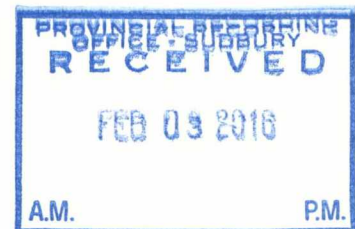


2-56597

Misema Property  
Claim L4269624  
Larder Lake Mining Division

Katrine Township  
Temiskaming District  
NTS - 32 D/4  
79° 44' 52" W, 48° 13' 24" N  
Dellelce/Vallillee



September 2015

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## FORWARD

The Kirkland-Larder Lake area has been a prolific gold producer for over one hundred years. A large part of the mineralisation in the camp is known to be associated with Timiskaming syenite and feldspar intrusive rocks and to be structurally controlled by higher-order splays off of the Larder Lake-Cadillac Break, a major deep crustal break in the Abitibi greenstone belt, which controls gold mineralisation for over 200 kilometers through Ontario and Quebec. The gold occurrences at the Misema Lake Property have a similar association with late syenite and feldspar intrusions, which appear to be concentrated between the Misema Lake Fault and the Mulven Lake Fault, both regional-scale splays off the Larder Lake -Cadillac Break.

The Misema Property includes a number of high grade historical gold showings on mining claims in the Kirkland-Larder Lake area of northeast Ontario, Canada.

The Misema Property is underlain by the Abitibi Greenstone, "one of the world's largest, best preserved and most economically productive greenstone belts in the world" (Ayer and Trowell, 2002). Gold mineralization on the property is hosted by quartz veins, quartz carbonate veins and shear zones cutting andesitic volcanic rocks of the Blake River Group and swarm of late Timiskaming-age syenite and feldspar porphyry dykes.

This report was prepared by the author, under hire by the claim holders. The report summarizes observations on the property, provides a compilation of historical work, and outlines the observations or recent work by the author and or assistants.

## SOURCES OF INFORMATION

Material discussed in this report includes data collected the author. Information presented has been compiled from external sources such as government publications, academic papers, and assessment work reports. Source material is referenced in the text and listed in the bibliography.

Use was made of AFRI: 32D04NW0051 wherein L.J. Cunningham reported mapping results for six claim blocks on the Misema Peninsula, around the Wood Showing. Cunningham provides an excellent description of the local geology. In AFRI:32D04NE0035, T Twomey provides a good summary of the geology and history of exploration in this area in his report for Coventry Ventures whom had optioned the area claims. The 2008 Wallbridge Mining report prepared by J. Baily was also heavily relied upon. Many thanks to the authors as much research time was saved due to these three information sources.



