# ARGOSY MINERALS INC LAC PANACHE PROJECT

Airborne Electromagnetic Surveys of the Fish Creek - Brazil Lake, Little Panache and Sawmill Bay areas, Lake Panache Project, Dieppe, Truman, Nairn and Foster Townships, Sudbury Mining Division, Ontario, Canada

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Appendix 2	Little Panache	Airborne EM Profiles
Appendix 3	Sawmill Bay	Airborne EM Profiles

#### Summary

In July 2006, a helicopter electromagnetic and magnetic survey was carried out over three blocks southwest of Sudbury in Ontario, Canada. The purpose of the survey was to map basement geology and to define conductors likely to represent nickel, copper and PGE mineralization within the Nipissing Diabase.





Lake Panache AEM

#### Brazil Lake and Fish Creek

Four responses have been identified in the Nipissing Diabase and should be field checked. One of these is a known nickel occurrence.

Two other responses occur in the Espanola Formation sediments (limestones, sandstones and siltstones), but may also be of interest for base metal mineralization.

#### Little Panache

No Nipissing Diabase has been mapped within the survey area. A modest AEM response occurs near and coincident with high chargeabilities identified in a 1975 IP survey near the contact between the Bruce and Espanola Formations.

#### Sawmill Bay

Much stronger responses were detected at Sawmill Bay where the published geology map shows that conductors 3 and 8 are hosted by Nipissing Diabase and are respectively along strike and coincident with anomalous geochemical responses. Conductors 11 and 12 are also of immediate interest but the former lies beneath a lake and no geochemical data is available over the latter.

Weaker conductors occur elsewhere within the Nipissing Diabase (4, 5, 6, 7, 10 and 13) and also warrant inspection.

Other responses of possible interest are hosted by the Bruce Formation (conglomerates, sandstones and siltstones) in the north (conductors 1 and 2), and the Bruce and Espanola Formations (limestones, sandstones and siltstones) in the south (conductors 14 and 15).

#### Introduction

The Lake Panache project is about 45km SW of Sudbury. Access, previous exploration and the prospect geology is described by Katchan (2006).

The mineral claims are subject to an option agreement between Argosy Minerals Inc and Gordon Salo signed in April 2005. The agreement allows for Argosy to earn a 100% stake in the property by means of staged option payments and meeting certain annual exploration expenditures.

The Nipissing Diabase has been a prime focus for past exploration activity which was aimed at identifying economic concentrations of nickel, copper and PGE mineralization within this intrusion, and the current program continues that work.

#### Airborne EM system

Aeroquest Limited undertook airborne electromagnetic and magnetic surveys in 3 blocks over mineral claims in the project area in July 2006 using their AeroTEM II system which is pictured in Figure 1.



Figure 1 AeroTEM II system configuration showing magnetometer bird (A) and EM bird (B)

The basic survey specifications were

Line spacing	100m
Line direction	000 – 180°

System Transmitter loop diameter Transmitter moment Transmitter frequency Transmitter waveform	AeroQuest Ae 5m 38800 NIA. 150 Hz Triangular	eroTEM© II
	On time	1150 µs
	Off time	2183 µs
Transmitter position	38m below he	elicopter
	30m above gr	ound level (nominal)
Receiver sampling rate	38400 Hz	
Receiver components	Z – vertical	
	X – horizontal	in direction of flight
Magnetometer position	21m below he	licopter
	47m above gr	ound level (nominal)
Datum	NAD83 – Can	ada mean
Projection	UTM Zone 17	'N

Figure 2 illustrates the transmitter waveform, the receiver channel positions and widths, and the nominal responses of high and low conductance targets. A full description of the system is provided in Aeroquest (2006).



Figure 2 Schematic of transmitter and receiver waveforms (after Aeroquest 2006)

Anomalous responses were identified by Aeroquest using an automated system to recognize bedrock responses and estimate the properties of the target. Figure 3 shows the codes used for these anomalies.

In addition, the author independently picked responses manually from profile displays of the Z component on and off time data, and the X component on time data, and labeled groups of related responses.

The two sets of anomalous picks coincide for the stronger bedrock responses. There are systematic differences for the less well defined responses with more picks of early time features by Aeroquest and occasional late time picks by the author without corresponding Aeroquest picks.



