	ords*	
RGR- 16-1	670209	5850007	670191	5850234	N/A	10+00S, 8+70E	Casing left
RGR- 16-2	670389	5849808	670371	5850035	N/A	12+60S, 9+50E	Casing left
RGR- 16-3	669569	5849816	669552	5850043	N/A	9+00S, 2+07E	Casing left
RGR- 16-4	669675	5851149	669658	5851376	N/A	2+55N, 8+80E	Casing left & wooden drill platform in place.
RGR- 17-1	668662	5852486	668645	5852713	N/A	N/A	Casing left & wooden drill platform in place.
98-8	670541	5849291	670523	5849518	18+00S, 11+40E	18+00S, 8+50E	Actual location is ~290 m grid west of location on old maps. Casing left.
98-9	670069	5849735	670052	5849962	12+00S, 4+75E	12+00S, 6+20E	Actual location is 145 m ENE of location on old maps. Clipped west edge of Cu-Au zone. No casing, just timbers.
99-1	670063	5849847	670045	5850074	11+00S, 6+75E	11+00S, 6+75E	Close to map position. Casing left.
99-2	670040	5849931	670023	5850158	10+00S, 7+00E	10+00S, 7+00E	Close to map position. No casing left.
99-3	670132	5849973	670114	5850199	10+00S, 8+00E	10+00S, 8+00E	Close to map position. No casing left.
99-4	669903	5850307	669885	5850534	6+00S, 7+25E	6+00S, 7+25E	Close to map position. No casing left.
99-5	669722	5850663	669705	5850890	2+00S, 7+25E	2+00S, 7+25E	Close to map position. A lot of wood left behind.
* ( +/- ~:	3 m)				L	I	

Table 3: 2016-17 Drill Hole Locations and Previous Copper-(Gold) Zone Drilling

Given that the results of the 2016 drill program are sub-economic due to their low grades and the single 2017 drill hole result is at this stage not economic due to the limited thickness of the massive sulphide, the drill logs have not been included in this report. They are included in the assessment reports for this project filed with the Ontario Ministry of Northern Development and Mines which will be available to the public through the GeologyOntario site once they are reviewed, approved and posted online.

# 10.1 DRILL HOLE RGR-16-1

Collar: Line 10+00S, 8+70E. Azimuth: 250°. Dip: -60° Length: 479.4 m

#### 10.1.1 TARGET

The target of this hole was the depth extension of copper-(gold) mineralization previously intersected in holes 99-2 and 99-3 as well as the TEM and VTEM anomalies that flank, and to some degree overly, the copper-(gold) zone (see cross-section Fig. 7).

#### 10.1.2 LITHOLOGIES AND MINERALIZATION

Hole RGR-16-1 intersected a similar package of metasediments, schists, minor basaltic and ultramafic rocks and mineralized intervals as those in holes 99-2 and 99-3 (Fig. 7). The first 230 m of this hole consisted largely of fine-grained clastic metasediments, primarily siltstones +/- garnet and staurolite, intercalated with minor sericite schist horizons and basalt, gabbro and ultramafic intervals.

From 230 m to 362.8 m the lithologies were dominated by relatively coarse-grained staurolitegarnet-biotite-(quartz-feldspar) schist, commonly with highly altered and weak-moderately mineralized zones scattered throughout. These schists are intercalated with minor intervals of siltstone +/-garnet-staurolite and locally they appear to grade into each other, suggesting that these coarse-grained schists were produced by the hydrothermal alteration of the local siltstones. The alteration is typically evidenced by a distinct coarsening of the staurolite, increasing from ~1-2 mm up to 2-4 mm, and garnet, increasing from a few mm often to a few cm. Both of these 2 minerals commonly increase noticeably in abundance as well as in the perfection of their crystal forms from the "fresh" siltstone to the altered schists; staurolite can reach 40-50% in some of the schists and the garnets especially become much more euhedral. Biotite also commonly increases in abundance in these schists, often forming a prominent fine-grained network of anastomosing folia that can make up 30-40% of the schists. The aforementioned alteration is relatively pervasive in the staurolite-garnet-biotite dominant schists but these minerals also occur as sometimes spectacular alteration veins typically a few tens of centimetres wide. The veins consist of massive black biotite studded with very coarse-grained euhedral garnets up to 3 cm across and/or staurolite crystals a few mm across.

Chalcopyrite mineralization, +/- associated pyrrhotite, occurred intermittently throughout the aforementioned schists in several forms: as thin seams along the foliation planes, discrete

veinlets <few mm wide, and as fracture-fillings or blebs in the hydrothermal garnets. The best mineralized interval was from 269.1 to 289.5 m and returned a value of <u>0.22% Cu/14.8 m</u> along with 0.1 g/t Au (values are weighted averages). This interval returned the highest gold assay in 2016, 1,150ppb Au (1.1 g/t Au) and the highest copper assay, 1.31% (see Table 4 below).



Figure 7: Cross section of DDH RGR-16-1

Numerous narrow mineralized intervals occur intermittently throughout these schists but they are generally separated by completely barren schist or altered siltstone. For example, in the 53.2 m long interval from 307.3 m to 360.5 m there are 10 mineralized intervals ~1 m to 3.5 m long

totalling 13.2 m separated by barren intervals. When taken together these mineralized and barren zones have a weighted average of <u>504 ppm Cu over 53.2 m</u>, however, the best interval is a sub-economic 3.5 m @ 0.21% Cu (see Table 4 below).

Drill Hole	FROM (metres)	TO (metres)	Core Length (m)	Cu % Avg.	Au ppb Avg.	True Width (m) (Approximate)
RGR-16-1	274.70	289.50	14.80	0.22	101	11.4
RGR-16-1	307.30	360.50	53.20	0.05	18	42.6
including	343.20	346.70	3.50	0.21	76	2.8

Table 4: Significant Mineralized Intercepts in DDH RGR-16-1

Minor arsenopyrite occurs both locally with the copper mineralization and by itself with no chalcopyrite. The arsenopyrite generally forms small euhedral stubby crystals a few mm across concentrated in narrow bands adjacent to alteration zones/veins. It can reach up to 10% over 1 cm but remains very low over any significant interval. There is no apparent correlation of gold grades with the arsenopyrite content.

Although virtually all anomalous gold values are within the envelope of hydrothermally altered schists, the correlation between gold and copper values from this hole is poor and erratic as was the case in holes 99-2 and 99-3 as well as the other holes drilled in 2016. For example, the highest copper value of 1.31% Cu was accompanied by a gold assay of only 256 ppb Au. There is no obvious correlation of gold grades with pyrrhotite % or any other sulphide mineral.

From 362.8 m to the end of hole at 479 m, the lithologies consisted largely of two siltstone horizons separated by a sericite schist with minor syngenetic pyrite layers. This pyritic schist is similar to that encountered at 194.7-209.2 m in this hole and those in the "felsic wedge" at Musselwhite. No significant mineralization has ever been discovered in this horizon at Musselwhite or Akow Lake; maximum assays from the most pyritic interval in this hole were 226 ppb Au and 155 ppm Cu.

## 10.1.3 CORRELATION WITH GEOPHYSICAL TARGETS

The geophysical anomalies and conductors from past ground and airborne surveys in the vicinity of this drill hole are plotted on Fig. 7. When projected to surface along with the geology of holes 99-2 and 99-3, it appears that the two pyritic sericite schist horizons can be correlated with the western and eastern TEM formational-type conductors. The central, shorter-strike length TEM response overlies the projection of the copper-(gold) zone to surface. This zone also corresponds to the gravity high measured in the 1998 survey and can be explained by the much higher concentration of two relatively dense minerals, garnet and staurolite, in the altered, mineralized

schists. The 1998 IP survey revealed a prominent chargeability high centred at about 5+50E, which overlies the western pyritic schist formation, along with an apparent subsidiary response on its eastern shoulder. This latter response may correspond to the copper-(gold) zone but more work by a qualified geophysicist is required to determine the validity of this observation. The VTEM response shown on Fig. 7 adjacent to the gravity high is a ~4-500 m long anomaly situated ~250 m west of the main BIF position. At this time it appears to correlate with the copper-(gold) zone, however, once again more work is needed by a qualified geophysicist to confirm this possibility.

#### 10.2 DRILL HOLE RGR-16-2

Collar: 12+60S, 9+50E. Azimuth: 252°. Dip: -57° Length: 528.0 m

#### 10.2.1 TARGET

The targets of hole RGR-16-2 were: 1) the on-strike and at-depth extension of copper-(gold) mineralization previously intersected partially in hole 99-8 on Line 12+00S as well as the three holes on Line 10+00S; 2) the TEM conductors flanking the copper-(gold) zone; and 3) the main BIF running along the west side of Akow Lake. Based on the magnetic signature of this BIF, it was expected to have largely pinched out in the area of this drill hole but it was hoped there would be some remnant present.

### 10.2.2 LITHOLOGIES AND MINERALIZATION

Drill hole RGR-16-2 intersected a similar sequence of lithologies to that encountered in hole RGR-16-1 260 m to the north-northwest with one exception, an unusual tourmalinite bearing sequence (Fig. 8). From the top of the hole to 269.6 m the units are dominated by barren siltstone/ arenite +/- staurolite-garnet with several horizons of basalt and ultramafics. One 25 m wide interval of staurolite-garnet bearing schist was encountered at 110.5 m to 135.7 m but the staurolite and garnet are sporadic throughout and more fine-grained than the clearly altered schists found deeper in this hole. No oxide or silicate-facies iron formations were encountered in this upper section even though it underlies the geophysical (EM) expression of the main regional BIF. However, a sulphidic mudstone was encountered from 103.5 to 105.0 m and this closely resembles the structurally lowermost (stratigraphically uppermost) unit in the BIF at Musselwhite, known there as a "4H". It is a thinly (<1 cm) bedded, light to dark grey, cherty mudstone with 10-25% remobilised Py-Po filling fractures, breccia veins, etc. This unit can be correlated with the TEM response that traces the BIF at surface. This correlation suggests that the ultramafic intersected above the mudstone from 84.1 to 103.5 m is the uppermost member of the South Rim assemblage and the fine-grained clastic metasediments above (east) of this belong to the younger Eyapamikama sediments. This sequence is similar to that encountered at Musselwhite between the OMU and the younger sediments.

From 269.9 m to 495.1 m the hole intersected thick sequences of variably altered and locally mineralized staurolite-garnet-biotite-sericite schists with lesser sericite schists and minor basalt.

As was the case in hole RGR-16-1, the coarse-grained staurolite-garnet-biotite-sericite rich schists are intercalated with finer-grained versions of itself and minor intervals of relatively unaltered siltstone, suggesting that these coarse-grained schists are altered siltstone or similar metasediments. Intervals of staurolite-garnet-biotite-sericite schist occur from 283.2 to 293.5 m and 316.5-339.3 m but these are only weakly altered (fine-grained with much lower % of staurolite and garnet).

The strongly altered, coarse-grained schists were encountered from 358.5 to about 410 m and it was here that the broadest mineralization was found. Chalcopyrite-Pyrrhotite (Cp-Po) mineralization typically occurred in the most altered (coarse-grained garnets in massive biotite +/- quartz flooding) areas but some highly altered areas were barren. Mineralization was again best developed in the vicinity of the basalt and/or ultramafic dykes/sills. The most mineralized intervals are summarized below in Table 5:

Drill Hole	FROM (metres)	TO (metres)	Core Length (m)	Cu % Avg.	Au ppb Avg.	True Width (m) (Approx.)
RGR-16-2	365.60	379.95	14.35	0.21	77	12.5
RGR-16-2	434.70	441.25	6.55	0.31	120	5.8
including	434.70	437.65	2.95	0.59	215	2.6

Table 5: Significant mineralized intercepts in DDH RGR-16-2

Less altered and mineralized schists with minor basalts dominated from ~410 m to 495.1 m but this interval included some of the most unusual and potentially significant rocks encountered in the 2016 drilling – a sequence of tourmalinite-bearing sericite schist and massive tourmalinite veins.

TOURMALINITE ZONE: From 434.7 to 437.65 m the drill hole encountered a white, fine-grained, siliceous, moderately schistose unit with ~30% streaky, discontinuous (sheared out) black layers ~0.5 cm thick composed of a hard, very fine-grained black mineral presumed to be tourmalinite (3 samples of this material averaged 0.59% Boron, indicating a high tourmaline content). This unit was cut by 4 massive tourmalinite veins/bands, 5-20 cm wide, containing 10-40% biotite, +/- chlorite, plus minor to 5% chalcopyrite, minor pyrrhotite, and a variable % of arsenopyrite throughout, up to 10%/few cm. This interval returned some of the highest copper values from the 2016 program, 2.95 m @ 0.58% Cu, along with elevated silver values, up to 29.5 ppm Ag; gold values ranged from 100 to 430 ppb Au. This interval was followed from 437.65 to 441.75 m by a related unit of sericite-garnet-(staurolite)-quartz-feldspar schist with 0.5% small tourmalinite is an important part of mineralized hydrothermal systems in a number of mining centres and its presence at Akow Lake is considered potentially very significant. This will be expanded upon in the Interpretation and Conclusion section.