# Kirkland Lake Resident Geologist's District

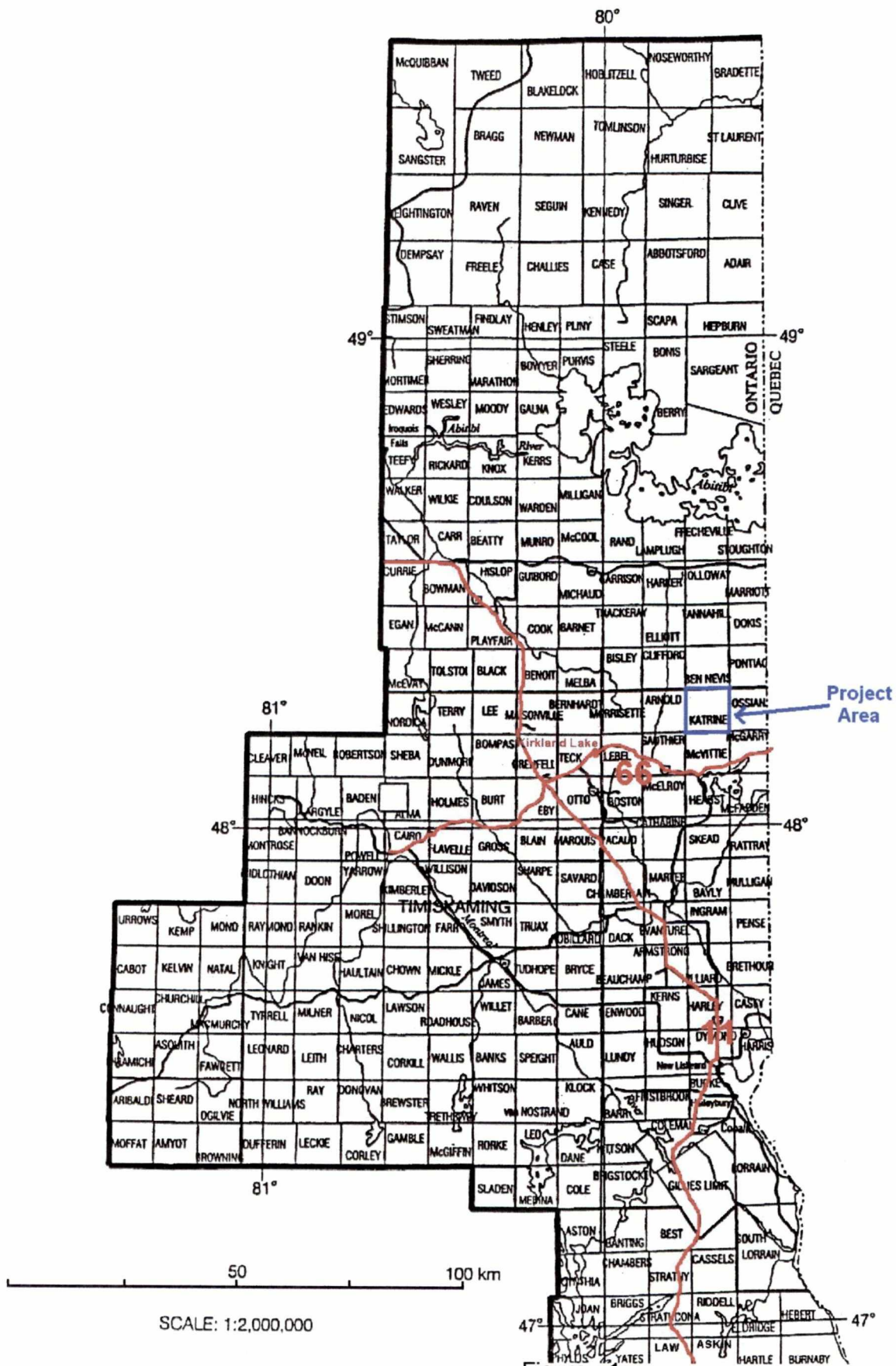
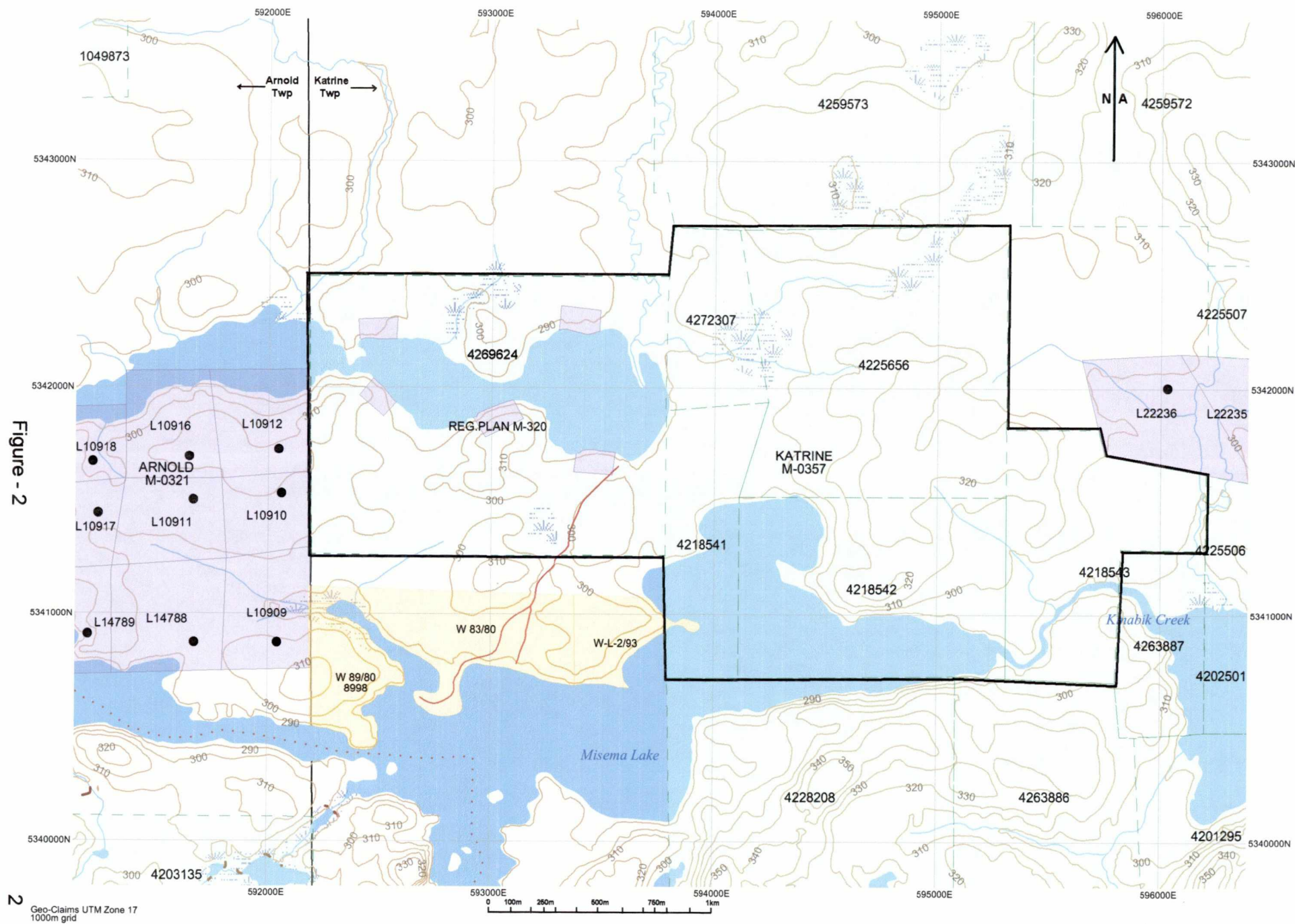


Figure - 1







## LOCATION

The Misema Property is in Katrine Township in the Larder Lake Mining Division, Ontario, Canada. It is located 20 kilometres northeast of Kirkland Lake and 10 kilometres north of the Town of Larder Lake, with the geographic center of the project at about 79° 44' 12" W, 48° 13' 17" N.

Detailed position of each claim posts of record was undertaken in October 27 to 30 of 2014 and was performed by C. Johnson of Sudbury. GPS coordinates were obtained and submitted to MNDM as work report W1480.02175. Unfortunately, the MNDM does not publish this data for industry benefit so no AFRI file is available. Any reference to the location of the claims is based upon records on file at the Ontario Mining Records Office or field observations where noted by the author.

## ACCESS

During the summer of 2015 the Misema Property was accessed by boat via the the Misema chain of lakes. From Kirkland Lake, drive 13 kilometres east on Highway 66 toward Larder Lake, then turn northward on the Esker Lake Provincial Park Road for another 10 kilometers brings you to Howard Lake access road. Follow this for about 3.2 kilometers to the Howard Lake Landing. From here, the property is accessible by boat using Howard Lake for about 5 kilometers will bring you to the section of the chain of lakes referred to as the Misema Lake Lake section. There are many shallowly hidden rocks, some of which, but not all, are marked with buoys. The northern area of the Property can also be accessed via Misema Lake and reportedly by logging cuts mapped as extending off of the Larder Station Road. Upkeep on one of these cut roads is reportedly atv drivable almost to the township boundary, north of North Arm of Misema Lake.