Figure 3 Aeroquest off time anomaly symbols

## **Regional overview**

Regional data sets available in the public domain, mainly from the Ontario Geological Survey (OGS), are shown in Figures 4 to 9. The gridded regional gravity data shown in Figure 6 has a cell size of 1000m and were supplied by OGS who derived it from stations with spacings varying from 0.3 to 15 km.

Figure 10 shows the claim boundaries and the extent of the recent airborne electromagnetic (AEM) surveys in more detail. Figure 11 shows the general topography as a Landsat image and Figure 12 shows the available aeromagnetic data at the same scale as the published geological mapping in Figure 13.

A report accompanying the gridded regional magnetic data supplied by OGS states that the grids were derived from 41 surveys flown between 1947 and 1987 at line spacings between 800 and 1000m and terrain clearances between 150 and 300m. Line directions were usually N-S or E-W. The gridded data supplied by SGC has a cell size of 200m and a nominal terrain clearance of 300m.

The responses of intrusive dykes dominate the magnetic data in the project area (Figures 4, 5 and 12) with no apparent magnetic signature from the Nipissing Diabase. However, the regional gravity data (Figure 6) suggest that significant volumes of dense mafic lithologies are present nearby, if not within the project area.



Figure 4Regional magnetics - total magnetic intensityLake Panache AEM



Figure 5 Regional magnetics – First vertical derivative of total magnetic intensity

Lake Panache AEM



Figure 6Regional gravity – first vertical derivative of Bouguer gravityLake Panache AEM



Figure 7Regional digital terrain modelLake Panache AEM



Figure 8Location of producing mines at SudburyLake Panache AEM



Figure 9Landsat 7 imageLake Panache AEM



Figure 10

AEM survey areas and claim boundaries





Landsat 7 image acquired in 2000



Figure 12 First vertical derivative of regional and detailed total magnetic intensity





Regional Geology (Ontario Geological Survey Map 2361, 1975)



#### Figure 14 Regional geology legend

## Brazil Lake and Fish Creek

The western survey block covers the Brazil group of claims at its southern end and the Fish Creek claims at the northern end. Table 1 lists the detailed figures relevant to the survey block

Figure	Theme
15	Published topographic map
16	AeroTEM flight path and anomaly locations
17	Landsat 7 image
18	Published geology (OGS, 1978)
19	AeroTEM digital terrain model
20	AeroTEM Total magnetic intensity (TMI)reduced to pole
21	AeroTEM First vertical derivative (1VD) of TMI
22	AeroTEM Z component off time channel 0
23	AeroTEM Z component off time channel 4
24	AeroTEM Z component off time channel 8

 Table 1 List of detailed figures for Brazil Lake and Fish Creek

Figure 3 shows the symbols used for the anomaly picks by Aeroquest.

The author's picks are denoted by white filled circles, group numbers and brief comments. The positions of the picks on the profiles are shown in Appendix 1.

The magnetic data show ENE trends with the highest amplitude and most continuous responses in the north of the area.

The earliest TEM channel (Off time Z component channel 00) shows a good correlation with parts of the lakes and swamps evident on the Landsat and DTM images, and probably represents the response of clays there-in. These responses decay quickly, and are not evident beyond channel 8.

Continuous stratigraphic conductors likely to represent moderately to steeply dipping graphitic shales are absent. However there are some discrete responses which may represent bedrock conductors. The best of these are responses 7 and 8 near the southern boundary of the survey. Both have strong on-time and off-time responses indicated relatively high conductivities. Response 7 is limited in strike length and is associated with a local magnetic response, but response 8 is not fully covered by the flight lines, and it may continue southwards. However, both are within the Espanola Fm (limestone, siltstone and sandstone) and therefore are probably not prospective for nickel or PGEs.

Response 2 is associated with a significant magnetic response, a mapped nickel occurrence on the 1975 geological map published by OGS, Nipissing diabase, and a number of NMDM drill holes. A review of previous exploration data is recommended in the first instance, and then a field inspection. About 1100m to the west, a weak, single line response associated with a similar magnetic and geological setting occurs at 1 which may also be of interest.

