

# Assessment Report on a Fixed Wing Magnetic and VLF Survey West Gabbro Property, Havelock-Belmont-Methuen Township, Ontario Trigan Resources Inc.



GEOSCIENCE ASSESSMENT OFFICE

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# Assessment Report on a Fixed Wing Magnetic and VLF Survey West Gabbro Property Havelock-Belmont-Methuen Township, Ontario

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#### Summary

A fixed wing magnetic and VLF survey was flown over the West Gabbro property, Havelock-Belmont-Methuen Township, Ontario. The survey was flown by Terraquest Ltd. for Trigan Resources Inc. under Terraquest job number B-290. Total coverage as presented on final maps was 144 line km. The results were presented at 1:10,000. The survey area is centered 40 km northeast of Peterborough and includes claims 1240115, 1240130, 1240142, 1240150, 1240154 and 1240155.

The airborne results are compared with available geology. Areas of agreement and disagreement are highlighted.

Cover : Total magnetic intensity contours with claim fabric

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Certificate of Qualifications

### Maps

Three derivative maps at 1:10,000 combining elements of the airborne geophysical survey and the geology are provided with this report. All maps show topography, claim boundaries and claim numbers from the claimap3 website of the Ministry of Northern Development and Mines (copyright Queen's Printer for Ontario). All maps show flight path and an overlay that includes the claim fabric, drill holes WG-1 to WG-10 and major lithological contacts from figure 4 of a report by Oakridge Environmental Ltd. Map types are

- total magnetic intensity
- calculated vertical magnetic gradient
- VLF total field 24.8 kHz

### Assessment Report on a Fixed Wing Magnetic and VLF Survey, West Gabbro Property Havelock-Belmont-Methuen Township, Ontario Trigan Resources Inc.

A fixed wing magnetic and VLF survey was flown over the West Gabbro property, Havelock-Belmont-Methuen Township, Ontario. The survey was flown on October 4, 2008 by Terraquest Ltd. for Trigan Resources Inc. under Terraquest job number B-290. Total coverage as presented on final maps was 144 line kilometres over an area of 10 km<sup>2</sup>. Total coverage within the defined survey area of 7.5 km<sup>2</sup> was 106 line km. The results were presented at 1:10,000.

The survey area is centered 40 km northeast of Peterborough and just east of Stony Lake (figure 1). The survey area covers claims 1240115, 1240130, 1240142, 1240150, 1240154 and 1240155 and surrounds. Flight path and claim fabric are shown in figure 2. The base map for figure 2 is from the Government of Ontario, Ministry of Northern Development and Mines, claimap3 website (copyright Queen's Printer for Ontario).



Figure 1. Regional Location Map



Figure 2. Flight path and claim fabric

#### 1. Airborne Survey

The airborne survey involved 33 traverse lines at 75 m at 346° / 166° and 4 tie lines at 750 m at 76° / 256°. The nominal aircraft terrain clearance was 100 m. The nominal survey airspeed was 275 km/hr (76 m/sec). The aircraft (Piper Navajo PA 31-310) was equipped with three cesium vapour magnetometers and a Herz Totem 2A VLF receiver. The magnetometer sensors were mounted in two wing-tip pods and in a tail stinger. The VLF sensor was mounted in the tail stinger. Total magnetic intensity and VLF total fields and vertical quadrature components were sampled every 0.1 seconds. Ancillary equipment included radar and barometric altimeters, a navigation system based on a differential GPS receiver, a 3 component fluxgate magnetometer and a base station cesium vapour magnetometer.

The VLF receiver operates at two frequencies, designated as Line and Ortho. Frequencies (transmitters) used were

Line : 24.8 kHz, NLK, Jim Creek, Washington, 48.2° N, 121.9° W, 250 kW

Ortho : 24.0 kHz, NAA, Cutler, Maine, 44.6° N, 67.3° W, 1000 kW

The survey area is centered at 44.6° N, 78.0° W. Jim Creek is west of the survey area and this favours conductors that trend east / west. Cutler is east of the survey area and this also favours conductors that trend east / west.

The IGRF for this place and time is defined by a total magnetic intensity of 55,035 nT, inclination 71°, declination 12° west of north.

The results were presented by Terraquest in a report dated October 27, 2008, in maps at 1:10,000, Geosoft grids and a Geosoft database. Maps are presented as jpeg images and as Geosoft \*.map files. Map projection is UTM based on the NAD83, Z18N datum. The base map is a colour image of elevations plus drainage. Map types are

- flight path

- total magnetic intensity, colour + line contour

- calculated vertical magnetic gradient, colour + line contours
- VLF (line station), total field colour + line contours + vert. quadrature offset profiles

- VLF (ortho station), total field colour + line contours + vert. quadrature offset profiles The total magnetic intensity map from Terraquest is shown in figure 3. The line contours have been removed for clarity.