## TOPOGRAPHY

Topography in the area ranges from steep-faced to rolling hills with interceding lows. Much of the Property resides in a topographic low characterized by muskeg swamp. Bedrock exposure is sporadic, generally concentrated on the edges of topographic highs. Overall, there is very little outcrop, 10-25% glacial cover, 75-90% drainage and swamp. Black spruce, jack pine, trembling aspen, white birch, white spruce, balsam poplar, and balsam fir are the dominant trees in the area. The shorelines of Beaverhouse Lake are generally densely vegetated with alder spruce and or balsam. Wildlife includes moose, beaver, muskrat, snowshoe hare, grouse, ducks, geese, loons, martens, black bear, wolves, and lynx. Cougar are known in the range of the claim area. Fish in the Misima Lake chain is predominantly pike and pickeral with occasional perch and less bass.

## CLAIMS

As of August, 2015, the Misema Property includes 6 staked mining claims comprising 36 claim units covering 576 hectares. The total work commitment for these claims totals \$14,400 annually. Currently, sufficient work is being completed and filed to keep the claims in good standing through till spring of 2016. It has not yet been established how much the conversion of the ground staked mining claims to the forced cell type scheme of mining claims will impact the annual assessment work after conversion. The claims have not been legally surveyed for lease or other purposes.

The claim numbers are L4218541, L4218542, L4218543, L4225656, L4264624 and L4272307 which are recorded on plan M-0357 of Katrine Township. Currently, the claims are held 100% by Peter Dellelce (2/3) and David Vallillee (1/3).

	Cl #	owners	area	ha	due date	work req
1	L4218541	Dellelce/Vallillee	Katrine Twp	48	15-May -2015	1,200
2	L4218542	Dellelce/Vallillee	Katrine Twp	96	15-May -2016	2,400
3	L4218543	Dellelce/Vallillee	Katrine Twp	64	15-May -2016	1,600
4	L4225656	Dellelce/Vallillee	Katrine Twp	144	04-Feb-2016	3,600
5	L4269624	Dellelce/Vallillee	Katrine Twp	184	05-Aug-2017	4,800
6	L4272307	Dellelce/Vallillee	Katrine Twp	32	12-Nov-2016	800



# General Geology of the Kirkland Lake Area

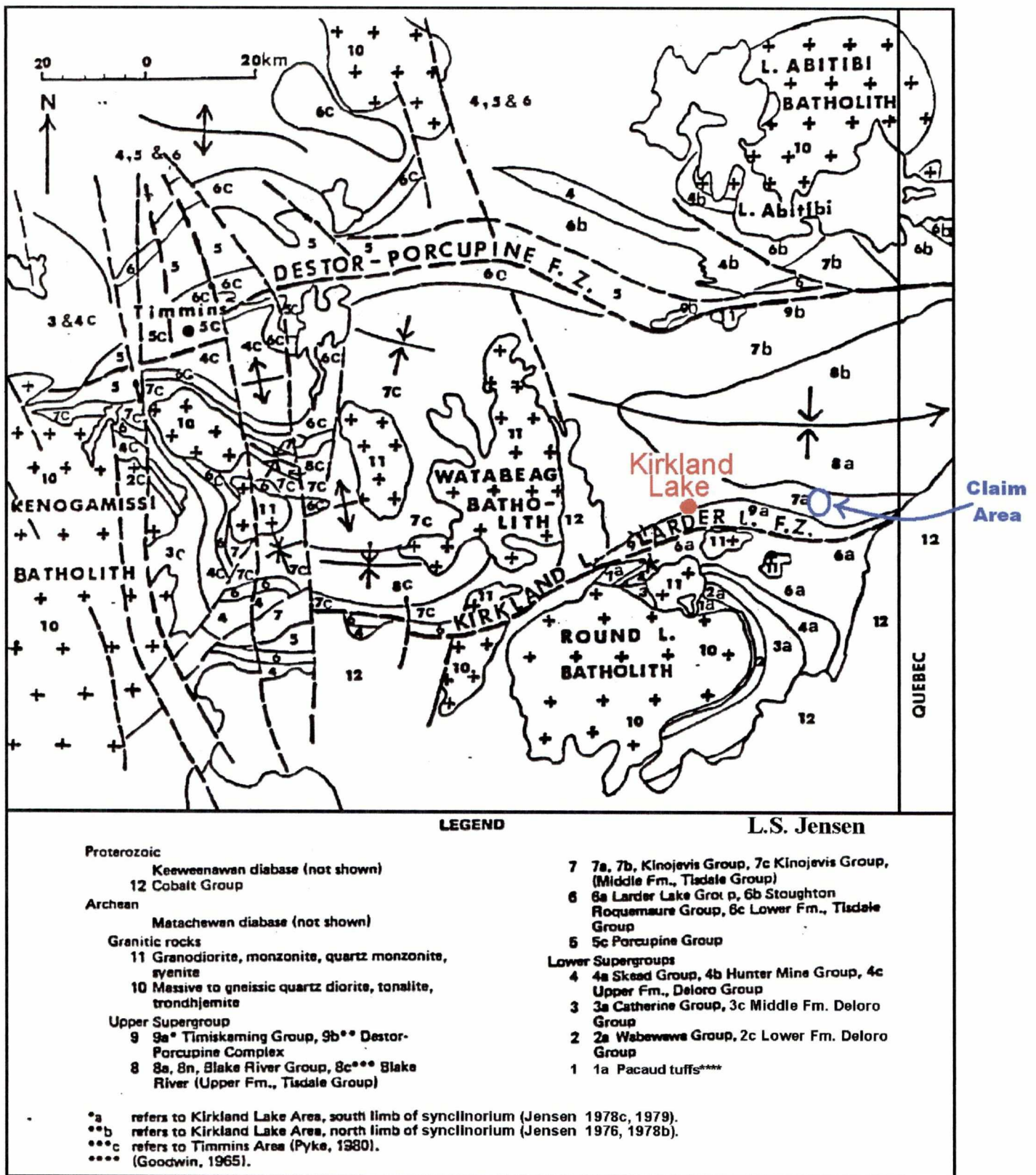


Figure - 3





## GENERAL GEOLOGY

This area is in the Abitibi Greenstone Belt of the Superior Province, in a region dominated by Archaean mafic to felsic pillowed, massive and agglomeratic volcanics and granitic batholiths with attendant intrusions, with minor clastic interflow and fluvial sediments.