Following these variably altered and mineralized schists the hole intersected a sericite-quartz-feldspar schist (felsic ash tuff) with minor syngenetic pyrite layers from 495.1 m to the end of the hole at 528 m.





Of particular geological interest in this hole was a 5 cm wide band of folded sulphides at 379.8 m which suggests mineralization is pre- to early tectonic.

## 10.2.3 CORRELATION WITH GEOPHYSICAL TARGETS:

The geophysical anomalies and conductors from past ground and airborne surveys in the vicinity of this drill hole are plotted on Fig. 8. When projected up-dip to surface the sulphidic mudstone encountered at 103.5 to 105.0 m can be correlated with the TEM which marks the position of the main regional BIF. As was the case in hole RGR-16-1, the pyritic sericite schists, encountered at 269.6 to 276.0 m and 495.1 to 528.0 m can be correlated with the eastern and western formational-type TEM conductors respectively. The Gar-Bio-Staur-Qtz-Fd Schist encountered from 358.5 to 434.7 m can be correlated with the central, shorter strike-length TEM conductor and the gravity high.

# 10.3 DRILL HOLE RGR-16-3

Collar: 9+00S, 2+07E Azimuth: 252°. Dip: -45° Length: 399.0 m

## 10.3.1 TARGET

The primary target of hole RGR-16-3 was a pair of partially defined TEM conductors located at 0+50E and 0+50W on Line 9+00S and L10+00S (Fig. 3). The position of the loops laid out in the 2003 TEM survey was such that these 2 conductors were only partially surveyed. The conductors are roughly coincident with two Max-Min HLEM conductors, identified in the 1997 survey by Vytyl Exploration Services, which are continuous over a considerable length. The western HLEM conductor extends north to the end of the survey at 17+00N and south to the end of the grid at 23+00S. The eastern conductor is more intermittent but appears to continue at least from 1+00N to 11+00S. A weak-moderate aeromagnetic high is evident in the 2003 Geotech survey in a narrow corridor along these conductors as well. There are no outcrops and no past drilling in a 400 m wide zone between the baseline and the western edge of the "lower clastic sediments" on the entire Akow Lake grid. Drill hole RGR-16-3 was planned to be the first hole in this large untested area.

## 10.3.2 LITHOLOGIES AND MINERALIZATION

Drill hole RGR-16-3 intersected three basic assemblages: 1) Dacitic volcanics with minor felsic ash tuff and intercalated siltstone from bedrock surface to a depth of 137.5 m, 2) Siltstone from 137.5 m to 192.45 m, and 3) Basalt with thin beds of intercalated sediments and one gabbro intrusion (Fig. 9). Several thin feldspar-porphyry dykes occur throughout the basalt, including one at the siltstone-basalt contact. No appreciable mineralization was found in this hole. Two small quartz vein clusters returned weakly anomalous results, one up to 1080 ppb Au/40 cm and the other 1040 ppm Cu and 329 ppb Au/70 cm. Numerous thin beds of interflow metasediments, typically siltstone to pelite but locally cherty, occur throughout the basalt and some carry appreciable pyrrhotite, up to 20% Po/40 cm with trace to minor chalcopyrite. These beds returned a

maximum copper value of 467 ppm Cu and in spite of being commonly highly deformed/sheared the maximum gold value returned was only 622 ppb Au.



Figure 9: Cross section of DDH RGR-16-3

# 10.3.3 CORRELATION WITH GEOPHYSICAL TARGETS:

Although this hole did not intersect any appreciable mineralization or promising structures it provided useful geological information that helped to fill in a large unknown part of the stratigraphic sequence as well as explaining one, and possibly two, significant EM conductors on the property.

# 10.4 DRILL HOLE RGR-16-4

Collar: 2+55N, 8+80E Azimuth: 252°. Dip: -45° Length: 420.0 m

#### 10.4.1 TARGET

Drill hole RGR-16-4 was a step-out hole intended to test the position of the copper-(gold) zone between the two formational-type TEM conductors 450 m north of the northernmost previous drilling (DDH 99-5) (see Fig. 3). The shorter-strike length TEM conductor that marks the copper-(gold) zone in the vicinity of holes RGR-16-1 and 2 is not evident in the northern part of the Akow Lake grid, however, given the uncertainty surrounding the EM response of this zone it was considered necessary to drill test this portion of the "lower clastic metasediments" for the copper-(gold) zone.

#### 10.4.2 LITHOLOGIES AND MINERALIZATION

This hole intersected a sequence of fine-grained metasediments, sericite schist and various hydrothermally altered staurolite-garnet-biotite schists with intermittent copper-(gold) mineralization (Fig. 10). This package of rock types is quite similar to that in holes RGR-16-1 and 2 with perhaps a greater amount of sericite in many of the units. In spite of the lack of a corresponding TEM signature, this hole intersected four mineralized zones comparable in width, grade and style of mineralization to previous holes in the copper-(gold) zone (see Table 6 below).

Drill Hole	From (metres)	To (metres)	Core Length (m)	Cu % Avg.	Au ppb Avg.	True Width (m) (Approx.)
RGR-16-4	178.70	185.50	6.8	0.23	67	5.4
RGR-16-4	204.00	209.30	5.30	0.13	77	4.1
RGR-16-4	297.20	303.95	6.75	0.16	105	5.1
RGR-16-4	316.30	327.05	10.75	0.32	183	8.1

Table 6: Significant mineralized intercepts in DDH RGR-16-4

As was largely the case in holes RGR-16-1 and 2, this hole first intersected a sequence of finegrained clastic metasediments (arkose and siltstone), followed by sericite schist with minor pyrite and then a sericite-staurolite dominant schist ending at 159.3 m. At that point began a series of 5 intervals of locally mineralized biotite-staurolite +/- garnet +/- sericite schists, 7 to 40 m wide, which continued to 351.5 m. These schist units were separated by generally narrower and barren horizons of basalt, siltstone and sericitic schists as well as a 45 m wide interval of siltstone that was commonly altered to biotite-garnet-staurolite and mineralized in narrow seams. The alteration features in this major siltstone unit as well as the more mineralized biotite-staurolitegarnet dominant schists support the earlier observations that these schists are hydrothermally altered version of the siltstones. Following the last of the biotite-garnet-staurolite bearing schists





Figure 10: Cross-section of DDH RGR-16-4

Several features of particular geologic interest were noted in this hole:

- 1) A minor Z-fold at 129.2 m indicates that the units to the east moved up relative to those to the west.
- A ptygmatic garnet vein ~1 cm wide with minor Cp-Po throughout occurs at 192.2 m; this highly folded vein suggests that at least some of the mineralization and garnet formation predates folding.
- Thin coatings of chalcopyrite line the foliation planes every few cm from 207.0-209.3 m. These coatings tend to flank the veins of intense garnet-biotite-quartz alteration for ~20-90 cm suggesting that this style of mineralization emanated from the veins.

4) Nineteen olivine lamprophyre dykes 1-40 cm wide were intersected between 320.9 and 358.5 m. This author has never observed so many lamprophyre dykes in such a small area. The association of lamprophyre dykes with deep-seated fault structures suggests that such a fault may have been present at some time.

# 10.4.3 CORRELATION WITH GEOPHYSICAL TARGETS:

In the previously described 2016 drill holes, i.e. RGR-16-1 and 2, the two "formational-type" TEM conductors tested by this drill hole, RGR-16-4, lined up well with pyritic sericite schist horizons. In this hole the correlation between the conductors and pyritic formations is not so apparent. The first interval of pyritic schist encountered from 89.7 to 107.8 m appears to lie too far east of the TEM conductor whereas the copper-(gold) mineralized zones between 178 and 209 m directly underlies the conductor (Fig. 10). The western TEM conductor does lie directly above a sericite schist, however, there was very little pyrite intersected in it. If projected up-dip to surface, the copper-(gold) zone at 316.3-327.05 m would come within perhaps 40 m of this conductor axis. The position of the TEM conductor axes can have an uncertainty of +/- 25 m (Geophysicist Bob Lo, pers. comm. 2016). Even though these two conductors correlate well with the pyritic schists farther south, the possibility that they have "switched over" to reflect different (mineralized) horizons is too important to overlook. A re-evaluation of the axis positions of both conductors from the original survey data is now required.

## 10.5 DRILL HOLE RGR-17-1

Collar: 668645E, 5852713N (NAD 83). Azimuth: 252°. Dip: -45°

# 10.5.1 TARGET

The target of this hole was three parallel VTEM conductors spaced across ~200 m and lying largely beneath Atim Lake North (see Fig. 11, 12). These conductors were postulated to be sulphide horizons, potentially linked to the northward projection of the copper-(gold) enriched alteration zone located 200 m to the east (Fig. 11). Maxwell plate models of the VTEM conductors were created by professional geophysicist Bob Lo, P.Eng., and are illustrated on Fig. 12 as the orange lines. Of particular note is the lack of a VTEM response for the central and otherwise longest conductor, #4, in the area between conductors #3 and #5. This lack of response is likely due to interference from the flanking conductors whereas the best fit for the Maxwell models requires this conductor (#4) to be continuous as shown (B. Lo, pers. comm. 2017).



Figure 11: Regional geophysical targeting model for DDH RGR-17-1



Figure 12: Maxwell Plate Models and location of DDH RGR-17-1

# 10.5.2 RESULTS

This drill hole was successful in discovering a massive sulphide style horizon with abundant chalcopyrite and pyrrhotite and significant copper, gold and silver grades (see Table 7 below). In addition, three intervals of copper-(gold) mineralized schist similar to that in the "Romios Copper-(Gold) Zone"/Lower Alteration Zone were intersected at hole depths between 96 m and 162 m.

From (m)	To (m)	Drilled Width	True Width	Cu %	Au g/t	Ag g/t	Description
96.55	98.75	2.2	1.6	0.58	0.24	-	Quartz veined schists with chalcopyrite blebs
100.95	106.3	5.35	3.9	0.38	0.34	-	Quartz veined schists with chalcopyrite blebs
159.0	161.7	2.7	1.97	0.28	-	-	Quartz veined schists with chalcopyrite blebs
299.2	301.1	1.9	1.4	2.35	1.4	68.2	Massive sulphide

Table 7: Significant mineralized intercepts in DDH RGR-17-1

## 10.5.3 LITHOLOGIES

From the start of the bedrock at 17.0 m to a depth of 450.4 m, this drill hole intersected a package of fine-grained clastic metasediments (mainly meta-siltstone with minor meta-arenites) with intervals of various intercalated staurolite-garnet-sericite-biotite-quartz-feldspar schists and sericite dominant schists thought to be derived from felsic tuffs (see Fig. 13). The meta-siltstones vary from relatively fresh units composed largely of fine-grained biotite-quartz-feldspar through intervals with increasing amounts of garnet and staurolite into hydrothermally altered, coarse-grained schists dominated by garnet and staurolite. These schists are very similar to those encountered by drilling in the "Romios Copper-(Gold) Zone"/Lower Alteration Zone 1.5 to 3 km to the southeast. (This zone is believed to continue northward and pass about 200 m east of the 2017 drill hole collar, see Fig. 11). The sericite content is nil to low in most of the meta-siltstones but increases to a minor component (~5-10%) in some intervals and then to a predominant component in the intercalated sericite+/-garnet+/-biotite schist horizons. Several minor basalt horizons are found scattered throughout this package, especially in the lowermost 50 m.

From 450.4 m to the end of hole at 513 m the lithologies are dominated by basalt with a 10 m gabbro unit. Biotite alteration of the basalt ranges from nil to moderate in the first 30 m and then increases to moderate-strong (20-30% biotite concentrated in bands about 5 mm wide) below the gabbro from 490.6-513 m (biotite alteration is prominent within and adjacent to highly strained and/or mineralized areas at the Musselwhite mine).

## 10.5.4 MINERALIZATION

The principle mineralization encountered in this hole was primarily of two types: a massive sulphide style horizon encountered from 299.2-301.1 m and three intervals of chalcopyrite mineralized, quartz veined/flooded schists very similar to the style of mineralization in the "Romios Copper-(Gold) Zone"/Lower Alteration Zone. These are discussed separately below.

## 10.5.4.1 The Massive Sulphide Horizon

Drill hole RGR-17-1 was successful in intersecting the first base-metal rich massive sulphide horizon to be discovered in the Lundmark-Akow Lake - Musselwhite area. This horizon was intersected from 299.2 m to 301.1 m (Fig. 13), a drilled width of 1.9 m which is estimated to have a true width of 1.4 m (based on foliation angles in the core). The intersection is 200 m vertically below surface but is expected to extend close to surface based on the geophysical signature (B. Lo, pers. comm.). The mineralized horizon was broken down into three samples reflecting changes in the amount of sulphides and the nature of the host rock (see Table 8 below).