There are single line, moderate responses at both 5 and 9 on the margin of Nipissing diabase with a weak, single line magnetic response associated with the latter. Because of the mafic host, both responses are worth inspecting.

In summary, ground inspection of responses 1, 2, 5, and 9 is recommended for possible mineralization associated with the Nipissing Diabase. Conductors 7 and 8 occur in other host rocks, but may still be of interest.

Anomaly	Rating	Geology	Line	Fid	UTM_mE	UTM_mN
1	weak	Near margin of Nipissing on a strong mag response	1160	1531530	448300	5126650
2	good	Known Ni and Cu occurrence at the contact of Nipissing and conglomerate. Strong mag response, NMDM drill holes in the vicinity.	1270	2368980	449400	5126820
2	moderate	As above	1280	2530080	449500	5126860
3	v weak	Probably fault or lake sediment related response over Mississagi Fm sandstone	1080	846930	447510	5124350
3	"	ű	1100	1008570	447710	5124480
3	"	ű	1140	1335600	448110	5124510
3	"	ű	1170	1580040	448400	5124590
4	v weak	Near the contact of Bruce Fm conglomerate and Mississagi Fm sandstone on a lake edge	1040	613020	447100	5123110
5	moderate	On the contact of Mississagi Fm and Nipissing	1080	830580	447510	5123190
6	v weak	Within Bruce Fm	1040	605160	447110	5122500
7	<mark>v good</mark>	Within Espanola Fm near a N-S mafic dyke. Associated mag response	1060	704490	447300	5122060
7	weak	Within Espanola Fm	1050	693270	447200	5122070
8	<mark>v good</mark>	Within Espanola Fm near a N-S major fault	1170	1616220	448410	5121960
8	good	ű	1180	1623210	448480	5121960
9	moderate	On the contact of Espanola Fm and Nipissing. Associated weak mag response.	1280	2458350	449510	5122420

#### Table 2AEM responses at Brazil Lake and Fish Creek



Figure 15 Brazil Lake (southern claims) and Fish Creek (northern claims) location map







Figure 17 Brazil Lake Landsat 7 image (2000)



Figure 18Brazil Lake published geology (OGS 1978)

(See Figure 14 for geological legend)



Figure 19 Brazil Lake digital terrain model from AeroTEM survey



Figure 20 Brazil Lake total magnetic intensity reduced to the pole



Figure 21 Brazil Lake first vertical derivative of total magnetic intensity



Figure 22 Brazil Lake AeroTEM Z component off time channel 00



Figure 23 Brazil Lake AeroTEM Z component off time channel 04



Figure 24 Brazil Lake AeroTEM Z component off time channel 08

### Little Panache

The northeastern survey block covers the Little Panache group of claims. Table 3 lists the detailed figures relevant to the survey block

Table 3List of detailed figures for Little Panache

Figure	Theme
25	Published topographic map
26	AeroTEM flight path and anomaly locations
27	Landsat 7 image
28	Orthophoto
29	Published geology (OGS, 1978)
30	AeroTEM digital terrain model
31	AeroTEM Total magnetic intensity (TMI)reduced to pole
32	AeroTEM First vertical derivative (1VD) of TMI
33	AeroTEM Z component off time channel 0
34	AeroTEM Z component off time channel 4
35	AeroTEM Z component off time channel 8

Figure 3 shows the symbols used for the anomaly picks by Aeroquest.

The author's picks are denoted by white filled circles, group numbers and brief comments. The positions of the picks on the profiles are shown in Appendix 2.

The magnetic data show E-W trends in general with two conspicuous NW trending dykes in the southern part of the area

The earliest TEM channel (Off time Z component channel 00) shows a good correlation with parts of the lakes and swamps as indicted by the Landsat and DTM images, and probably represents the response of clays there-in. These responses decay quickly, and are not evident beyond channel 8.

Continuous stratigraphic conductors likely to represent moderately to steeply dipping graphitic shales are absent. However there are some discrete responses which may represent bedrock conductors. The best of these is response 5 on Line 2080 on the eastern boundary of the survey and coincident with the mapped contact of the Bruce Fm and the Espanola Fm. Its response is only moderate, but it may continue eastwards beyond the survey boundary. On the basis of the mapped geology, the response is unlikely to be prospective for nickel of PGEs.