"All exposed bedrock in the Larder Lake area is Precambrian. Archean volcanic, sedimentary, and intrusive rocks contain the mineralization of economic interest. Near Kenogami Lake in the west, and Kerr Addison in the east, relatively flat-lying Proterozoic sedimentary rocks cover the older folded formations. Pleistocene deposits of sand, gravel, and clay mantle about 90 % of the bedrock. Archean volcanic rocks with inter-bedded slate and chert are the oldest rocks (2.747 Ga to 2.705 Ga) and range from komatiite to mostly iron and magnesium-rich tholeiites at the stratigraphical base to calc-alkaline volcanic rocks at the stratigraphical top. These rocks contain long narrow bodies of diorite and gabbro as well as coarse-grained flows. Timiskaming-type interbedded sedimentary and volcanic rocks, also Archean in age (2.680 Ga), unconformably, overlie the older volcanic rocks. They form a long, relatively narrow east-trending belt intruded by syenite (2.673 Ga). Lamprophyre dikes are widespread and most of the "diabase" is of the "Matachewan" swarm of north-striking dikes (2.485 Ga). Overlying all the above rocks with great unconformity are Proterozoic undeformed Huronian sediments of the Cobalt group intruded by Nipissing Diabase (2.200 Ga). Jurassic age diamond-bearing kimberlite pipes are found east of Kirkland Lake and Matheson". \*(ref Lovel 1967)

Larder - Cadillac Deformation Zone (LCDZ), a major east-west structural control on gold bearing alteration and mineralization, which in much of its length coincides with a folded and deformed sinuous belt of sedimentary rocks of conglomerate, sandstone and volcanic tuffs. The LCDZ is a carbonatized shear zone characterized in some places by the presence of quartz stockwork, and green mica. It is considered to be the western extension of the Malartic-Cadillac Deformation Zone, a more than 160 km long. The deformation zone is a south-dipping reverse fault, the south side of which seems to have moved upward and eastward relative to the north side.

Locally, the Larder Lake Deformation Zone has been traced at intervals from east of Kerr Addison mine to west of Kenogami Lake. It is exposed about 2 km south of the gold mines of Kirkland Lake. Kirkland Lake "main break" is a fault zone branching northeastward from the LCDZ in the vicinity of Kenogami Lake. It passes through all the gold mines at Kirkland Lake, and has been identified to a depth of more than 2 km. Relative to the north side, its south side moved up 460 m almost vertically. The fault zone varies from a single plane to multiple bifurcating planes.

The Misema Property is approximately 12 kilometers north of the Larder Lake - Cadillac break. The Larder Lake - Cadillac break is a long-lived deep crustal scale structure that extends for over 200 kilometers through Ontario and Quebec and has produced over 100 million ounces of gold. The Larder Lake Mining District itself has historically produced over 70 million ounces of gold, 40 million ounces of which have come from the Kirkland-Larder Lake area. Gold mineralization on the Misema Property occurs with quartz/carbonate veins and pyrite disseminations associated with faults and shear zones near syenite and feldspar porphyry intrusions. These intrusions appear to control the magnetic high anomaly in the Misema Lake area, between the Misema Lake-Mist Lake fault and the Mulven Lake fault. These are regional scale structures that are interpreted as splays off of the Larder-Cadillac Break to the south. The Misema Lake-Mist Lake Fault can be followed along a strong topographic and magnetic lineament into continuity with the Kirkland Lake Main Break, which has produced over 28 million ounces of gold in the Town of Kirkland Lake. Much of the gold mineralization in the Kirkland-Larder Lake area is associated with late Timiskaming age syenite and feldspar porphyry intrusions at the confluence of regional scale structures

## CLAIM - LOCAL GEOLOGY

The Misema Property occurs in Katrine Township. It is underlain by the Blake River Group of the Abitibi Subprovince of the Archean Superior Province of Canada (Peloquin and Piercey, 2005). The Property is dominantly underlain by mafic to intermediate volcanic rocks, including massive flows, pillows, hyaloclastite, and agglomerates. A thin E-W horizon of tuffaceous rhyolite was mapped by Hogg (1964) on the Misema Peninsula. The volcanic rocks are intruded by several







kilometer sized gabbro and diorite intrusions near North Arm on the Misema Lake. The volcanic rocks and mafic intrusions are cut by a concentration of younger (probably Timiskaming age) syenite, hornblende [mafic] syenite, and feldspar porphyry dykes near Misema Lake. A concentration of these intrusions form a diamond-shaped magnetic high anomaly at Misema Lake which is bound between, and possibly controlled by, the regional-scale northeast striking Misema Lake-Mist Lake and Mulven Lake Faults. Narrow northwest trending diabase dykes cut all older lithologies and stand out quite well on magnetic maps.

Bedding orientations are generally steep, striking east-west. The Misema Lake Peninsula area mostly occurs on the northern limb of a broad east-west trending anticline mapped by Hogg (1964). A number of steeply south dipping, east-west striking shear zones are exposed on the shores of Misema Lake, often associated with flat-lying tensional quartz veins.

A number of gold occurrences have been identified on the Misema Lake Property including the Norwood-Kirkland showing, the Vallillee showing, the Macdonald showing, the Wood showing, and the Flood showing.

#### THE NORWOOD KIRKLAND SHOWING

The underlying rocks are dacitic lavas intruded by syenite porphyry dikes. The quartz veins are reported to have yielded low gold values.

The earliest record found of work at the Norwood Kirkland showing, is by Hogg (1964, p.12): Norwood Kirkland Gold Mines Limited (Chartered Cancelled in 1953)

The Norwood Kirkland Gold Mines Limited property was formerly held by Enterprise Gold Mines Limited. It comprised an area of approximately 1,145 acres, north of Misema Lake in Katrine Township. Prior to 1936 a number of test pits and trenches exposed several quartz veins. In 1938, 14 diamond drill holes were put down on the property. Two of these holes intersected gold values beneath surface showings.