Figure 13: Cross-section of DDH RGR-17-1

200m

Sample #	From (m)	To (m)	Drilled Width (m)	Au g/t	Cu %	Ag g/t
390029	299.2	299.7	0.5	1.11	2.57%	81.5
390031	299.7	300.3	0.6	1.10	1.63%	57.9
390032	300.3	301.1	0.8	1.85	2.76	67.5

Table 8: Assay results from the massive sulphide zone

The first 0.5 m and lower 0.8 m of the sulphide horizon average ~5-7% each of visible chalcopyrite and pyrrhotite which are locally concentrated in semi-massive zones exhibiting a milled texture (see Plate One). The host rock contains a high percentage of tourmalinite (very fine-grained, black, massive tourmaline, typically produced by certain hydrothermal fluids at or near vent sites) as thin laminae, milled fragments within the sulphide rich zones, and as massive veins up to several centimetres wide (see Plate Three). The remainder of these intervals is too fine-grained to distinguish individual minerals but it is believed to be a mix of quartz, tourmalinite, siltstone and sulphides. The presence of abundant tourmalinite was confirmed by three assays which ranged from 0.79 to 1.02% Boron in samples 390029, 390031 and 390032. Trace fine-grained disseminated arsenopyrite occurs throughout the horizon. The assay results from these two intervals are quite encouraging and range from 2.57-2.76% Cu, 1.1-1.85 g/t Au and 67.5-81.5 g/t Ag (Table 8). The levels of other base metals such as Pb, Zn, Ni, Co are too low to be of economic significance although the cobalt values were the most elevated at 134 to 161 ppm.

The central 60 cm of the massive sulphide zone, from 299.7 to 300.3 m, is more siliceous and contains less sulphides than the upper and lower portions (see Plate Two) but still assayed 1.63% Cu, 1.1 g/t Au and 57.9 g/t Ag (Table 8). It consists of ~3-4% visible chalcopyrite and 1-2% pyrrhotite in a hard, siliceous, light grey unit composed of alternating layers/laminae of silica (very fine-grained quartz) a few mm to 5-6 cm thick, and ~40% tourmalinite laminae <5 mm thick, with local intervals of dismembered tourmalinite laminae. The levels of the other base metals is also too low to be of significance in this central portion.

There are no obvious quartz veins or zones of quartz flooding within this mineralized horizon and it is interpreted as an exhalative massive sulphide, very likely related to the >3 km long alteration pathway (i.e. "the Romios Copper-(Gold) Zone) located ~200 m to the east. No obvious hydrothermal alteration pipe is noted in the rocks flanking the massive sulphides, however, tourmalinite spots up to 1 cm across are locally abundant (e.g. up to 3-15% across 1.4 m) in the first 13.4 m of meta-siltstone below the massive sulphides indicating that hydrothermal fluids exhaled onto or passed through those sediments as well.



Plate 1: High grade portions of the massive sulphide horizon

(metre marks refer to core in lower row, Sample 390032. Upper row is part of sample #390029)



Plate 2: Central portion of the massive sulphide horizon.

(Sample #390031)



Plate 3: Tourmalinite-rich section of the massive sulphide horizon.

## 10.5.4.2 Mineralized Schist Intervals

Multiple zones of modest copper-(gold) mineralization were intersected in staurolite-biotitegarnet-quartz-feldspar schists and intercalated sericite-dominant schist layers and the three most significant of these intercepts are listed in Table 9 below and illustrated on Figure 13 above. The three mineralized schist intervals were intersected at depths between 68 m and 110 m. Chalcopyrite mineralization in these intervals typically occurs as scattered blebs and veinlets <2 cm wide flanking or within quartz veins up to 40 cm wide and/or biotite veins up to 20 cm wide. It is generally associated with the development of coarse-grained hydrothermal garnets, staurolite, and massive black biotite. These mineralized schist intervals are very similar to those encountered in the 2016 drilling of the "Romios Copper-(Gold) Zone"/alteration pathway 1.5 to 3 km to the southeast. This zone was postulated to continue northward to the Atim Lake North area some 1.8 km from the northernmost drilled intersection (DDH RGR-16-4) based on the EM signature of two pyritic horizons that flank the copper-(gold) zone. The intersection of mineralized schists at Atim Lake North similar to those in the copper-(gold) zone suggest that this latter zone does indeed extend from Akow Lake to Atim Lake North, a distance of >3.3 km.

Nine additional smaller zones of mineralized quartz veining/flooding are found scattered throughout the hole. These range from 0.13 to 0.75 m in drilled width and grade up to 0.29% Cu and 1.66 g/t Au.

From (m)	To (m)	Drilled Width	True Width	Cu %	Au g/t	Ag g/t	Description
96.55	98.75	2.2	1.6	0.58	0.24	-	Quartz veined schists with chalcopyrite blebs
100.95	106.3	5.35	3.9	0.38	0.34	-	Quartz veined schists with chalcopyrite blebs
159.0	161.7	2.7	1.97	0.28	-	-	Quartz veined schists with chalcopyrite blebs

Table 9: Mineralized intercepts in quartz veined schists, RGR-17-1

# 10.5.5 CORRELATION WITH GEOPHYSICAL TARGETS

Drill hole RGR-17-1 was planned to test three conductors identified from the 2014 VTEM survey and modelled by B. Lo, P.Eng., as shown in Figure 12. The approximate surface position of these conductors are depicted on the drill hole cross-section (Figure 13) and numbered from east to west as #3, 4 and 5. It is apparent from the drill section that the massive sulphide horizon lies approximately vertically below conductor #3 and can be correlated with it. Conductor #4 lies approximately vertically above a 40 cm zone of semi-massive (30-40%) pyrrhotite intersected at a down-hole depth of 449.9 m and can be correlated with this barren horizon. Due to the increasingly slow drilling rate near the end of the hole combined with various logistical and budgetary constraints, the hole was terminated prior to reaching the source of conductor #5. While there may be a sulphidic source for that conductor, the fact that the hole had passed from the package of metasediments and felsic metavolcanics that were the target of this program, and the host to the massive sulphide horizon, made conductor #5 a low priority for this program at that time.

# **10.6 LITHOGEOCHEMISTRY**

The origin of the schists that host the copper-(gold) mineralization is an important question that has major implications for the true nature of this mineralization and the potential for discovering a higher-grade deposit. If the schists are simply products of a shear zone in a package of metasediments there is limited potential for a large, significant zone of better copper-(gold) mineralization along its length. If however, these schists were produced by strong hydrothermal alteration of the local metasediments then they may well be part of a widespread hydrothermal cell that could have deposited higher grade deposit(s) in the adjacent strata somewhere along its length. In an effort to provide some initial lithogeochemical input into this question, twenty samples of the 2016 drill core were sent for whole rock analysis to ActLabs in Thunder Bay, Ontario. A complete discussion of these results is beyond the scope of this report, however, several important features are evident in the data and are discussed below.

Samples were specifically selected to include metasediments that appeared to be unaltered, some that were partially altered to varying percentages of coarser-grained biotite, garnet, staurolite and sericite, and some that were highly altered to these minerals and often hosted Cu-(Au) mineralization nearby. The major oxides and Rb/Sr ratio of the metasediments and schists are presented in Table 10 below.

Sample	Hole RGR-	Depth (m)	Rock Type	SiO2	AI2O3	Fe2O3	MgO	CaO	Na2O	K20	TiO2	Rb/Sr
W1120453	16-1	262	Homogsiltstone	67.4	15.08	4.33	1.51	5.06	2.01	2.49	0.44	1.01
W1120455	16-1	265.8	Staur-(Gar) siltstone	69.28	16.48	4.97	0.94	0.57	0.65	3.13	0.55	1.94
W1120458	16-1	363	Siltstone, f.g., minor Staur	77.31	12.41	3.69	0.79	0.69	0.26	2.85	0.23	6.20
W1120459	16-1	378.7	Staur. Siltstone, f.g., "fresh"	71.08	15.86	4.55	0.84	0.27	0.22	3.82	0.44	6.29
W1120467	16-4	210.5	Siltstone, no staur	64.76	14.91	8.01	1.75	3.84	0.32	3.22	0.46	3.66
W1120471	16-4	419	Sericitic siltstone, few % gar	63.21	15.88	6.58	2.58	5.47	1.04	2.39	0.63	1.27
W1120456	16-1	266.8	Gar-Staur Seds, weak alt'n	64.04	14.83	14.4	1.49	0.35	0.21	2.77	0.49	5.27
W1120452	16-1	54.7	Staur rich schist	70.01	17.91	6.08	0.7	0.37	0.6	0.85	0.68	0.55
W1120463	16-1	340.7	Staur-Bio-Gar-QF Schist (intermed between fresh and alt'd seds)	65.2	14.6	14.28	1.38	0.34	0.12	2.63	0.44	10.64
W1120457	16-1	359	C.g. Staur-Gar-Bio Schist	60.2	17.59	16.27	1.64	0.3	0.09	2.51	0.70	16.29
W1120466	16-4	178.4	Bio-Staur-Q-Fd-Bio Schist beside hydrothermal veins	68.23	14.46	10.95	1.43	0.34	0.12	2.64	0.41	9.10
W1120468	16-4	213.4	Gar-Staur Siltstone	62.8	15.25	13.87	1.89	0.29	0.08	2.67	0.47	34.33
W1120469	16-4	258.8	Ser-(Gar) Schist intercalated with alt'd siltstone	67.89	16.78	5.43	0.57	0.3	0.38	4.02	0.69	2.94
W1120470	16-4	397.5	Ser-Gar-Q-F-(Bio) Schist	65.53	14.06	11.51	1.33	0.41	0.23	3.54	0.41	7.08
W1120464	16-3	106.5	Gar-Ser-(Staur) Schist.	67.14	14.85	11.43	0.82	0.35	0.24	3.29	0.39	6.86
W1120460	16-1	382.4	Ser Schist/Felsic wedge tuff	63.53	15.59	7.88	0.57	0.66	0.37	4.71	0.64	4.97
W1120451	16-1	364	Felsic volcaniclastic schist	72.36	14.94	1.78	0.62	5.2	1.69	1.2	0.15	0.35

 Table 10: Whole rock analyses of metasediments and schists

One of the most prominent lithogeochemical changes often evident in rocks that have experienced significant amounts of fluid flow through them is a reduction in their sodium levels. Na<sub>2</sub>O levels in the freshest looking metasediments range from 0.22% to 2.01% whereas those in the schists range from 0.08 to 0.38%. Although there is considerable overlap in these value fields, the four lowest values, between 0.08 and 0.12%, are all within the most altered looking schists and are abnormally low, suggesting that these rocks have been subjected to significant hydrothermal fluid flow. The field evidence suggests that the schists are derived from hydrothermal alteration of a thick package of metasediments. The chemical composition of these rocks may be quite variable due to changes in the % of volcanic versus sedimentary input and this is evident in the wide range of sodium values of the siltstones for example. To overcome the heterogeneity of the original protoliths when looking for patterns in the altered rocks one can use ratios of minor elements that are particularly susceptible to fluid flow and generate large scale anomalies largely irrespective of the original major oxide content. One such ratio commonly used is Rb/Sr which roughly parallels the addition of potassium and removal of calcium during fluid flow. Rb/Sr ratios of the unaltered siltstones range from 1.0 to 6.3 whereas those from the

schists range up to 34.3, again suggesting that at least some of the schist have been greatly affected by hydrothermal fluid flow.

The Rb/Sr ratios are plotted versus the Na<sub>2</sub>O values in Fig. 14 below and indicate that ~6 of the schist samples, when compared to the metasediments, are highly depleted in sodium and have elevated Rb/Sr ratios suggestive of high hydrothermal fluid flow. These samples, especially the 4 with the highest Rb/Sr values, are the coarse-grained staurolite-garnet varieties that also appear to have a hydrothermal origin based on their textural and mineralogical relationships in the core.



Figure 14: Rb/Sr versus Na<sub>2</sub>O

Although the number of samples is not great and further analysis of the data is needed, the preliminary interpretation of the lithogeochemical data supports the field interpretation that many of the staurolite-biotite-garnet schists were derived by the hydrothermal alteration of precursor metasediments.

# **11 SAMPLE PREPARATION, ANALYSES AND SECURITY**

11.1 Sample Preparation Methods and Quality Control Measures in the Field The 2016 drill core was logged by the author under a temporary shelter near the collar of DDH RGR-16-1 at UTM co-ordinates 670219 E, 5850251 N (NAD 83) and all core from this program is stored in cross piles at that site except for a small number of boxes currently stored in Thunder Bay. The 2017 drill core was logged near the site of DDH RGR-17-1 on the southeast side of Atim Lake North and all of it is stored in cross piles at 668674E, 5852701N, again except for a few boxes stored in Thunder Bay. Core samples were delineated by the author with coloured markers at appropriate intervals (typically <1 m wide) based on changes in geology (rock type, alteration style and intensity, amount of mineralization, etc.) and split using a manual core splitter on site. Typically the worker splitting the core was given one box of core at a time with the sample bags marked and inserted at the beginning of each interval. The author then inspected the split (half) core remaining in the box and the bagged samples once each box was finished. Several boxes of core that were deemed too schistose to split effectively with the manual splitter and several boxes of the best mineralization were transported to Thunder Bay by the author at the end of the job(s) and sawn under the author's supervision at contract core sawing services there.