Weaker responses occur at 4 about 250m to the immediate west of 5 in a similar geological position. MNDM drill holes indicate that there has been some exploration activity here, as do the interpreted results from a 1975 IP survey which delineated general WNW trends passing through 5 and immediately north of 4 (Figures 30 - 32). Both responses lie within an area of magnetic complexity but do not coincide with magnetic peaks.

Lesser conductors occur at 1, 2, and 3, and from their context on the available imagery and digital terrain model, 1 could be related to culture, and 2 and 3 to clays within lakes and swamps.

Complex responses occur on all lines at the base of a steep 40m slope just north of the shoreline of Lake Panache at the southern edge of the survey. The responses vary unpredicatably from line to line, and its source is probably related to culture along the shore of the lake. The early time channels indicate the presence of clays a short distance offshore.

Ground inspection of response 5 is recommended.

Table 4	AEM	responses	at	Little	Panache
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Anomaly	Rating	Geology	Line	Fid	UTM_mE	UTM_mN
1	weak	Probably culture	2070	1495050	470440	5125810
1	weak	ű	2080	1042290	470530	5125820
2	weak	Probably clay in lake or swamp	2040	1291800	470150	5125550
3	weak	ű	2920	968640	469920	5125140
4	weak	Near contact of Bruce and Espanola Fms. IP response to the north.	2040	1305330	470140	5124600
4	weak	ű	2050	1361520	470250	5124510
5	moderate	Near contact of Bruce and Espanola Fms. Coincident with IP response.	2070	1476600	470460	5124520
5	moderate	ť.	2080	1057560	470540	5124570
6	complex	Probably culture	2010	1117710	469840	5123250
6	complex	α	2010	1116030	469840	5123130
6	complex	α	2020	1211820	469940	5123180
6	complex	α	2030	1226070	470040	5123250
6	complex	α.	2040	1323510	470140	5123330
6	complex	α.	2040	1324260	470140	5123280
6	complex	α.	2050	1341780	470260	5123300
6	complex	ű	2060	1440900	470350	5123350
6	complex	ű	2070	1458540	470430	5123390
6	complex	ű	2080	1071750	470530	5123430



Figure 25 Little Panache location map



Figure 26 Little Panache AeroTEM flight path with anomaly picks



Figure 27 Little Panache Landsat 7 image (2000)



Figure 28 Little Panache orthophoto with anomaly picks



Figure 29 Little Panache published geology (OGS 1978)

(See Figure 14 for geological legend)



Figure 30 Little Panache digital terrain model from AeroTEM survey



Figure 31 Little Panache total magnetic intensity reduced to the pole



Figure 32 Little Panache first vertical derivative of total magnetic intensity



Figure 33 Little Panache AeroTEM Z component off time channel 00



Figure 34 Little Panache AeroTEM Z component off time channel 04



Figure 35 Little Panache AeroTEM Z component off time channel 08

## Sawmill Bay

The AEM survey block covers the eastern end of the Panache group of claims. Table 5 lists the detailed figures relevant to the survey block

Figure	Theme
36	Published topographic map
37	AeroTEM flight path and anomaly locations
38	Landsat 7 image
39	Orthophoto
40	Published geology (OGS, 1978)
41	AeroTEM digital terrain model
42	AeroTEM Total magnetic intensity (TMI)reduced to pole
43	AeroTEM First vertical derivative (1VD) of TMI
44	AeroTEM Z component off time channel 0
45	AeroTEM Z component off time channel 4
46	AeroTEM Z component off time channel 8
47	AeroTEM Z component off time channel 12
48	AeroTEM Z component off time channel 16

 Table 5
 List of detailed figures for Sawmill Bay

Figure 3 shows the symbols used for the anomaly picks by Aeroquest.

The author's picks are denoted by white filled circles, group numbers and brief comments. The positions of the picks on the AEM profiles are shown in Appendix 3.

The earliest TEM channel (Off time Z component channel 00 – Figure 44) shows a good correlation with parts of the lakes and swamps as indicted by the Landsat and DTM images, and probably represents the response of clays there-in. These responses decay quickly, and are not evident beyond channel 4.