In the assessment report written for Coventry Ventures in 1987, Twomey provides the best account of the 1930's work by Norwood Kirkland Gold Mines Ltd. He references a report by Seeber (1986) which the author has been unable to obtain a copy of. According to Twomey, the Enterprise Gold Syndicate (later Enterprise Gold Mines Limited) spent \$90,000 on extensive surface trenching and test pitting on a 30 claim property in the Misema Lake area. In 1936, the company was taken over by Norwood Kirkland Gold Mines Ltd., who conducted further test pitting and diamond drilling on 12 quartz veins, as also described by Hogg (1964, above). The only available data from this are two sketches provided in Twomey's 1987 report (ref AFRI 32D04NE0035). The historical gold assays below are presented in dollar values at a price of \$35 per ounce of gold.

##### 1936 Norwood Kirkland samples very approximate coordinates

Sample	NAD83	Au \$35/Oz	Au Oz/ton	Au gram/ton
1	594560E 5342298N	7.11	0.20	6.96
2	594560E 5342298N	16.91	0.48	16.56
3	594540E 5342290N	1.01	0.03	0.99
4	594540E 5342290N	15.24	0.44	14.93
5	594540E 5342290N	2.71	0.08	2.65
6	594420E 5342248N	6.10	0.17	5.98
7	594420E 5342248N	21.34	0.61	20.90
8	594673E 5342280N	9.82	0.28	9.62
9	594673E 5342280N	43.00	1.23	42.12
10	594673E 5342280N	16.93	0.48	16.58
11	594673E 5342280N	8.47	0.24	8.30
12	594673E 5342280N	35.85	1.02	35.12
13	594673E 5342280N	26.43	0.76	25.89
14	594673E 5342280N	98.54	2.82	96.53
15	594673E 5342280N	65.02	1.86	63.69

Coventry Ventures mapped the location of the old pits and sampled some of the rubble nearby, identifying gold concentrations up to 1.9 g/t in "Vein #3" from Figure 7(ref AFRI 32D04NE0035). Coventry then drilled at least two holes in 1988, targeting the Norwood Kirkland showing. Their logs describe several quartz veins and altered syenite and volcanic rocks; they report sample intervals but not assay results.



Wallbridge Mining performed minor manual stripping and limited sampling was completed at the Norwood Kirkland showing in the fall of 2008. A number of quartz veins were located and sampled, including "Vein #2" and "Vein #3". Samples returning 6.5, 6.0, and 3.8 g/t gold were collected from "Vein #3". The "High Grade Vein" was not located; given the topography in the area, this structure is likely not exposed at surface and was probably identified by Norwood Kirkland in drill core. MIS-01, MIS-02, and MIS-08 were drilled in January 2009, targeting the Norwood Kirkland showing.

MIS-01 was located at 594680E, 5342225N, dip of  $-45^{\circ}$ , at azimuth  $000^{\circ}$ , to a 74.68 m depth. MIS-01 was drilled at the Norwood-Kirkland showing beneath a hand-dug timbered shaft and a number of hand dug trenches that reported high grade gold (up to 96.5 g/t Au) in the 1930's, and the samples collected by Wallbridge in the fall of 2008 along strike which returned 6.5, 6.0, and 3.8 g/t Au. MIS-01 was planned for a depth of 150 metres and was abandoned at a depth of 74.68 metres before encountering the target. This hole intersected altered intermediate-mafic volcanic rocks cut by numerous altered feldspar porphyry dykes. At 37 metres a 16 centimetre quartz-carbonate healed fault breccia was intersected. Trace pyrite occurred throughout, in all rock types. No significant assays were returned.

MIS-02 was located at utm's 594600E, 5342145N, at dip  $-45^{\circ}$ , on azimuth  $000^{\circ}$ , to a 148.44 m depth. MIS-02 was also drilled on L46E, also at the Norwood-Kirkland showing. It also targeted ML-16, a weak but continuous chargeability anomaly identified by the 2008 Abitibi Geophysics DCIP survey.

MIS-02 intersected intermediate-mafic volcanic rocks cut by dykes of feldspar porphyry and syenite, all overprinted by pervasive silica, epidote, carbonate alteration and cut by many fine quartz, quartz-carbonate, carbonate veins and minor epidote and hematite fracture fillings. Thicker quartz veining is surrounded by intense sericite-quartzchlorite-pyrite alteration and an increase in quartz veinlets and chloritized hairline seams. This alteration shows weakly anomalous concentrations of gold, up to 60 ppb Au with a 2.20 metre interval averaged 0.10 g/t Au, associated with a small syenite dyke and andesite cut by many 4 millimetre quartz veinlets and carbonate micro-fractures. Trace to several percent pyrite occurs throughout the core, but was not sufficient to explain the geophysics.

MIS-08 was located at utm's 594595E, 5342325N, on a dip  $-45^{\circ}$ , at azimuth  $180^{\circ}$ , to a 154.53 m depth. MIS-08 was drilled on L46E at the Norwood Kirkland showing and was designed to undercut the historical pits and to scissor MIS-02. It intersected altered andesite, feldspar porphyry, and syenite. A small ductile shear zone, along with significant quartz-carbonate veining and alteration, was intersected almost directly beneath the historic pit. Between 37 and 40 metres, increased sericite and carbonate alteration with quartz and carbonate veinlets was associated with 0.11 g/t Au over 0.91 metres.

## THE VALLILLEE SHOWING

In the autumn of 2006, David Vallillee, of Sudbury, collected a sample containing 128 g/t Au (3.74 Oz/t Au) from an old grown-over pit near the northeast corner of Misema Lake. Vallillee held these claims in partnership with Peter Dellelce, of Sudbury. In June of 2007, Vallillee arranged for the drilling of two x-ray diamond drill holes (Table 2) totalling 104 feet beneath this surface occurrence. Vall-01 reported two high grade gold intervals, including 13 g/t Au over 76 cm and 7 g/t Au over 91 cm (core lengths, true widths are unknown). The steeper VALL-02 intersected anomalous gold concentrations. Drill logs for these two holes are on record at the government as assessment reports. (ref:AFRI 20003899)

In the fall of 2008, Wallbridge manually stripped and pressure washed a large section of outcrop at and around the Vallillee showing. This work exposed syenite and volcanic rocks cut by many cm-sized quartz veins, similar to that sampled by Vallillee. However, the initial rather spectacular results were not duplicated. A 0.5-1 metre wide dolomite-hematite-chlorite breccia vein containing fine disseminations of chalcopyrite was also exposed, however no significant assay results returned.