Figure 3. Total magnetic intensity contours (from Terraquest)

Profile average, minimum and maximum values from the database of selected channels are listed in table 1. Grid statistics are listed in table 2. The grid cell is 15 m x 15 m. DTM is the digital terrain model, equal to the ellipsoidal elevation above sea level (= GPSALT – RALT).

Channel	Average	Minimum	Maximum
RALT	98.7	55.4	98.7
GPSALT	312.4	293.4	343.5
DTM	213.7	196.5	262.9
mag_fnl	57389	53540	60277
LT_fnl	0.1	-9.4	16.4
LQ_fnl	0.1	-8.3	9.3
OT_fnI	0.1	-11.9	16.3
OQ_fnl	0.1	-7.4	8.4

#### Table 1. Database statistics

Channel	Average	Minimum	Maximum
DTM	214	196	263
TMI	57327	53529	60277
CVG	-0.16	-16.01	17.96
VLF_LTF	0.15	09.42	16.37
VLF_OTF	0.13	-1 <u>1.</u> 91	16.40

#### Table 2. Grid statistics

The distribution of total magnetic intensity values from the database is shown in figure 4. This is after removal of the IGRF value of 55,035 nT.



Figure 4. TMI distribution (IGRF out)



#### 2. Background

From Donald Phipps -

The history of the Trigan property starts on the East Gabbro where Trigan have a substantial massive to semi massive pipe-like ilmenite deposit. This was the focus of earlier exploration but finding no market for the product, the focus turned to the barren gabbro hosting the ilmenite deposit, as a source of high quality bedrock aggregate. A quarry on the East Gabbro has been in operation now for several years and produces a high quality aggregate with high demand. The quarry face is now approaching the ilmenite body. The West Gabbro is similar to the East Gabbro and the subject claims were staked to cover that portion of the gabbro adjacent to the railway line for a possible future source of aggregate with rail access. A program of geological mapping was carried out by Oakridge Environmental in 2006.

Trigan Resources has provided a copy of a report by Oakridge Environmental Ltd. This report is titled 'Trigan Resources – West Gabbro Property, Geological Mapping Report' and is dated January, 2007 (project ref. 05-895). The work involved mapping within the 6 claim block registered to Trigan Resources. Results were presented on a 1:5,000 scale map showing drainage, claim fabric, drill holes WG-1 to WG-10, major lithological contacts and sample locations coded by rock type.

Drill holes are from 2003 and are vertical to depths of 31.9 to 45.7 m. Major lithological contacts separate the central gabbro (unit 1) from a transition zone (unit 2) to porphyritic granite (unit 3). Claim fabric, drill holes and lithological contacts from figure 4 of the Oakridge Environmental report are shown in figure 5. The base map is from the MNDM claimap3 website.



Figure 5. Claim fabric, drill holes and major lithological contacts (from the Oakridge Environmental report, figure 4)

Reading from the Oakridge Environmental report -

- The "West Gabbro" gabbro/diorite body has a complex structure which includes a
  perimeter zone of porphyritic granite and metasediments. The gabbro appears to have
  intruded the sediments and porphyry which occurred in a regional scale synform. The
  injection of mafic magma resulted in a partial assimilation of these country rocks,
  creating a granodioritic diorite transition zone surrounding the pluton. In the central
  'core" zone of the pluton, the gabbroic rocks appear to have a cumulate-type composition
  and include enrichment in magnetite (and perhaps ilmenite).
- 2. Future traprock production should be concentrated in the central, core zone of the pluton where granitic intrusives are less common. It will not be possible however to avoid all granitic intrusive rocks.
- 3. The mapping results suggest that the mafic magma may have remobilized felsic material from the porphyry and possibly from the metasediments, allowing the formation of pegmatites throughout the claim group area. Some of these appear to exhibit anomalously high gamma counts (discriminated for U) and thus suggest a potential for future discovery of U mineralization. Further prospecting for uraniferous mineralization is therefore recommended.
- 4. A detailed geophysical survey of the claim group, including gamma counts plus total field and vertical gradient magnetics would be of considerable assistance in further identifying possible U enriched pegmatites. The survey would also assist in better defining contact relationships and the deep structure of the gabbro core zone, plus any potential ilmenite bodies that may be contained within the gabbro.

#### 3. Derivative Maps

Three maps at 1:10,000 combining elements of the airborne geophysical survey and the geology have been prepared. The base map shows topography, drainage, claim boundaries and claim numbers from the claimap3 website of the Ministry of Northern Development and Mines (copyright Queen's Printer for Ontario). All maps show flight path and an overlay that includes the claim fabric, drill holes WG-1 to WG-10 and major lithological contacts from figure 4 of the report by Oakridge Environmental Ltd. Map types are

- total magnetic intensity
- calculated vertical magnetic gradient
- VLF total field 24.8 kHz

These maps are reproduced here as figures 6, 7 and 8.