In the centre of the northern part of the area, conductors 1 and 2 are oriented approximately eastwest and are hosted by the Bruce Formation. To their immediate south, conductor 3 contains a strong response just within the Nipissing Diabase and immediately along strike from an anomalous geochemical response. As such, it is a high ranking target..

4 discrete responses (4, 5, 6 and 7, of which 4 exhibits the highest conductivity) all lie within the centre of a large area of Nipissing diabase. None have an associated magnetic response, and 6 and 7 are on the southern margin of a probable E-W intrusive magnetic dyke. All are on elevated topography.

A cluster of conductors occurs in the SW of the survey area. Of these, 10 and 11 have strike lengths more than 200m, while 9, 12 and 13 are more discrete, although 9 and 13 remain open to the west. Most coincide with swamps or lakes with 11 and 12 showing the strongest responses and representing the better targets The geology map shows that all are hosted by or are very close to the Nipissing Diabase.

Conductor 8 and the eastern ends of 10, 12 and 13 are proximal to a NE trending faulted contact of the Nipissing diabase. An anomalous geochemical response follows the contact where it diverges from the fault at conductor 8 and trends NNE. Hence conductor 8 is also a high ranking target.

Near the southern boundary of the survey, conductor 14 is a minor response in the Espanola Fm and beneath a lake, and conductor 15 coincides with an E-W stream segment crossing the Bruce Fm. Both conductors are weak.

Several of the conductors lie beneath lakes and swamps, but some occur on higher ground and may be amenable to field checking, in particular, the high ranking targets 3, 8 and 12.

Apart from conductor 3 which appears to coincide in part with a modest magnetic response, none of the EM responses coincide with significant magnetic responses. The magnetic dykes appear to disrupt the continuity of some of the conductors (e.g. from 11 to 12), and the magnetic data appear to confirm the faulted SE boundary of the main outcrop of Nipissing Diabase.

In summary, conductors 3, 8 and 12 should be field checked for signs of mineralisation. Conductor 11 is of similar rank but is beneath a lake.

#### Table 6AEM responses at Sawmill Bay

Anomaly	Rating	Geology	Line	Fid	UTM_mE	UTM_mN
1	weak	E-W trending response hosted by Bruce Fm on south side of WNW dyke	3130	1438320	471400	5119880
1	weak	ű	3140	1474950	471510	5119880
1	weak	ű	3150	1579050	471590	5119890
2	weak	E-W trending response hosted by Bruce Fm and beneath a swamp	3120	1340400	471290	5119470
2	moderate	ű	3130	1432710	471410	5119500
2	weak	и и	3140	1480320	471500	5119520
3	moderate	Hosted by Nipissing near contact with Bruce Fm. Along strike from anomalous geochem	3130	1427250	471400	5119130
3	moderate	"	3140	1484970	471490	5119200
3	strong	"	3920	398850	471500	5119260
4	moderate	Isolated response in Nipissing	3070	1010160	470810	5118620
5	weak	Isolated response in Nipissing	3050	879840	470600	5118440
6	weak	Isolated response in Nipissing	3030	746130	470400	5118270
6	weak	ű	3930	440040	470370	5118280
7	weak	Isolated response in Nipissing close to an inlier of Espanola Fm	3040	827430	470500	5118170
7	weak	ű	3050	876540	470600	5118220
7	weak	ű	3060	956700	470700	5118220
7	weak	ű	3930	443190	470570	5118270
8	weak	Hosted by Nipissing near fault contact with Bruce Fm	3120	1359450	471300	5118150
8	weak	Hosted by Nipissing near fault contact with Bruce Fm and Mississagi Fm. Coincident with geochem anomaly	3130	1414170	471400	5118300
8	strong	Hosted by Nipissing near fault contact with Mississagi Fm. Coincident with geochem anomaly	3140	1497510	471510	5118410
8	moderate	Hosted by Nipissing near fault contact with Mississagi Fm. Coincident with geochem anomaly	3150	1556370	471600	5118400
8	moderate	Hosted by Nipissing near fault contact with Bruce Fm and Mississagi Fm. Coincident with geochem anomaly	3930	455400	471420	5118270
9	weak	Hosted by Espanola Fm inlier within Nipissing	3010	609450	470190	5118030
9	moderate	ιί (Internet in the second se	3020	699180	470300	5118030
10	weak	On contact of Espanola Fm inlier and Nipissing	3030	739830	470400	5117830
10	moderate	"	3040	830760	470500	5117910
10	moderate	и 	3050	871350	470590	5117850
10	weak	и —	3060	960450	470700	5117920