Drill holes MIS-05 and MIS-06 completed in 2009 targeted the Vallillee showing and were designed to scissor beneath VALL-01 and VALL-02.

The first part of the paper discusses the importance of understanding the underlying mechanisms of the observed phenomena. It is essential to identify the key factors that influence the system's behavior and to develop a theoretical framework that can explain the observed results. This involves a combination of experimental data and theoretical modeling, which allows us to test our hypotheses and refine our understanding of the system.

The second part of the paper focuses on the development of a mathematical model that can describe the system's behavior. This model is based on the principles of conservation of mass and energy, and it takes into account the various physical processes that are involved in the system. The model is then used to predict the system's behavior under different conditions, and the results are compared with the experimental data to validate the model.

The third part of the paper presents the results of the numerical simulations that were performed using the mathematical model. These simulations show that the model is able to accurately predict the system's behavior, and they provide valuable insights into the underlying mechanisms of the observed phenomena. The results also show that the system's behavior is highly sensitive to the initial conditions, and this sensitivity can be used to optimize the system's performance.

The fourth part of the paper discusses the implications of the results for the design and optimization of the system. It is clear that the system's behavior is highly sensitive to the initial conditions, and this sensitivity can be used to optimize the system's performance. For example, by carefully selecting the initial conditions, we can ensure that the system operates in a stable and efficient manner. This is particularly important in the design of systems that are used in critical applications, where even small variations in the initial conditions can have significant consequences.

The fifth part of the paper presents the conclusions of the study. It is clear that the mathematical model developed in this study is able to accurately predict the system's behavior, and it provides valuable insights into the underlying mechanisms of the observed phenomena. The results also show that the system's behavior is highly sensitive to the initial conditions, and this sensitivity can be used to optimize the system's performance. This study has important implications for the design and optimization of systems that are used in critical applications, and it provides a valuable framework for future research in this area.

In conclusion, this study has shown that the mathematical model developed in this study is able to accurately predict the system's behavior, and it provides valuable insights into the underlying mechanisms of the observed phenomena. The results also show that the system's behavior is highly sensitive to the initial conditions, and this sensitivity can be used to optimize the system's performance. This study has important implications for the design and optimization of systems that are used in critical applications, and it provides a valuable framework for future research in this area.







MIS-05 was set up at 594556E, 5341569N, with dip -45°, and azimuth 180°, to a 93.57 m depth. MIS-05 was drilled at the Vallillee showing and was designed to undercut the surface grab sample (128.2 g/t Au) collected by David Vallillee in 2006 and the two short X-Ray diamond drill holes (Vall-01 and Vall-02) that were completed for Vallillee.

The hole intersected altered andesite and several phases of altered syenite. Small, millimetre to centimetre quartz, quartz-carbonate, carbonate, and epidote-carbonate-quartz veins were common throughout the core. Dolomite-hematite-chlorite breccia veins, identical to those found at surface in this area, were intersected from 24.08 – 24.38 metres and from 25.53 – 26.52 metres. Trace disseminated pyrite occurs through all lithologies and very fine grained specks of disseminated chalcopyrite were identified in all vein types. Hornblende [mafic] syenite was intersected from 26.52 – 41.68 metres, characterized by medium grained hornblende (phenocrysts? Xenocrysts?) within a very fine grained, chalky, strongly hematized matrix. The mafic syenite is similar to that intersected in VALL-01 and VALL-02, suggesting a northward dip to the dyke.

MIS-06 was located at utm's 594558E, 5341477N, with dip -45°, at azimuth 000°, and drilled to a 93.27 m depth. MIS-06 was designed to undercut the Vallillee showing from the south, scissoring MIS- 05 in order to define the orientation of contacts and structures in this area. MIS-06 intersected mostly altered andesite, and confirmed the northward dipping nature of the syenite in MIS-05. One short interval of feldspar porphyry was intersected. Small quartz carbonate veinlets were common throughout the core. No significant assays were returned.

### MACDONALD

Carlyle's (1923) indicated that gold could be panned on the Macdonald, Wood, and Flood showings on the Misema Lake Peninsula where he described a number of feldspar porphyry [and presumable syenite] dykes "come together" (Figure 3). He mentions that at the time exploration was limited to "surface stripping with some trenching".

### WOOD SHOWING

In the 1980's Kerr Addison Mines drilled a hole near the Wood showing when they had optioned the ground from Len Cunningham. Drill logs for this are available in the assessment records, but no assays results were reported. The location of this hole is difficult to pin down from the old sketches. The author visited the area of the Wood showing a couple of times during the summer and fall of 2008. The Wood showing occurs on a gentle rising hill that is dotted by many old and overgrown pits, likely from the 1920's and 1930's, and at least one timbered shaft. Syenite and gabbro and minor quartz/quartz-carbonate veinlets are exposed in some of the pits, others are completely grown over (if they ever reached outcrop at all). Piles of rubble at the top of the timbered shaft contained abundant bull quartz veining with pyrite rich alteration selvages. Samples of this material returned up to 0.38 g/t gold, but the vein was never observed in outcrop. In 2009 small centimetre sized quartz veinlets were sampled by Wallbridge in two overgrown pits just off of the Beaverhouse ATV trail south of the Wood showing, and returned up to 0.14 g/t Au.

Drill hole MIS-07 targeted ML-07, a very strong chargeability anomaly identified by the 2008 Abitibi Geophysics survey which coincided with a very strong magnetic anomaly in the Wood showing area, but did not intersect quartz veining similar that that at the timbered shaft. The old pits and timbered shaft of the Wood area were identified along strike of MIS-07 within the same coincident chargeability/magnetic anomaly, and it was thought that the IP anomaly may represent an extension of similar structures.