Samples were placed in plastic sample bags along with their corresponding assay tag and sealed with a zip tie. They were then placed in poly-weave plastic sacks along with blank samples, copper and gold standard samples at regular intervals (typically every tenth sample was a standard and/or blank). The sacks were then zip-tied by the author and stored in his logging facility in the field until transport by helicopter from the site to the staging area at Mawley Lake and trucking to ActLabs in Thunder Bay.

# 11.2 Analytical Procedures

All gold assays, copper analyses, whole rock analyses and specialty analyses such as the boron assays were performed on behalf of Romios by Activation Laboratories (ActLabs) in Thunder Bay, Ontario, or in the case of the boron analyses, at their main laboratory in Ancaster, Ontario. ActLabs is a Canadian based company with 21 locations worldwide. They are ISO 17025 (includes ISO 9001 and 9002) accredited and/or certified for Mineral Analysis/Geological Tests (CAN-P-1579) as well as accredited by Health Canada, the Food & Drug Administration (FDA) and the Ontario Ministry of Agriculture and Food (for soil analysis). ActLabs has no relation to Romios.

All gold values were determined by fire assay (ActLabs code 1A2) and copper was determined by ICP analysis (code 1E3). These two techniques and the sample crushing procedure are described below briefly from information on ActLabs website.

## Sample Crushing and Pulverising Code Rx 1:

The samples are crushed such that up to 90% passes through a 2 mm sieve, followed by splitting the sample down to 250g which is then pulverized (mild steel) to 95% passing  $105\mu$ .

## Gold Fire Assay 1A2-ICP:

A 30 g sample of the rock pulp is mixed with fire assay fluxes (borax, soda ash, silica, litharge) and with Ag added as a collector, and the mixture is placed in a fire clay crucible. The mixture is preheated at 850°C, intermediate at 950 °C and finish at 1060 °C; the entire fusion process should last 60 minutes. The crucibles are then removed from the assay furnace and the molten slag (lighter material) is carefully poured from the crucible into a mould, leaving a lead button at the base of the mould. The lead button is then placed in a preheated cupel which absorbs the lead

when cupelled at 950°C to recover the Ag (doré bead) + Au. The Ag doré bead is then digested in hot (95°C) HNO3 + HCl. After cooling for 2 hours the sample solution is analyzed for Au by ICP-OES using a Varian 735 ICP.

#### 1E Multi-element Analysis including Copper Analysis by 1E3 - Aqua Regia - ICP

0.5 g of rock pulp sample is digested with aqua regia for 2 hours at 95 °C. The sample is cooled and then diluted with deionized water. The samples are then analyzed using an Agilent 700 series ICP for the 38 element suite. QC for the digestion is 15% for each batch, 2 method reagent blanks, 6 *in house* controls, 8 sample duplicates and 5 certified reference materials. An additional 20% QC is performed as part of the instrumental analysis to ensure quality in the areas of instrumental drift.

#### **Lithogeochemistry**

Samples submitted to ActLabs for lithogeochemical analysis were analysed by ActLabs procedure 4-Litho which is a combination of 2 packages: Code 4B (lithium metaborate/tetraborate fusion ICP whole rock) and Code 4B2 (trace element ICP/MS).

#### 4B - Lithium Metaborate/Tetraborate Fusion - ICP

Samples are prepared and analyzed in a batch system. Each batch contains a method reagent blank, certified reference material and 17% replicates. Samples are mixed with a flux of lithium metaborate and lithium tetraborate and fused in an induction furnace. The molten melt is immediately poured into a solution of 5% nitric acid containing an internal standard, and mixed continuously until completely dissolved (~30 minutes). The samples are run for major oxides and selected trace elements (Code 4B) on a combination simultaneous/sequential Thermo Jarrell-Ash ENVIRO II ICP or a Varian Vista 735 ICP. Calibration is performed using 7 prepared USGS and CANMET certified reference materials. One of the 7 standards is used during the analysis for every group of ten samples.

## 4B2 - Research - Lithium Metaborate/Tetraborate Fusion - ICP/MS

Samples fused under code 4B2 are diluted and analyzed by Perkin Elmer Sciex ELAN 6000, 6100 or 9000 ICP/MS. Three blanks and five controls (three before the sample group and two after) are analyzed per group of samples. Duplicates are fused and analyzed every 15 samples. Instrument is recalibrated every 40 samples.

For further details on which elements are analyzed by each of the above procedures, detection limits for each element, etc. see the ActLabs website Lithogeochemistry section at <u>http://www.actlabs.com</u>.

#### Boron Assay by Neutron Activation Analysis Code: 4F - B - PGNAA (0.5 ppm and 2 ppm B)

This method was utilised for several samples in 2016. Samples 1 g in size are encapsulated in a polyethylene vial and placed in a thermalized beam of neutrons produced from a nuclear reactor. Samples are measured for the doppler broadened prompt gamma ray at 478 KeV using a high

purity GE detector. Samples are compared to certified reference materials used to calibrate the system. A minimum of four standards are analyzed with every work order. Duplicates are analyzed when samples are provided. The detection limit reported is a function of the counting times required for each.

#### Boron Assay by Peroxide Fusion and ICP/MS (used on three samples in 2017)

Fused samples are diluted and analyzed by Perkin Elmer Sciex ELAN 6000, 6100 or 9000 ICP/MS. Fused blank is run in triplicate for every 22 samples. Controls and standards fused with samples are run after the 22 samples. Fused duplicates are run every 10 samples. Instrument is recalibrated every 44 samples

# 11.3 Quality Control Procedures and Results

In order to ensure that the copper and gold analyses were accurate throughout the program, a number of standard QAQC steps were followed including the insertion of either a blank sample or one of two commercial standards in place of every tenth sample in the sample stream. During the early stages of the 2017 one-hole drill program it became apparent that there would be a relatively small number of samples taken and the number of standards and blanks would be too low for any statistical analysis if they were inserted at the rate of one every 10<sup>th</sup> sample. Consequently the number of standards and blanks inserted was then increased to three at every tenth sample spot. Every sample number ending in a zero, "0", including those followed by "A", "B" or "C", represents a blank or standard. These steps are in addition to those followed by the laboratory used (ActLabs in Thunder Bay, Ontario). ActLabs inserts blanks, a variety of standards, and a number of duplicates into the sample stream. No issues were noted with any of the results from the ActLabs QAQC samples. The analytical results of the company's standards and blanks were inspected by the author, the Qualified Person for this project, and no issues of any consequence with the accuracy or reproducibility of the assays were noted. The author is of the opinion that the analytical data is of good quality in terms of precision and reproducibility and sufficient for the purpose of this report.

The first step in QAQC is to ensure that there is no gold or copper contamination of the samples in transit between the field and the laboratory or during the crushing and pulverizing stages or any of the subsequent stages of the analyses at the lab. To do this in 2016 a small boulder of barren aplite (a fine-grained granitoid with very low content of mafic minerals and no visible sulphides, quartz veins or alteration) was located on site and broken into small pieces. In 2017, a gneissic granite boulder was utilised in the field and in one case a syenite blank supplied by ActLabs was used in a re-assay. Samples of these materials were then inserted into the sample stream as a "blank" at a rate of one for every twenty samples in 2016 and every 10th or 20<sup>th</sup> sample in 2017. All copper analyses and gold assays of these blanks returned very low values and confirm that there was no contamination of the samples at any stage of the process. Results are presented in the Tables 11 and 12 below. Gold assay results were all below detection limits (<5 ppb Au) while copper values ranged from <1 ppm to 13 ppm and the copper values remained consistently low over the time span of the four batches of samples analysed in 2016 (see Fig. 15).



Figure 15: Copper anlyses of the 2016 granite blanks

Table 11: Gold and	d copper an	alyses of g	granite blanks,	2016
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Lab Report #	Sample #	BLANK (Au ppb)	BLANK (Cu ppm)		
A16-09895	W-1120001	< 5	1		
A16-09895	W-1120040	< 5	<1		
A16-09895	W-1120060	< 5	2		
A16-09895	W-1120080	< 5	9		
A16-09895	W-1120100	< 5	1		
A16-10366	W1120120	< 5	10		
A16-10366	W1120140	< 5	3		
A16-10366	W1120200	< 5	2		
A16-10366	W1120250A	< 5	4		
A16-10422	W1120140	< 5	3		
A16-10422	W1120160	< 5	<1		
A16-10422	W1120180	< 5	3		
A16-10422	W1120204B	< 5	<1		
A16-10422	W1120220	< 5	13		
A16-10422	W1120240	<5	3		
A16-10422	W1121510	< 5	3		
A16-10480	W1120020	< 5	4		
A16-10480	W1121510	< 5	13		
GRANITIC BLANKS					
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Sample #	Au ppb	Cu ppm			
390000B	-	4			
390010	7	65			
390030A	< 5	43			
OREAS 9	OREAS 922 Copper Standard				
390020B	< 5	-			
390040A	< 5	-			

Table 12: Gold and copper assay values of b	olanks and OREAS 922 standards, 2017
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<u>GOLD STANDARDS</u>: To ensure that the gold assays were accurate, a gold standard was inserted in the field at a rate of one per every twenty core samples in 2016 and at a higher rate in 2017. The two different standards used and the assay results from these standards are as follows:

- OxK 119 produced by RockLabs and composed of basalt and feldspar minerals mixed with finely divided gold. The recommended gold content as determined after multiple assays by RockLabs is 3,604 ppb Au with a standard deviation of 105 ppb. The acceptable range of values is taken as the recommended value plus/minus 2x the standard deviation. The assay results of the two assayed standards of this material are both well within the acceptable range, varying by only 20-60ppb, or 1-2% from the certified value (see Table 13 below). This was the only gold standard used in the 2016 program.
- 2. OREAS 220 produced by ORE Research & Exploration Pty Ltd of Australia. The standard was prepared from a blend of Archean greenstone-hosted Wilber Lode primary ore from the Andy Well Gold Mine, barren Cambrian greenstone and barren Quaternary tholeiitic basalt (company website). The certified value of this standard assayed by fire assay is 866 ppb Au and one standard deviation is 20ppb Au. The acceptable range is taken as the certified value (866 ppb) plus or minus two times the standard deviation (2 x 20 = 40 ppb), i.e. between 826 and 906 ppb Au. All three of these gold standards inserted in the sample stream in 2017 lie within the acceptable range with a variation of only 0 to 28ppb, or 0-3% (Table 15). This standard was not used during the 2016 program.

2016 GOLD STANDARD RESULTS: Out of the 18 gold standards assayed in 2016 only one was over the recommended value of 3,604 ppb and barely so (3,630 ppb), seven were more than one standard deviation (Std Dev) below that value and six were more than two Std Dev below it (Figure 16, Table 13). On average, the results are 183 ppb or 5% below the recommended value. Under normal circumstances the number of assays more than 2 x Std Dev too low would be of some concern, however, as it turned out the gold values from the mineralized zones tested by this program averaged much lower than the recommended value of this standard. The average gold value of the zones is only <215 ppb so a 5% variation is insignificant. Recommended average

values of the 2 gold standards inserted by ActLabs as part of their routine procedure, OREAS 203 and OREAS 251, turned out to be closer to the upper range of gold values encountered in the mineralized zones, i.e. 871 ppb Au and 504 ppb Au respectively. Results of assays from standard OREAS 203 were within 6 ppb of the recommended value of 871 ppb Au. Results of assays from standard OREAS 251 were within 40 ppb of the recommended value of 504 ppb Au and the variance averaged only 3%. These results are tabulated below in Table 14.



#### Figure 16: Gold assay results of gold standard OxK119 in 2016

Lab Report #A16-	Sample #	Au Standard ppb
9895	W-1120050	3510
9895	W-1120070	3440
9895	W-1120090	3520
10366	W1120150	3100
10366	W1120010	3380
10366	W1120110	3280
10366	W1120130	3300
10366	W1120170	3370
10366	W1120190	3460
10422	W1120090	3460
10422	W1120153B	3540
10422	W1120170B	3630
10422	W1120210	3440
10422	W1120230	3470
10422	W1120250B	3300
10422	W1121520	3500
10480	W1120030	3560
10480	W1120100	3500

 Table 13: Gold assay results of gold standard OxK119 in 2016

Table 14: Gold assay results of gold standards	OREAS 203 and OREAS 251 in 2016
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Lab Report #	OREAS 203	OREAS 203 (871 ppb Au)		OREAS 251 (504 ppb Au)		
	Actual Assay	% Variance	Actual Assay	% Variance		
A16-09895	872	0.1%	519	3%		
A16-09895	877	0.7%	512	2%		
A16-09895	876	0.6%	522	4%		
A16-10422			504	0%		
A16-10422			544	8%		
A16-10422			518	3%		
A16-10480			517	3%		
	Within 1-6 ppb	0.5% avg	Within 0-40 ppb	3% avg		

The good agreement between the lab results and the recommended value for standard OREAS 203, and the fact that it falls within the range of typical higher gold values returned from the mineralized zones at Akow Lake, makes it a good choice for the company gold standard for future work on this property.