10	weak	"	3070	999480	470790	5117890
10	weak	"	3080	1088640	470900	5117820
10	moderate	Near faulted contact of Bruce Fm and Nipissing	3090	1128420	470990	5117830
10	moderate	"	3100	1218210	471100	5118030
10	weak	ű	3100	1219530	471100	5117930
10	weak	"	3110	1267260	471190	5117980
11	moderate	Hosted by Nipissing beneath lake	3010	602880	470200	5117600
11	strong	"	3020	706080	470300	5117510
11	weak	"	3030	734010	470410	5117470
11	weak	"	3040	836970	470510	5117430
12	weak	Hosted by Nipissing on faulted contact with Bruce Fm	3060	965460	470700	5117550
12	strong	α.	3070	994770	470800	5117560
12	strong	"	3080	1090020	470900	5117710
13	weak	Hosted by Nipissing beneath lake	3010	598020	470200	5117260
13	weak	"	3940	523200	470260	5117270
13	weak	ű	3940	521910	470380	5117280
14	weak	Hosted by Espanola Fm beneath lake	3050	859620	470620	5117070
15	weak	Hosted by Bruce Fm, coincident with stream	3200	535530	472090	5117110
15	weak	"	3210	552420	472210	5117120
15	moderate	"	3220	657840	472300	5117140
15	weak	u (	3230	676620	472410	5117090
15	weak	Hosted by Bruce Fm	3940	499080	472320	5117280
15	moderate?	Hosted by Mississagi Fm	3940	494430	472670	5117200



Figure 36 Sawmill Bay location map







Figure 38 Sawmill Bay Landsat 7 image (2000)



Figure 39 Sawmill Bay orthophoto with anomaly picks



Figure 40Sawmill Bay published geology (OGS 1978)

(See Figure 14 for geological legend)



Figure 41 Sawmill Bay digital terrain model from AeroTEM survey



Figure 42 Sawmill Bay total magnetic intensity reduced to the pole



Figure 43 Sawmill Bay first vertical derivative of total magnetic intensity



Figure 44 Sawmill Bay AeroTEM Z component off time channel 00



Figure 45 Sawmill Bay AeroTEM Z component off time channel 04



Figure 46 Sawmill Bay AeroTEM Z component off time channel 08



Figure 47 Sawmill Bay AeroTEM Z component off time channel 12



Figure 48 Sawmill Bay AeroTEM Z component off time channel 16

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# Graham Jenke Statement of Qualifications

exploration with major Australian mining companies and the airborne survey contracting graduating with Honours (first class) in 1972. I have over 30 years experience in mineral I completed a BSc geophysics and geology degree at the University of Adelaide, industry.

member of the team which discovered the Ellendale lamproite province and the Argyle programs for nickel, gold, copper, zinc, uranium and diamonds in a wide variety of diamond mine subsequently. geological terrains across Australia, Papua New Guinea and New Zealand. I was a core Perth, Darwin, Canberra and Adelaide providing geophysical support in exploration I joined CRA Exploration in 1973, and over the next 13 years was based in Kalgoorlie,

emergence as a successful provider of airborne geophysical surveys to the exploration industry. In 1987, I joined the newly formed Kevron Geophysics as manager, and oversaw its

characterization and environmental monitoring surveys at the company's mine sites in company's hydrogeological group exploring for water resources, and undertaking site the West Musgrave nickel exploration program. I also had a geophysical role in the in 1994 where I was a key member of a base metal exploration project near Mt Isa, and nickel and gold exploration projects and mine sites in the Yilgam before moving to Perth I returned to mineral exploration with Western Mining in Kalgoorlie in 1989, working on WA, SA and Queensland.

involvement in water exploration and environmental geophysical surveys at mine sites in data for nickel, gold and base metal exploration programs. I also have a continuing exploration and mining companies by planning, supervising and interpreting geophysical I joined Southern Geoscience Consultants in 2002, working for major and junior Western Australia.

I am an active member of SEG, ASEG and EAEG

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