MIS-07 was drilled at 592990E, 5341645N, dip -45°, azimuth 000°, to a 148.44 m depth. MIS-07 intersected a massive strongly magnetic gabbro with centimetre or greater sized amphibole grains and local accumulations of coarse (5 millimetre) magnetite grains. This gabbro is locally cut by many wisp carbonate veinlets and a number of massive feldspar porphyry and syenite dykes. In one instance, a clear contact relationship shows the syenite to be younger than the feldspar porphyry. The very coarse magnetite explains the IP response, but no veining was intersected and the drill hole is not thought to have tested the quartz structures observed at surface. No significant assays were returned.



## FLOOD

On Gledhill's (1928, Map 37G) map of the Ben Nevis area an "old shaft" is shown at the Flood Showing.

In 1964, Hogg describes work completed northeast of the Flood showing, on the "Fockler-Little- Lowe-Garvie group of claims". He describes four diamond drill holes totalling 1,068 feet (326 meters) completed in September and October of 1947, about 1500 feet (457 metres) north of North Arm and 1000 feet (305 metres) west of the Arnold-Katrine Township boundary. He indicates that "traces of gold were reported from assays".

## PREVIOUS - LOCAL WORK

The nearest gold production occurred about 2 kilometers south of the Misema Property at the Upper Beaver Mine, where there is a strong association between gold and late syenite and feldspar porphyry intrusions. The Upper Beaver (formerly the "Argonaut Mine and before that La Mine d'Or Huronia) historically produced 140,000 oz. of gold and an undisclosed amount of copper from 526,678 tonnes grading 8.3 g/t Au and 1% Cu. On September 22, 2008, Queenston Mining announced the first 43-101 compliant resource for the Upper Beaver, the results of 134 drill holes (97,065 m) they completed since 2005. Their estimate includes total indicated mineral resources of 1,373,500 tonnes grading 8.5 g/t Au (capped) (375,000 oz. of Au) with 0.43% Cu and total inferred mineral resources of 1,061,300 t grading 7.7 g/t Au (capped) (262,800 oz. of Au) with 0.39% Cu. On December 16, 2008, Queenston announced additional exploration success intersecting 30.3 g/t Au with 1.0 % Cu over 20.8 m, about 200 metres below the previously defined mineral resources. National Instrument 43-101 requires it be stated that information regarding mineralization on adjacent properties is not necessarily indicative of there being similar mineralisation on the Misema Lake Property.

The earliest documented geological work in the area of the Misema Property area was by C.W. Knight in 1919. This is reported in the Department of Mines Annual Report Volume 29 in 1920, which included map 29e, at a scale of 1 inch to 1 mile. This map was re-published in 1927 at a scale of 1 inch to 1 ½ mile. Knight describes quartz veins (including one north of North Arm on the township boundary), schistose rocks, red feldspar porphyry dykes and basalt in the area of the Property and recommends prospectors explore the area for gold. Knight also notes several "Indian Cabins" on the shores of Misema Lake, North Arm, and Howard Lake and observes that these are used seasonally during trapping season. One of these is on the point where the Beaverhouse First Nations community is currently established. In 1923, A. W. Carlyle provided a brief note on geology and exploration around the Misema Lake area on pages 87 and 88 of Ontario Department of Mines, Volume 32 (Figure 3). He described gold being panned on the Macdonald, Wood, and Flood claims.

In 1928, T.L. Gledhill revised Map 29e as Map 37g. (Department of Mines Annual Report Volume 37). Gledhill's map shows mining claims on the Misema Lake Peninsula and the location of an "old" shaft on the Flood claims near the township boundary immediately north of North Arm where there is currently a cottage. In the text he indicates most of the schistose rocks occur along the margins of late feldspar porphyry or syenite dykes and highlights these as prospecting targets for gold exploration.

Exploration in the 1930's near Misema Lake is documented in a report by Twomey, 1987, for Coventry Ventures (AFRI# 32D04NE0035). He describes: In the early 1930's, Enterprise Gold Syndicate (later Enterprise Gold Mines Limited) consolidated the original four claims into a 30 claim property and completed \$ 90,000 worth of trenching and test pitting.

In 1936, Enterprise was taken over by Norwood Kirkland Gold Mines Ltd., which conducted trenching, test pitting [in 1936], and diamond drilling [in 1938] on 12 quartz veins on the Property [this work further detailed in Twomey's report, summarized below].

Copies of two newspaper clippings (dated Dec 7th and Dec 28th, 1939) on file at the Kirkland Lake assessment office indicate that at this time Wright-Hargreaves Mines, Ltd. was granted an option by Norwood Kirkland on the project at Misema Lake. The clippings suggested Wright-



Hargreaves was planning further diamond drilling; however, no record of further work by either party has been found. According to Hogg (1964), Norwood Kirkland Gold Mines Ltd. drilled 14 diamond drill holes on their property two of which intersected gold values beneath surface showings. Their charter was cancelled in 1953.

In 1947, a number of test pits and four diamond drill holes totalling 1,068 feet were completed on the Fockler-Little-Lowe-Garvie claims, 1500 feet north of North Arm and 1000 feet west of the Arnold-Katrine Township boundary north of North Arm, near the older Flood showing. According to Hogg (1964) traces of gold were reported from assays.

In 1949, three diamond drill holes totalling 313 feet were cored north of Misema Lake, near the branch of the North Arm on the A.E. Linton Claims. According to Hogg (1964) no gold values were reported.

In 1960 the Anderson Group performed diamond drilling in the area of the Misema Lake property. This report summarizes nine (9) drill holes completed by the Anderson Group in June 1954 and March 1960 on the Misema River between Misema Lake and Beaverhouse Lake, near the Katrine-McVittie Township Boundary. Drill holes intersected basalt and andesite cut by quartz stringers. Sample intervals are recorded but no assay results reported. ref - AFRI: 32D04NE0054,

In 1964, W.A. Hogg reported on his mapping of Arnold and Katrine Townships during the summer of 1962 (ODM GR #29, Map 2061). Map 2061 shows mining claims on the Misema Peninsula and on the Misema River near the McVittie Township Boundary (location of Anderson Group's drilling from 1960, see above). It shows the location of the Norwood Kirkland workings, and drill holes to the north of North Arm near the Flood showing. The map also provides more detail on the distribution of syenite and syenite porphyry bodies and describes a large body of gabbro around North Arm. In his report he summarizes assessment work filed by prospector Dave Lowe, the Misema Lake Mining Corporation Ltd., and Norwood Kirkland Gold Mines Ltd. with the Ontario Department of Mines for early exploration in the Misema Lake area. His summaries are itemized above; however, at the time of writing, the author has been unable to obtain copies of any of these reports. Originals for these have likely been stolen from the assessment office over the years.