2017 GOLD STANDARD RESULTS: All of the OREAS 220 and OxK 119 standards inserted in the sample stream in 2017 lie within the acceptable range with a variation of only 0-3% (Table 15).

<u>OREAS 220 - 8</u>	<u>66 ppb Au</u>	OxK 119 - 3604 ppb Au		
Sample #	Au Result ppb	Sample #	Au Result ppb	
390020A	866	390020C	3610	
390030C	858	-	-	
390040B	838	390040C	3570	
Variation ppb	0-28 ppb	Variation ppb	20-60	
Variation %	0-3%	Variation %	1-2%	
Acceptable Range*	826 - 906	Acceptable Range*	3394-3814	
*Certified Value				

Table 15: Assay results of the inserted gold standards in 2017

plus 2 x Std Dev

The assay results from the five gold standards inserted in the 2017 sample stream, along with the assay results of the 3 granitic blanks and two copper standards, indicate that there has been no gold contamination during the sampling, transporting or assaying process and that the gold assay results can be taken as accurate.

#### COPPER STANDARD – 2016 Program

In the case of the 2016 program, due to the short time frame to prepare and mobilise for this project, and the very limited communication at the remote camp site, no copper standards were available in the field, so, to ensure that the copper analyses were accurate through all the sample batches submitted, a copper standard was inserted into the sample sequence after the samples had been assayed for gold and before they were sent for copper analysis. Under the author's direction, ActLabs personnel removed the gold standard from the sample stream after the gold assay stage and replaced it with copper standard OREAS 922 which has a recommended value of 2,122 ppm Cu with a standard deviation of 86.4 ppm. Results of the analyses of this standard are charted in Figure 17 and listed in Table 16 below.

The results of the analyses on the 17 samples of copper standard OREAS 922 were all slightly higher than the accepted average value of 2,122 ppm Cu, ranging from 1% to 8% higher and averaging 5% or 106 ppm Cu higher, but all samples except two fell within 2 x Std Dev of the accepted average for this material.

The standards inserted in the sample stream by ActLabs covered a wide range of accepted values from 66 to 6850 ppm. Results of these analyses are tabulated in Table 17 below and fall within 0% to 11% of the accepted values with the least variance among the more copper rich samples (e.g. GRX-4 and CZN-3).



Figure 17: Copper analyses of the OREAS 922 copper standard in 2016

able 16: Copper an	alyses of the OREAS	922 copper standard	in 2016
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Lab Report #A16-	Sample #	OREAS 922 Standard (2,122 pm Cu)	
		Actual Result	% Variation
10366	W1120150	2140	1%
10366	W1120010	2220	5%
10366	W1120110	2230	5%
10366	W1120130	2170	2%
10366	W1120170	2280	7%
10366	W1120190	2300	8%
10422	W1120210 2270		7%
10422	W1120230	2280	7%
10422	W1120250B	2220	5%
10480	W1120030	2220	5%
9895 repeat	W1120040	2200	4%
9895 repeat	W1120050	2220	5%
9895 repeat	W1120060	2230	5%
9895 repeat	W1120070	2240	6%
9895 repeat	95 repeat W1120080 2240		6%
9895 repeat	W1120090	2240	6%
9895 repeat	W1120100	2290	8%
	Average	2235	+5%

Report #	GXR-1 (1110 ppm Cu)	GXR-4 (6520 ppm Cu)	GXR-6 (66 ppm Cu)	SdAR (236 ppm Cu)	CZN-3 (6850 ppm Cu)	CPB-2 (1213 ppm Cu)
A16-09895	1220	6580	73			
A16-09895						
A16-09895						
A16-10422	1180	6780	73	256		
A16-10422						
A16-10422						
A16-10480	1210	6590	71	252	6850	1240
	70-110 ppm higher	60-260 ppm higher	5-7 ppm higher	16-20 ppm higher	Precisely the same value	27 ppm higher
	6 to 10% higher	1 to 4% higher	8 to 11% higher	7 to 8% higher	0% variance	2% higher

Ideally a copper standard would have been inserted in the sample stream by Romios personnel in the field, rather than ActLabs personnel at the lab. As noted, due to the hurried mobilisation phase of this program and the poor communication at the remote camp site this was not the case. The author, however, has full confidence that the copper standard OREAS 922 was inserted into the sample stream in the correct by ActLabs personnel as shown by the consistency of the assay results for those standards, the lack of any appreciable discrepancy in the assay results versus the estimated chalcopyrite content, and the excellent correlation of the duplicate batch of samples discussed below. With the knowledge gained from this program regarding the expected range of copper and gold values, and the slight variations in the various commercial standards utilised, it will be possible to refine the selection of copper and gold standards to have on hand for any future program so that they lie more consistently within the range of typical values, assuming the next target(s) drilled are of the same type of mineralisation.

#### COPPER STANDARD – 2017 Program

To ensure that the copper analyses were accurate, copper standards were inserted into the sequence of core samples analysed for copper, originally as samples 390020B, 390030B and 390040A. Even though two of the commercially prepared standards were combined into one sample bag, the lab reported after the initial analyses were completed that there was not enough material in two of these standard samples to analyse both gold and copper. Consequently, the first 18 samples were re-analysed for copper with new standards inserted.

The copper standard used in this program was CZN-4. In the end, four of these standards were distributed amongst the 29 samples analyzed for copper. Standard CZN-4 is produced by CANMET Mining and Mineral Sciences Laboratories of Ottawa, Canada. This material is a zinc sulphide flotation concentrate donated by Xstrata Copper Canada Division, Kidd Metallurgical Site, Timmins, Ontario, Canada. The mineral species include: sphalerite (90.6%), pyrite (4.1%), pyrrhotite (3.3%), iron oxides (0.5%), quartz (0.5%), chalcopyrite (0.3%), various other silicates (0.2%), ankerite (0.1%), arsenopyrite, cassiterite, chlorite and galena (all at 0.1%). The accepted,

certified copper value for this standard is 4030 ppm Cu and the standard deviation is given as 100 ppm (information taken from CANMET website). Consequently the acceptable range of analytical values (certified value +/- 2 times the standard deviation) is 3830 to 4230 ppm Cu.

The copper analyses of the four CZN-4 standards are listed in Table 18 below. Three of the four results are within 1% of the certified value of 4030 ppm Cu and well within the acceptable range. Only sample 390030B is slightly below the acceptable range and 5% below the certified value. Although not ideal, this latter result is of little consequence.

CZN-4 STANDARD					
Sample #	Variation ppm	Variation %			
390000A	4000	-30	1%		
390010A	4040	+40	1%		
390020D	3980	-50	1%		
390030B	3810	-220	5%		
Acceptable Range	3830 to 4230 ppm Cu				
Certified Value	4030 ppm Cu				

# Table 18: Analytical results of copper standard CZN-4 in 2017

# 11.4 Duplicate Analyses

As an additional check on the accuracy of the analytical results, a series of duplicate analyses is commonly undertaken during large drilling and sampling programs on significant mineralized zones. Typically these programs have access to core saws and can accurately saw the core into quarters and then submit two of these quarters for assay. In the case of the Romios 2016 and 2017 essentially reconnaissance programs however, no saw was available in the field and the core was split with a manual splitter which results in a rough break between two approximate halves of the core. Splitting this core further into two even quarters can be problematic and may not result in two samples that are reliable duplicates, especially in the case of the stringer and semi-massive irregular sulphides encountered in these programs. Consequently, no duplicate samples were prepared or inserted in the field into the sample stream. Duplicate copper analyses were, however, conducted in both 2016 and 2017 as a check on the lab results and to overcome issues that had arisen with the availability and analysis of copper standards.

<u>2016 Duplicate Analyses:</u> Due to the time constraints during the mobilization phase of this program and the need for a quick turnaround on the first batch of samples, a procedure for inserting the copper standards in the sample stream was not in place by the time of the first analyses. To compensate for this, all samples from that batch (A16-09895) were re-analysed for copper a second time with seven copper standards inserted throughout. The results of the

standards in this duplicate batch are included with the other standard results in Figure 18 and Table 19 below and their values are very similar to results from the other batches. This repeat analysis also provided the opportunity to conduct a duplicate test of the lab as well. The graphs presented below in Figure 18 compare the results of the original copper analyses with those from the repeat analyses, the first over the entire range of values and the second with an emphasis on the more numerous lower values below 2,000 ppm.



Figure 18: Comparison of copper values from duplicate analyses in 2016

The correlation between results from the original and repeat copper analyses is excellent with a correlation coefficient of 0.9987. There is no obvious bias evident in either graph towards a higher or lower value in the repeat analyses with respect to the overall amount of copper. The individual results are listed below in Table 19.

Report	Original	Repeat		Report	Original	Repeat	% Variance
Number: A16-09895	24/10/2016	11/11/2016	% Variance	Number: A16- 09895	24/10/2016	11/11/2016	(Abs.
Sample No.	Cu ppm	Cu ppm		Sample No.	Cu ppm	Cu ppm	Value)
W1120002	23	23	0%	W1120066	70	68	3%
W1120003	24	23	4%	W1120067	149	147	1%
W1120004	28	25	11%	W1120068	1440	1410	2%
W1120005	37	34	8%	W1120069	2850	2820	1%
W1120006	56	56	0%	W1120071	4220	4170	1%
W1120007	27	27	0%	W1120072	905	886	2%
W1120008	30	29	3%	W1120073	1500	1490	1%
W1120036	1130	1150	-2%	W1120074	2130	2100	1%
W1120037	294	283	4%	W1120075	1020	987	3%
W1120038	161	162	-1%	W1120076	779	772	1%
W1120039	299	299	0%	W1120077	85	84	1%
W1120041	354	329	7%	W1120078	1240	1230	1%
W1120042	541	530	2%	W1120079	5120	5190	-1%
W1120043	5240	5070	3%	W1120081	1320	1310	1%
W1120044	622	598	4%	W1120082	410	407	1%
W1120045	1360	1300	4%	W1120083	1090	1090	0%
W1120046	447	438	2%	W1120084	1040	1090	-5%
W1120047	1730	1680	3%	W1120085	3260	3370	-3%
W1120048	881	867	2%	W1120086	5890	5970	-1%
W1120049	1360	1360	0%	W1120092	148	142	4%
W1120051	6060	5930	2%	W1120093	120	121	-1%
W1120052	1350	1240	8%	W1120094	149	150	-1%
W1120054	2240	2200	2%	W1120095	44	44	0%
W1120055	2110	2060	2%	W1120096	47	49	-4%
W1120056	3210	3290	-2%	W1120097	66	64	3%
W1120057	742	723	3%	W1120098	90	88	2%
W1120058	2180	2210	-1%	W1120099	42	40	5%
W1120059	202	197	2%	W1120101	2380	2640	-11%
W1120061	535	532	1%	W1120102	814	817	0%
W1120062	2450	2370	3%	W1120103	686	655	5%
W1120063	1450	1400	3%	W1120104	185	182	2%
W1120064	62	59	5%	W1120105	942	915	3%
W1120065	294	296	-1%	W1120106	419	420	0%
L	1	1	1	1	1	Average	2%

Table 19: Comparison of copper values from duplicate analyses in 2016

The average difference between the 56 original and repeat analyses is only 2%. The range of variances is only 0 to 5% for all but 4 of the samples. Those 4 samples show a maximum variance of 11%. Overall the reproducibility of the copper analyses is considered excellent.

Given the largely reconnaissance nature of the 2016 drilling, the overall low levels of gold expected (avg. ~100-200ppb), and the difficulty or preparing representative duplicate samples in the field with a manual splitter, no gold duplicates were undertaken in 2016. The accuracy of the assay results of the inserted gold standards indicates that there is no issue with ActLabs gold assays.

#### 2017 Duplicate Analyses:

In terms of the copper analyses, two of the standards inserted in the first half of the sample stream turned out to be too small for the lab to conduct both gold and copper analyses (even though they were two times the size of the single commercial standard supplied), consequently there was a need to re-analyze the first 19 samples with new copper standards inserted. This re-analysis also provided an opportunity to compare duplicate copper analyses. The results of the original and repeat analyses are listed below in Table 20 below and charted in Figure 19 below (minus samples that contained >10,000 ppm Cu and were subsequently assayed).

The correlation between results from the original and repeat copper analyses is excellent with a correlation coefficient of 0.9986 and there is no obvious bias evident on the graph towards a higher or lower value in the repeat analyses with respect to the overall amount of copper (see Figure 19 below). The individual results are listed in the Table 20 below. The average variance between the original and repeat analyses is only -1% with most values typically <4% and only two outliers beyond that at +6% and -8%.