Digital results are archived on CD. These include this report and the three derivative maps.

#### 4. Discussion

The core of the West gabbro is roughly under a circular magnetic high with peak amplitudes of 59,500 to 60,000 nT (4,500 to 5,000 nT over the IGRF). These are strong values for a 100 m terrain clearance – values over 10,000 nT would be expected from a ground survey. The porphyritic granite to the northwest and south are marked by magnetic gradients and no strong, shallow magnetic sources. Aeromagnetic patterns along the north and south margins of the survey show a linear grain that would be consistent with metasediments.

Large areas of high magnetic amplitudes and high magnetic relief to the east and south of the core of the West Gabbro as mapped are not explained by the geology. These areas of



potential gabbro may be unchecked, buried under lakes or overburden or under a thin cover of transition rocks. Some of these unexplained magnetic highs may be of exploration interest.



Figure 6. Total magnetic intensity





Figure 7. Calculated vertical magnetic gradient

The vertical gradient highlights shallow magnetic sources. One drill hole (WG-5) is into one of the cvg highs. The other drill holes are on the edge of cvg highs and on possible magnetic contacts. Lineaments suggest northwest trending breaks within the gabbro.

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Strong linear VLF total field highs in the north and south are over topographic lows marked by rivers or a lake. The cause may, in part, be underlying conductive metasediments – the southern VLF high follows the magnetic grain. As with the vertical gradient, northwest trending lineaments cut across the West Gabbro.



Figure 8. VLF total field – 24.8 kHz

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The TMI profile for line 1150 is shown in figure 9. The horizontal axis is distance in metres from the northwest line end. Drill hole WG-10 is near distance marker 2375. This profile suggests a magnetic body of similar form. There is no evidence of a depth limited magnetic body.



Figure 9. TMI profile, line 1150. Horizontal axis is distance from the northwest line end (m)

#### 5. Conclusions

A fixed wing magnetic and VLF survey was flown by Terraquest Ltd. for Trigan Resources Inc. over the West Gabbro Property in Havelock-Belmont-Methuen Township, Ontario. The survey was flown on October 4, 2008. The results have been presented at 1:10,000. The survey area included claims 1240115, 1240130, 1240142, 1240150, 1240154 and 1240155. Total production as present on final maps was 144 line km.

Selected features from the airborne survey and a recent geological report by Oakridge Environmental Ltd. have been combined in 3 maps at 1:10,000. These maps suggest the gabbro is larger than mapped .

Blaine Webster B. Sc., P. Geo. November 20, 2008

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### **Certificate of Qualifications**

Blaine Webster President - JVX Ltd., 60 West Wilmot Street, Unit 22 Richmond Hill, Ontario L4B 1M6 Tel : (905) 731-0972 Email : bwebster@jvx.ca

I, Blaine Webster, B. Sc., P. Geo., do hereby certify that

- 1. I graduated with a Bachelor of Science degree in Geophysics from the University of British Columbia in 1970.
- 2. I am a member of the Association of Professional Geoscientists of Ontario.
- 3. I have worked as a geophysicist for a total of 38 years since my graduation from university and have been involved in minerals exploration for base, precious and noble metals and uranium throughout much of the world.
- 4. I am responsible for the overall preparation of this report. Most of the technical information in this report is derived from geophysical surveys conducted by Terraquest Ltd. for Trigan Resources Inc. and information provided by Trigan Resources Inc.

Blaine Webster, B. Sc., P. Geo.

Operations Report for TRIGAN RESOURCES INC. High Resolution Aeromagnetic & VLF-EM Survey, Methuen Township, Peterborough, ON

## 2.4. FLIGHT PLAN



*Terraquest Ltd., Airborne Geophysical Surveys* Contract B-290 File: B-290-ksa-sdas Operations Report for TRIGAN RESOURCES INC. High Resolution Aeromagnetic & VLF-EM Survey, Methuen Township, Peterborough, ON

# 2. SURVEY SPECIFICATIONS

## 2.1. LINES AND DATA

Parameter	Specification	Instrument Precision	
Aircraft Speed	277 km/hr		
Sampling Interval	8m (10Hz)		
Flight-line Interval	75 m	+/- 3m	
Flight-line Direction	346/166 degrees		
Control-line Interval	750 m	+/- 3m	
Control-line Direction	076/256 degrees		
Aircraft MTC	100 m	+/- 5m	
Mag Sensor MTC	100 m	+/- 5m	

## 2.2. SURVEY KILOMETRAGE

Survey Kilometers:		
Lines	96 km	
Tie	10 km	
Total	106 km	

33 lines @ 2.9km/line.

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