Sample Number	Original Copper Value	Copper Re-Analysis	Variance ppm	Variance %
390001	135	133	2	1%
390002	2740	2860	-120	-4%
390005	326	338	-12	-4%
390006	2580	2420	160	6%
390007	2570	2630	-60	-2%
390008	5870	6020	-150	-3%
390011	1640	1670	-30	-2%
390012	262	282	-20	-8%
390013	3200	3330	-130	-4%
390014	1390	1370	20	1%
390015	5060	5170	-110	-2%
390016	2220	2210	10	0%
390017	3000	3070	-70	-2%
390018	338	331	7	2%
			Range	-8% to +6%
			Avg Variance	-1%

# Table 20: Comparison of original and repeat copper analyses in 2017



Figure 19: Scatter-plot comparison of copper values from duplicate analyses in 2017

Again, given the largely reconnaissance nature of the 2017 drilling, the overall low levels of gold expected, the low number of apparently mineralized samples (only six samples assayed >1 g/t Au), and the difficulty or preparing representative duplicate samples in the field with a manual splitter, no gold duplicates were submitted in 2017. The accuracy of the assay results of the inserted gold standards indicates that there is no issue with ActLabs gold assays.

# 11.5 Security

In 2016, all samples were prepared and stored at the author's temporary remote logging set-up in the forest near DDH RGR-16-1 on the southeast corner of Akow Lake. In 2017, the core was logged and the samples prepared at a temporary shelter near the site of DDH RGR-17-1 at Atim Lake North. No other personnel except the core splitter worked at these sites. Samples were bagged and tied by the author and placed in plastic sacks which were zip-tied before being transported by helicopter to the staging area at Mawley Lake. No evidence of tampering was noted at any time during this process.

In 2016, the first batch of samples was transported by pickup truck to Pickle Lake and then sent by commercial trucking to ActLabs in Thunder Bay. No signs of tampering with the sample bags were reported by ActLabs personnel and the results of the analyses correspond well with visual estimates of the chalcopyrite content and very well with results from two historic holes (99-2 and 99-3) near the first two holes drilled in this program. All of the remaining batches of core samples in 2016 and the single batch of samples from 2017 were transported by helicopter to Mawley Lake under the authors watch and then trucked directly to ActLabs facility in Thunder Bay by the author. The author is confident that the security measures were adequate for this reconnaissance type exploration program and that no tampering occurred with any of the samples. If more significant mineralization is identified in any future program the security protocols will be increased accordingly.

# **12 DATA VERIFICATION**

The assay results provided by ActLabs were copied from their spreadsheets and pasted into the authors drill hole logging forms and double checked afterwards by visual comparison between the logs, sample ticket books, and the assay sheets. Samples with the highest copper values were compared with the visual estimates of the chalcopyrite content recorded for that sample as an added way to ensure the assay data had been entered properly, as well as confirming that there had been no contamination of the sample, and no significant discrepancies were noted.

Given the reconnaissance nature of this program, and the lack of any mineral resource on the property to date, the analytical data was not subjected to any other statistical analysis.

# 13 MINERAL PROCESSING AND METALLURGICAL TESTING

Given the sub-economic grade of the mineralization discovered to date in the copper-(gold) zone and the limited extent of the Spence showing, no mineral processing studies or metallurgical tests have been undertaken to date. The grade of the massive sulphide mineralization discovered in 2017 at Atim Lake North is considered encouraging and initial metallurgical tests may be warranted after a follow-up drill program on that zone.

# **14 MINERAL RESOURCE ESTIMATES**

There is no mineral resource delineated on this property.

# **15 MINERAL RESERVE ESTIMATES**

There is no mineral reserve delineated on this property.

# **16 MINING METHODS**

As there is no mineral resource delineated on this property there has been no discussion or study of potential mining methods.

# **17 RECOVERY METHODS**

As there is no mineral resource delineated on this property there has been no discussion or study of recovery methods.

# **18 PROJECT INFRASTRUCTURE**

As there is no mineral resource delineated on this property there has been no discussion or study of potential infrastructure.

# **19 MARKET STUDIES AND CONTRACTS**

As there is no mineral resource delineated on this property there has been no discussion or study of the potential market for the commodities present or contracts for their sale.

# 20 ENVIRONMENTAL STUDIES, PERMITTING and SOCIAL OR COMMUNITY IMPACT

Given the lack of any mineral resource on the property and the generally grass-roots nature of the exploration work so far there have been no environmental studies conducted, no permits associated with potential development have been applied for or granted, and no community or social impact studies have been undertaken.

As described in Section 4.3, Romios signed a new Memorandum of Understanding (MoU) with the North Caribou Lake First Nation (NCLFN) in May 2017 and a new 3-year Exploration Permit from the Ontario Ministry of Northern Development and Mines was granted June 19, 2017. The Lundmark-Akow Lake claims lie within the traditional lands of the NCLFN and trap lines held by members of that community. Under the terms of the MoU, Romios undertakes to provide opportunities for the employment of NCLFN community members and utilization of local businesses during any work program whenever feasible and cost-effective, abide by certain environmental and cultural safeguards, etc. The NCLFN in turn agrees to support Romios' exploration efforts.

# 21 CAPITAL AND OPERATING COSTS

As there is no mineral resource delineated on this property there has been no discussion or study of the potential capital requirements or operating costs.

# 22 ECONOMIC ANALYSIS

As there is no mineral resource delineated on this property there has been no economic analysis undertaken.

# **23 ADJACENT PROPERTIES**

Currently there is only one active exploration and mining property in the Lundmark-Akow Lake vicinity and that is the Musselwhite gold mine (Fig. 4). The author is unaware of any occurrence elsewhere in the North Caribou greenstone belt that is similar to the copper-(gold) zone at Akow Lake or the Cu-Au-Ag tourmalinite-massive sulphide horizon at Atim Lake North. In the northwestern corner of the NCGB, 45 km NW of Akow Lake, long-standing claims covering an unusual zinc-lead-silver occurrence discovered by Northern Dynasty in 1987 were recently dropped by them and re-staked by Goldcorp Canada Ltd. Northern Dynasty reported that the occurrence contained 1 million tonnes grading 8.7% combined Zn and Pb with 1.5 oz/t Ag (Breaks et al., 2001). The origin of this deposit is uncertain, it has been interpreted as both a synvolcanic VMS and an epigenetic deposit. It occurs in the North Rim volcanics as opposed to the South Rim volcanics that host the Atim Lake North massive sulphide horizon.

# 23.1 Musselwhite Gold Mine

The Lundmark-Akow Lake property of Romios is flanked to the east and south by claims belonging to Goldcorp Canada Ltd. (Fig. 2), owners of the Musselwhite gold mine which is located 18 km south-southeast of Akow Lake (Fig. 4). Romios staked the Lundmark-Akow Lake claims to cover the northward extension of the same banded iron formation (BIF) that hosts the gold mineralization at Musselwhite, but as noted previously, the lack of early encouragement from the BIF combined with the early discovery of the Spence showing (gold in sheared basalts and quartz-feldspar porphyry) and the copper-(gold) zone in the "Romios Shear Zone" diverted the majority of exploration efforts away from the BIF.

The geology and mineralization at Musselwhite has previously been described in Section 7.3. In brief, gold mineralization is developed in high-strain zones along the near-vertical limbs of tightly folded banded iron formation within the East Bay Synform and the smaller T-Antiform developed within the keel of the aforementioned synform (Biczok, 2012). Since beginning production in 1997, numerous different ore zones up to 10 m wide have been mined along the fold limbs as well as portions of the crests and keels across a zone ~225 m wide from the Moose Zone in the

west to the PQ Deeps in the east (Biczok, 2012). Typically the individual ore zones are about 100 m in vertical extent with some zones up to 300 m high, and they are semi-continuous on a scale of 1 km up to 2-3 km. Of relevance to the Romios claims is the observation at Musselwhite that the ore zones can quickly pinch out into barren iron formation over short distances and therefore large intervals of BIF cannot be assumed to be barren based only on a few drill holes.

# 24 OTHER RELEVANT DATA AND INFORMATION

The assessment report for this project has been filed with the Ontario Ministry of Northern Development and Mines and will be available to the public through the GeologyOntario site once it is reviewed, approved and posted online. That report includes the detailed drill logs and assay certificates. Other information regarding the Lundmark-Akow Lake property can be found on the Romios website at <u>www.romios.com</u>.

# **25 INTERPRETATION AND CONCLUSIONS**

The 2016 and 2017 diamond drilling programs each intersected a different style of Cu-Au-(Ag) mineralization but these two mineralized systems are now believed to be intimately related. The results of the 2016 program, combined with those from the 1998 and 1999 programs, have traced the copper-(gold) zone found in the "lower clastic metasediments" on the Akow Lake grid a distance of 1.5 km from 12+60S to 2+55N. The style and tenor of this mineralization remains similar along strike and over the approximately 300 m maximum vertical extent tested (e.g. on Line 10+00S). Each of the three holes drilled into the copper-(gold) zone intersected at least one broad zone 8.1-12.5 m wide (estimated True Width) grading between 0.2% and 0.32% Cu with about 0.1 g/t Au, plus or minus one to three smaller adjacent zones of similar grade. These mineralized intercepts are similar to those from the 1999 drill program and illustrate how consistent the mineralization in this zone is over the 1.5 km strike length tested. The 2017 drilling intersected scattered intervals of similar mineralized schists at Atim Lake North, suggesting that this system is over 3.3 km long. Nevertheless, the copper-gold grade of this zone is significantly lower than what would be needed for an economic ore body and no significant widths of what might be considered economic grades were encountered. However, the 2016 drill holes provided key geological information that led to the revision of the geological model for the copper-(gold) bearing schists from the original model of a mineralized shear zone to the current model of a "lower semi-conformable alteration zone" which in effect is the "plumbing system" for potential massive sulphide deposit(s) nearby. This revised model led Romios to extrapolate the extent of this Cu-(Au) enriched alteration zone a further 1.5 km northward to Atim Lake North and select a series of three adjacent EM conductors located 200 m west of this projection. The one hole drilled in 2017 was successful in discovering a Cu-Au-Ag massive sulphide horizon 1.4 m thick (estimated True Width) by using this new geological model and the existing geophysical data.

Although the thickness of this lone intercept is only 1.4 m, the grades are quite good (2.35% Cu, 1.4 g/t Au and 68.2 g/t Ag), the zone is open along strike and down dip and there is good potential for thicker portions of this horizon along strike (because there was no indication in this hole of a "alteration pipe" such as those found beneath the central, generally thickest portions of VMS deposits). The geology of each of the two mineralized systems is discussed separately below.

The two pyritic sericite schist horizons which flank the copper-(gold) to the east and west, and are believed to correlate with two >2.8 km long "formational-type" TEM conductors, were intersected by three of the 2016 drill holes and found to be barren. No significant mineralization has been encountered in these horizons in past drilling at Akow Lake and they will not be discussed as potential targets any further.

# 25.1 The "Romios Copper-(Gold) Zone"

# 25.1.1 Mineralization style and distribution

There are three main styles of mineralization in this zone:

- 1. Thin seams and coatings of chalcopyrite along foliation planes.
- 2. As discrete veinlets of massive to semi-massive chalcopyrite +/- pyrrhotite, <1 cm wide.
- 3. As fracture fillings and blebs in the coarse-grained, mainly hydrothermal garnets.

Mineralization is typically found within pervasively and strongly altered biotite-staurolitegarnet+/-sericite schists and is commonly proximal to hydrothermal veins of massive biotite with varying % of coarse-grained garnets and medium-grained staurolite. These veins range from a few centimetres to a few tens of centimetres in width and frequently contain veinlets of massive chalcopyrite +/- pyrrhotite with local arsenopyrite concentrations along their margins. As was particularly evident in hole RGR-16-4, the chalcopyrite coatings/seams along the foliation planes are often concentrated within 1 m of the hydrothermal veins, suggesting that at least some of this type of mineralization emanated outwards from these veins.

# 25.1.2 Genetic Model

As noted in the lithogeochemistry section and the descriptions of the drill hole lithologies, the evidence at this point suggests that the schists were produced by the strong hydrothermal alteration of precursor metasediments at an early stage (pre-peak metamorphism). Geological features such as a 5 cm wide band of folded sulphides (at 379.8 m in hole RGR-16-2) and a ptygmatic garnet vein ~1 cm wide with minor Cp-Po throughout (at 192.2 m in hole RGR-16-4) supports this model and suggests that mineralization and garnet formation predates the latest folding.

The alteration and mineralization associated with the now >3.3 km long copper-(gold) zone has some similarity to the "lower semi-conformable alteration zone" found beneath many massive sulphide deposits (e.g. the Mattabi deposit in northwestern Ontario and the Snow Lake camp in

Manitoba). These alteration zones are essentially the aquifer that channeled hydrothermal fluids along a particular stratigraphic horizon below the sea-floor for several kilometres before they broke through and rose towards the sea-floor, potentially depositing massive sulphides. These alteration zones are generally depleted in metals (Franklin, 1995, and references therein), and highly altered (e.g. with major sodium depletion, and variable enrichment in Mg, Fe, Ca, etc.). They may have served as the source of some of the metals in the associated VMS deposits. Once metamorphosed to amphibolite conditions, these altered rocks commonly develop coarsegrained garnets, staurolite, biotite, etc., and have sometimes been mistaken for the "pipes" beneath VMS deposits. If the copper-(gold) zone at Akow Lake is indeed one of these "lower semi-conformable alteration zones" it is atypical in having weakly mineralized zones within it over a considerable strike length. However, these mineralized zones are generally concentrated in ~10-15 m intervals within highly altered corridors 100 to 160 m in width. Detailed lithogeochemical sampling and mass balance calculations would be required to determine if the alteration zone is depleted in metals overall and narrow portions of it served as the passageway for the expulsion of metal-enriched fluids. If the "Romios Cu-(Au) Zone" is indeed one of these lower alteration zones, then it has potential to have vented massive sulphides anywhere along its length in addition to the recently discovered Cu-Au-Ag massive sulphide horizon at Atim Lake North.

The presence of several metres of tourmalinite rich rocks and veins of tourmalinite with Cp-Po-(Asp) mineralization in hole RGR-16-2 is of particular significance. Tourmalinite such as this (massive fine-grained tourmaline resembling black chert) is typically a product of hydrothermal fluid flow or perhaps a hot spring setting in a marine setting and is known to be associated with at least two copper deposits and the Sullivan Pb-Zn deposit. The presence of tourmalinite suggest that those host rocks may lie close to the paleo-seafloor where the hydrothermal fluids vented and that the stratigraphy adjacent to the "Romios Copper-(Gold) Zone should be considered a prime target for massive sulphide exploration. This topic is discussed in more detail below.

# 25.2 Atim Lake North Massive Sulphide Horizon

# 25.2.1 Mineralization style and distribution

Massive sulphide style mineralization was intersected in drill hole RGR-17-1 from 299.2 m to 301.1 m and returned a weighted average grade of 2.35% Cu, 1.4 g/t Au and 68.2 g/t Ag. The first 0.5 m and lower 0.8 m average ~5-7% each of visible chalcopyrite and pyrrhotite which is locally concentrated in semi-massive sulphide zones exhibiting a milled texture (a net or sponge-like area of rounded rock fragments generally <1-2 cm across surrounded by an interconnected network of semi-massive sulphides). The host rock contains a high percentage of tourmalinite as thin laminae, milled fragments within the sulphide rich zones, and as massive veins up to several centimetres wide. The remainder of these intervals is too fine-grained to distinguish individual minerals but it is believed to be a mix of quartz, tourmalinite, siltstone and sulphides. Trace fine-

grained disseminated arsenopyrite occurs throughout the horizon. The central 60 cm of the massive sulphide zone, from 299.7 to 300.3 m, is more siliceous and contains less sulphides than the upper and lower but still assayed 1.63% Cu, 1.1 g/t Au and 57.9 g/t Ag. It consists of ~3-4% visible chalcopyrite and 1-2% pyrrhotite in a hard, siliceous, light grey unit composed of alternating layers/laminae of silica (very fine-grained quartz) a few mm to 5-6 cm thick, and ~40% tourmalinite laminae <5 mm thick, with local intervals of dismembered tourmalinite laminae. The contacts of the massive horizon with the barren sericite schist (felsic tuff?) above and the meta-siltstone below above are sharp. The meta-siltstone below, however, locally contains up to 15% tourmalinite spots 1 mm to 1 cm across and extending as much as 13 m below the contact with the massive sulphide.

There are no obvious quartz veins or zones of quartz flooding within the mineralized horizon or adjacent strata. The grades of other base metals such as lead and zinc are surprisingly low, <6 ppm Pb and <70 ppm Zn. Cobalt is somewhat elevated at 100 to 161 ppm Co.

#### 25.2.2 Genetic Model

The unusual copper-(gold)-silver-tourmalinite rich, Pb-Zn poor nature of the Atim Lake North massive sulphide is very similar to portions of the Romios Copper-(Gold) Zone / alteration pathway and support the model where this pathway for hydrothermal fluids deposited massive sulphides at Atim Lake North and perhaps elsewhere along its length in the adjacent strata.

The author is unfamiliar with any Canadian massive sulphide deposits (other than the Sullivan Pb-Zn deposit in BC) that have abundant tourmalinite but is familiar with such a setting in India: the Singhbhum copper belt and it's four main past-producing mines (Rakha, Surda, Mosaboni and Kendadih as well as numerous smaller mines and occurrences) spaced over a strike length of about 20 km. Total estimated reserves for the belt in 1983 were 173 Mt at 1.38 % Cu, out of which Mosaboni contributed 19.77 Mt at 1.70 % Cu (Mining Magazine, November, 1983, quoted in Deb and Kaur, 2008). The author has observed fragmented tourmalinite in the footwall rocks of the Rakha copper mine as well as thick intervals of tourmalinite laminae at some distal locations. Like the Atim Lake North discovery, the Singhbhum deposits are almost exclusively copper deposits with little or no lead or zinc. The Bieluwutu mine in Inner Mongolia is also a copper dominant deposit associated with abundant tourmalinite, appreciable by-product silver and only minor Pb-Zn, estimated at <2% (Nie, 1993; USGS Mineral Resources Online). The deposit has a reported tonnage of 7.8 Mt grading 0.64%Cu and is thought to be the product of the mixing of copper-bearing fluids derived from mafic volcanism and boron-rich seawater or meteoric fluids circulating in the felsic volcano-sedimentary strata within a continental margin rift zone.

As noted in Biczok (2016), copper mineralization in the "Romios Copper-(Gold) Zone" was commonly concentrated at or near the margins of basaltic units scattered throughout the volcano-sedimentary pile. This correlation implies that either the copper was derived from/associated with mafic magmatism, and/or the movement of the copper-bearing fluids was focussed along these more impermeable units. This setting would seem to be similar to the

Bieluwutu setting whereby mafic magmatism within a rifting basin generated copper-bearing fluids that interacted with boron rich fluids from the volcano-sedimentary pile.

No obvious hydrothermal alteration pipe is noted in the rocks flanking the massive sulphides, however, tourmalinite spots up to 1 cm across are locally abundant (e.g. up to 3-15% across 1.4 m) in the first 13.4 m of meta-siltstone below the massive sulphides indicating that hydrothermal fluids exhaled onto or passed through those sediments as well.

#### 25.2.3 Remaining Targets Associated with the Copper-(Gold) and Massive Sulphide Zones

There are no obvious untested geophysical conductors flanking the projected extent of the "Romios Copper-(Gold) Zone" in the Akow Lake area. However, the presence of Cu-Au-Ag mineralization within a tourmalinite zone in drill hole RGR-16-2 may be an indication that massive sulphides were vented nearby. This particular mineralization was intersected at a depth of 335 m, likely below the detection limits of past geophysical surveys in the area. A down-hole EM survey may be successful in detecting any accumulation of massive sulphide near this drill hole.

With the discovery of massive sulphide style mineralization at Atim Lake North, any EM conductor in that area that may be on strike from the mineralized horizon becomes a high-priority target for further work. The historic ground magnetic survey data from the Atim Lake north area has been reprocessed by Romios' consulting geophysicist Mr. Bob Lo, P. Eng. and is presented in Figure 20 below with the VTEM conductors overlain on the magnetics.



Figure 20: VTEM conconductors overlain on ground magnetics, Atim Lake North area

The massive sulphide horizon discovered in 2017 is moderately magnetic and lines up with a linear magnetic high on Fig. 20. Approximately 600 m to the NNW of the discovery hole is a 6-700 m long VTEM conductor that appears to lie along the same magnetic high as the massive sulphide zone. This conductor may not be as strong a conductor as #3, the short conductor which reflects the massive sulphide zone, but this could be due to any number of factors including depth to source, the level of interconnectedness of any sulphides present, etc., in addition to the possibility that the source sulphides (?) are less abundant here than in the intersected massive sulphide horizon. This conductor is considered a high priority for additional ground geophysical surveys and diamond drilling. Several additional conductors are found to the north of the aforementioned conductor and one or more may be the on-strike continuation. These should be tested by several lines of HLEM and Magnetic surveying as well and then followed up by drilling if the geophysical signature is encouraging.

#### 25.2.4 Risks and Uncertainties with the Revised Model for the Copper-(Gold) Zone

The revised interpretation of the copper-(gold) zone suggests that this zone is not a "shear zone" as previously believed but rather a "lower, semi-conformable alteration zone" such as those found beneath numerous massive sulphide deposits and it served as a pathway for the mineralizing fluids. This interpretation is based on the author's observations from 3 drill holes spaced over a 1.5 km strike length. If the new model is correct then any nearby EM conductor becomes a high-priority drill target as does the potential vent site in drill hole RGR-16-2 indicated by the presence of mineralized tourmalinite. The discovery of massive sulphides at Atim Lake North in 2017 was based on this new model for the copper-(gold) zone and gives the model some credibility. There is of course no guarantee that other geophysical targets flanking the copper-(gold) zone will also be due to base metal rich sulphides.

#### 25.2.5 Risks and Uncertainties with the Deposit Model for the Tourmalinite-Massive Sulphide

With so few analogous deposits to compare the Atim Lake North massive sulphide horizon to, there remain more unknowns with this mineralization relative to the more typical volcanogenic massive sulphide deposits such as Mattabi; e.g. is there metal zoning throughout the horizon?, is there a higher-grade central core?, are there well-defined structural boundaries controlling the distribution of mineralization?, and, is there a central alteration pipe that can be used to guide us to the central core of the deposit? Typical VMS deposits have a well-developed alteration pipe near the centre of the deposit where the mineralizing fluids vented and this is usually overlain by the thickest and often richest portion of the deposit. These metamorphosed, chemically altered pathways commonly consist of coarse-grained minerals such as garnet, staurolite, sericite, kyanite, etc. While coarse-grained garnet-staurolite and massive biotite and sericite zones marked the "lower semi-conformable alteration zone" (i.e. the Romios Copper-(Gold) Zone), there is no guarantee that such diagnostic minerals will have formed in an alteration pipe beneath the centre of the Atim Lake North deposit if it formed by a more pervasive mixing event. Similarly, if there is no primary vent for this deposit there is a risk that the mineralized horizon

may not be significantly thicker at its centre. At this stage, however, such scenarios are speculative and can only be resolved by drilling.

#### 25.3 Gold-In-Iron Formation Target

Although the main regional BIF was not the primary target of the 2016 drill program, the author did examine several outcrops on the property and review past drill logs from holes drilled through this horizon. Based on a comparison of the stratigraphy at Akow Lake with that at Musselwhite, it now appears probable that the favourable silicate facies ("4EA") found at Musselwhite would lie along the western side of the main iron formation at Akow Lake, if it is present in this area. Exploration at Musselwhite has shown that the 4EA facies can come and go along strike and its absence in one area does not mean it will not reappear farther along strike. The iron formation at Lundmark-Akow Lake is exposed between Line 1300N and Line 4400N (Fig. 21) and only weakly anomalous gold mineralization has been reported in this area. However, the western contact of this BIF apparently has not been observed (Zhang, 1998) and this may be the key contact where any of the favourable silicate facies might occur. Only four drill holes, 98-10 and 98-13, were drilled in this interval. Hole 98-10, drilled from east to west, intersected cherty BIF before passing through the oxide facies and ending in 4 m of "sediment" (Spence, 1998a). The BIF at Musselwhite has at least 2 iron formation facies bordering the oxide facies that might be logged as "sediments" by those unfamiliar with them, consequently intersecting 4 m of "sediments" is not considered definitive proof that no 4EA exists nearby. Similarly, drill hole 98-13 penetrated thick sequences of iron formation and ended in 5 m of "mafic volcanics with 50% garnets" (Spence, 1998a). Garnetiferous mafic volcanics are rare at Musselwhite and it is possible that this unit is equivalent to one of the silicate facies found at the structural top/stratigraphic base of the BIF at Musselwhite. Further field investigations and a fresh look at the old drill core is required to determine if this section of the BIF may still have some potential for gold mineralization.

Not only may the interval described above have some remaining potential, but at least one major 4 km long interval of the regional BIF (from 1700S to 1300 N) does not crop out and therefore has not been sampled, nor has it been drill tested (see Figure 21). The presence of mineralized zones cannot be ruled out in this interval either.

#### 25.3.1 Risks and Uncertainties Associated with Exploration of the Banded Iron Formation

Exploration of the main regional banded iron formation on the Lundmark-Akow Lake property is still largely at the grass-roots stage. Early work by Romios prior to 1999, as well as work by previous exploration companies, did not locate any significant mineralized zones in the exposed BIF or in the 5 drill holes that tested this extensive formation. However, there remains large intervals of the BIF up to 4 km long that do not crop out and have not been tested by drilling or any other exploration methods. In areas of abundant outcrop on the northern portion of the girds it is still unclear whether the most favourable facies of the BIF (the silicate facies known locally as "4EA") is present and has actually been intersected by drilling. Further work to assess the

potential of this BIF should follow a staged approach beginning with relatively low-cost geological mapping, soil sampling and geophysical analysis prior to any diamond drilling.

# **26 RECOMMENDATIONS:**

Further exploration work is recommended for two types of mineralization on the Lundmark-Akow Lake property: 1) The volcanogenic massive sulphide horizon discovered in 2017 at Atim Lake North and other potential VMS targets flanking the "Romios Copper-(Gold) Zone", and 2) gold mineralization associated with the main regional banded iron formation. These programs are largely independent of each other and one is not contingent on any success of the other. The author has not examined the Spence showing in person, nor made a thorough review of the data from previous exploration there, so consequently no recommendation for further work is being made at this time. During the course of any future program the author expects to examine the Spence showing and may make pertinent recommendations in a future report.

# 26.1 The Volcanogenic Massive Sulphide (VMS) Exploration Program

The discovery of a copper-gold-silver massive sulphide horizon at Atim Lake North in 2017 now requires follow-up geophysical surveys and further diamond drilling. This discovery has given substantial credence to the recently revised geological model (Biczok, 2016) that the historic "Romios Copper-(Gold) Zone" was in fact the metal enriched pathway for hydrothermal fluids that could have produced flanking VMS deposits at multiple points along its >3.3 km strike length. Consequently, additional geophysics and possibly diamond drilling is also recommended for this area. Details of the recommended program are presented below.

#### PROPOSED WORK

- The past geophysical surveys should be examined in detail to look for any indication of more massive sulphide accumulations along strike from the Atim Lake North massive sulphide horizon as well as in rocks adjacent to the package of schists hosting the "Romios Copper-(Gold) Zone". For example, the 2014 VTEM survey detected a 700 m long conductor along strike from the discovery hole (Figure 20) and several additional conductors occur north of this conductor, one of which may be the on-strike equivalent.
- 2. An HLEM survey using a 50 m cable length and 12.5 m station interval should be undertaken to delineate the Atim Lake North massive sulphide horizon in detail along strike and determine the most favourable sections for further drilling. The coverage area should include the 700 m long conductor located 600 m north of the discovery hole (Fig. 20) and several additional conductors that occur north of this conductor. As much of the required survey area is over Atim Lake North the work will have to be done in winter.

- 3. Down-hole geophysical surveys should be undertaken on drill holes RGR-17-1 and RGR-16-2. In the case of RGR-17-1, this is to determine in which direction the largest volume of sulphides is located. Hole RGR-16-2 intersected several metres of vein-type tourmalinite with significant Cu-Ag mineralization and it is quite possible that this system deposited exhalative, massive sulphide style mineralization nearby.
- 4. Diamond drilling should be undertaken at Atim Lake North to trace the extent of the newly discovered massive sulphide horizon both along strike and up/down dip. A minimum of nine holes spaced 100 m apart vertically and horizontally from the discovery hole is recommended to scope out the extent of this zone. Given that the massive sulphide horizon intersected in the discovery hole RGR-17-1 was relatively thin at 1.4 m, the author believes that it is more important to determine the potential scope and maximum thickness of this horizon rather than begin with more close spaced drilling around the discovery hole. The 5 holes testing the -100 m level would be ~150-175 m long and the 4 holes testing the -200 m level would be ~300-350 m long for a total of ~2,275 m of initial drilling. The initial layout of the diamond drill hole pattern may be further dictated by the results of any new or re-interpreted geophysical surveys but any pattern in the thickness or style of mineralization that develops after the initial holes should then be used as guide for continued drilling.
- 5. If possible, at least one of the drill holes testing the massive sulphide horizon (EM conductor #3) should be extended far enough to also intersect conductor #4 in the area of its greatest strength near the south shore of Atim Lake North or >100-200 m north of hole RGR-17-1 (Fig. 12). At some point one hole should be extended to intersect conductor #5 as well.
- 6. If the detailed review and refining of the existing or newly acquired geophysical data indicates that there are worthwhile untested conductors along strike from the Atim Lake North discovery hole then these should be drill tested as well. At this point, the 6-700 m long conductor 600 m north of the discovery hole appears to be an intriguing target that should be drill tested with at least one hole approximately 100 m long.
- If a worthwhile down-hole geophysical response is detected from hole RGR-16-2 this should be drill tested with one hole. This is likely to require a hole ~500 m long.
- 8. Careful geological mapping should be undertaken in a concerted effort to locate "tops" indicators such as volcanic pillows and graded bedding. It is imperative to ascertain the presence or absence of any isoclinal folds that may have repeated the copper-(gold) zone and the massive sulphide horizon. If sufficient "top" indicators to discern the folding

pattern are not located, and there is still enough encouragement to keep exploring in the vicinity of the massive sulphide horizon and the copper-(gold) zone, age-dating of the felsic volcanic units could be considered. The age of the main BIF is known from work at Musselwhite and dating the felsic lithologies intersected in the 2016-17 drilling should provide a younging / (tops) direction.

An estimated budget for the recommended work program is presented below in Table 21. At this time, these cost estimates are quite uncertain as there are several variables in terms of access to the property that are as yet unresolved and could have a major impact on the costs of setting up a camp on site, operating the camp, drill mob and demob, ice road maintenance, etc.

#### 26.2 The Gold-in-Banded Iron Formation Exploration Program

In addition to the Atim Lake North massive sulphide discovery and the "Romios Copper-(Gold) Zone" discussed above, the Akow-Lundmark Lake claims cover approximately 8 km of the same banded iron formation (BIF) (Figure 21) that hosts the Musselwhite gold deposit 18 km to the south. This BIF has been tested by one drill hole near the southern end of the claims and 4 holes in the northern section leaving a ~4 km long interval of un-explored BIF in the area west of Akow Lake. The BIF is known to pinch and swell as evidenced by the aeromagnetic pattern and the only hole drilled through it in 2016 (RGR-16-2) was in a known pinch-out. Given the limited drilling so far and the variability inherent in this BIF, it is unknown if the silicate facies ("4EA") that hosts most of the mineralization at Musselwhite occurs on the Romios claims or not. To address this shortcoming the work program outlined below is recommended.

#### PROPOSED WORK

- 1. The known BIF outcrops between 1300N and 4900N should be re-mapped in detail by a geologist very familiar with the complex stratigraphy of this regional BIF.
- 2. All available core from past drilling through this BIF should be re-examined by this same expert to see if any units flanking the obvious BIF that were mapped/logged in the past as "garnetiferous sediments" or "garnetiferous volcanics" are in fact one of the favourable silicate iron formation facies.
- 3. A study of the strongest magnetic profiles over the BIF both in areas of outcrop and areas of no outcrop should be undertaken to compare the response over the high chert low magnetite exposures with potentially narrower portions of the BIF with equally high magnetic signatures that might reflect more magnetite dominant intervals. Oxide

ITEM	UNITS	UNIT COST	COST	COMMENTS
PHASE ONE CAMP CONST		RUCTION, LINE-CUTTING, GEOPHYSICS		
Geophysical Review	5 days	\$800/day	\$4,000	Prior to and during the field program
Camp construction			\$120,000	Rough estimate, many unknown variables
Camp operations	15 days	\$1000/day	\$15,000	Food, fuel, camp manager, supply flights
Downhole Geophysics	2 holes	\$7,500	\$15,000	For hole RGR-17-1 and RGR-16-2
Line-cutting	10 km	\$1000/km	\$10,000	Including crew mob/demob
Geophysics (HLEM, MAG)	10 km	\$1000/km	\$10,000	Including crew mob/demob, interpretation
	Phase One Sub-Total		\$174,000	
	10%	% Contingency	\$17,400	
	PHA	SE ONE COSTS	\$191,400	
PHASE TWO		DIAMOND DRILLI	NG (using camp	established in Phase One)
Ice road prep & maintenance	45 days	\$400/day	\$18,000	Snow plow, operator and fuel
Equipment rental			\$10,000	Snowmobiles, Sat Phone, ice augers, etc.
Diamond Drilling (m)	3000 m	\$90/m	\$270,000	~Nine holes at Atim Lake North, one at Lundmark Lake, one hole near RGR-16-2, one short hole north of Atim Lake North.
Drilling Support Costs			\$270,000	Aircraft/helicopter support, drill mob/demob, etc.
Drill Hole Surveying			\$6 <i>,</i> 000	Rental of DDH alignment instrument
Assays	300	25	\$7,500	
Cook / medic	45	\$500/day	\$22,500	
Drill Geologist	50	\$500/day	\$25,000	Field supervision & report writing
Core splitter/helper	40	250	\$10,000	
Camp Operations	45	\$1200/day	\$54,000	Food, fuel, supply flights, camp manager
	Phase <sup>-</sup>	Two Sub-Total	\$693,000	
	109	% Contingency	\$70,800	
	PHAS	E TWO COSTS	\$763,800	
	SUMN	IER GEOLOGICAL	FIELD WORK	Coolecist & coolectant come any inmost
Geological Surveys (summer)	10 field days	-	\$20,000	& rentals, flights, travel, report writing, etc.
Lithogeochemistry	~50 samples		\$5,000	Analyses, 2 field days, report writing
	Field W	\$25,000		
10% Contingency			\$2,500	
	FIELD	\$27,500		
VMS EXPLOR	ATION TOTA	\$982,700		

# Table 21: Estimated budget for recommended VMS work programs



Figure 21: Trace of the main regional BIF and location of DDHs targeting BIF

iron formation has potential to be mineralized itself, typically more so than the cherty iron formations, and has a greater probability of grading into 4EA nearby. Any areas projected to be magnetite dominant that have suitable overburden cover should be covered by a narrow humus sampling grid.

- 4. Any portions of the outcropping or previously drilled BIF that are shown to have a silicate facies member and any portions of the BIF with the geophysical signature of the magnetite dominant facies should be mapped and prospected in detail, and covered by humus sampling where suitable overburden cover exists.
- 5. A series of 5-10 short (100-150 m) holes should be drilled through portions of the main BIF between 1700S and 1300N that the geophysics indicates are the most magnetite-rich and/or where humus sampling has returned anomalous gold values. Drilling is also recommended in portions of the BIF where the silicate facies is suspected, focussed on areas with gold-in-humus anomalies and/or evidence of high-strain, anomalous gold, or anomalous sulphides in the nearest outcrops.

An estimated budget for this recommended work program is presented below in Table 22. At this time it is assumed that the drill rig used will be a different rig from that used in the winter drill program. A lighter weight, more heli-portable rig is recommended for the BIF exploration program due to the short lengths of the holes and numerous moves anticipated. It is also assumed at this time that the crew will stay in a nearby fishing lodge and not re-establish a tent camp in the area. Again at this point there are a number of major unknowns about the access point to the site and costs may be reduced if a closer staging area becomes available.

ITEM	UNITS	UNIT COST	СОЅТ	COMMENTS
Line-cutting	11 km	\$1,000	\$11,000	Fill-in missing grid coverage from 10+00N to 14+00N
Ground Magnetic Survey	12 km	\$200	\$2,400	Fill-in missing grid coverage from 10+00N to 14+00N plus interpretation
Geological Surveys	12 field days	-	\$23,500	Geologist plus assistant(s), camp equipment and rentals, flights, travel, report writing, etc.
Geophysical Review	5 days	\$800/day	\$4,000	
Rock Sample Assays	Approx. 100 samples	\$20	\$2,000	Primarily gold assays, incl. sample preparation
Humus Sampling	Approx. 150 samples	\$30	\$4,500	Multi-element package plus sample preparation
Diamond Drilling	1500 metres	\$90/m*	\$135,000	10 holes, each ~150 m long split between any areas of anomalous gold- in-humus/rock over BIF and prospective silicate facies BIF.
Drilling Support Costs			\$135,000	Aircraft/helicopter support, drill mob/demob, etc., assuming the drill is moved and serviced by helicopter and crew stays in fishing lodge nearby.
Camp Rental			\$10,000	Nearby fishing lodge
Drill Hole Surveying			\$6,000	Rental of DDH alignment instrument
Assays	300	25	\$7,500	
Cook	30	\$300/day	\$9,000	
Paramedic	30	\$400/day	\$12,000	Field supervision & report writing
Drill Geologist	40	\$500/day	\$20,000	
Core splitter/helper	30	250	\$7,500	Food, fuel, supply flights
Camp Operations 30 \$600/day		\$18,000		
BIF Exploration Sub-Total			\$407,400	
10% Contingency			\$40,740	
BIF EXPLORATION TOTAL			\$448,140	

# Table 22: Estimated Budget for Exploration of Gold-In-Banded Iron Formation Targets

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