In July 1972, Noranda performed a ground mag in the area of the Misema property and in Oct 1972 followed up with a Vertical Loop EM. These two reports relate to a McPhar Vertical loop Magnetic/EM survey completed by Noranda at Misema Lake near the Wood showing. The reports describe a strong east-west conductor paralleling the contact of a gabbro cutting the volcanic rocks. They describe chalcopyrite mineralization 400' to the north of the anomaly and suggest that the conductor may represent a base metal [VMS] target. They proposed drilling, but there is no record of it. The old grid is difficult to locate. It appears the strongest conductor follows an E-W topographic low where the 2008 Abitibi DCIP survey identified a weak-moderate resistivity low. This feature is attributed to thickening of the overburden. Several other weak conductors are also described. Noranda's discussion of results is on pages 29 and 30 of a longer report that describes work on numerous properties across Ontario. ref AFRI: 32D04NE0066, AFRI: 32D04NE0063,

In June 1982, L Cunningham performed magnetometer survey on the Misema Lake property. In May and June of 1982, L. J. Cunningham completed a 23.24 mile ground magnetic survey around Misema Lake. The survey was completed on an extension of the cut grid previously established by Noranda. Magnetic highs in this survey are interpreted to reflect the distribution of the strongly magnetic syenite associated with gold mineralization. ref:AFRI: 32D04NE0052

In Dec 1982, L.J. Cunningham did mapping on the Misema Lake property. In November of 1982, L.J. Cunningham reported mapping results for six claim blocks on the Misema Peninsula, around the Wood Showing. Mapping was completed in November of 1982. Cunningham provides an excellent description of the geology in this area. ref: AFRI:32D04NW0051,



In March 1985, Kerr Addison Mines Ltd. optioned the Property from Cunningham and drilled two BQ drill holes, totalling 817 feet, near the Arnold-Katrine Township boundary between the north and south arms of Misema Lake. The drill holes intersected mafic volcanic rocks cut by numerous syenite porphyry dykes and quartz carbonate veining. No assays are reported in the assessment report, but in Twomey's 1987 report for Coventry Ventures (below) he describes Kerr Addison getting 190 ppb gold over 4.5 feet in one hole. Twomey had access to Kerr Addison results through Cunningham's records. One of the drill holes appears to have tested one of the weaker anomalies from Noranda's 1972 EM survey. ref-AFRI: 32D04NE0049

In Dec 1987, Coventry Ventures optioned Cunningham's claims in the Misema Lake area. In his report for Coventry, Twomey provides a good summary of the geology and history of exploration in this area. In this report Twomey emphasizes that, to his knowledge, the area has not been fully evaluated since the 1930's. He summarizes trenching completed by Norwood Kirkland Gold Mines Ltd. in the 1930's and provides a compilation map of these trenches. Re-sampling of the historic trench's yielded several multi-gram samples. Twomey noted, however, that the old workings were quite overgrown and much of the sampling was from old muck piles. He strongly recommended cleaning off some of the old workings and trenches and systematically re-evaluating the area. ref - AFRI:32D04NE0035,

In 1988 Drilling, Coventry Ventures completed two (2) BQ drill holes, CC88-1b and CC88-2, totally 1510 feet, on the Cunningham Prospect near Misema Lake. Drill holes were logged by Roger Hill under the supervision of Timothy Twomey. These intersected mafic volcanic rocks cut by multiple feldspar porphyry syenite dykes and quartz veins. Sampling seemed to focus on quartz veining and syenite altered to "Indian Red", but no analytical results are reported. Coordinates for these holes appear to reference the grid coordinates from maps included in Twomey's Dec 1987 report (above). ref - AFRI: 32D04NE0040,

In 1993 Sudbury Contact Mines completed 23 reverse circulation drill holes on two claim groups in Southern Arnold and Katrine Townships, and north central McVittie Townships. This work was designed to identify dispersion trails for gold and diamond indicator minerals. Three holes in south central Katrine Township returned anomalous gold counts (19, 32 and 35 total grains of gold).ref - AFRI: 32D04NE0050,

In 2005, A.S. Peloquin produced an update geological map for Ben Nevis and Katrine Townships (Map P3543-REV). Most of the work focussed on the geology alongside the Larder Station road and subsidiary logging roads, the interpretation of geology of the Misema Lake Property is mostly a compilation of Hogg's map from 1964.

In the autumn of 2006, David Vallillee collected a sample from an old pit (1930's?) near the northeast shore of Misema Lake that assayed 128 g/t Au (3.74 Oz/t Au) on claims he held jointly with Peter Dellelce. In June of 2007, Vallillee arranged for the completion of two x-ray diamond drill holes totalling 104 feet targeted beneath this surface occurrence. (ref : AFRI 20003899). Both holes were drilled at about 225° azimuth. VALL-01 drilled at -45° reported intersecting high grade gold, including 13 g/t Au over 76 cm and 7 g/t Au over 91 cm. The steeper VALL-02 reported intersecting anomalous gold concentrations, but no record of sample intervals has been found. Samples for hole VALL-1 were submitted for assay in two sets as follows

#### Summary of VALL-1 assay results, 2007.

Hole-ID	Sample	From(ft)	To(ft)	Length(ft)	g/t Au	Hole-ID	Sample	From(ft)	To(ft)	Length(ft)	g/t Au
VALL-01	809401	2.0	6.0	4.0	0.37	VALL-01	809408	0.0	2.0	2.0	0.137
VALL-01	809402	7.5	10.0	2.5	13.03	VALL-01	809409	6.0	7.5	1.5	0.010
VALL-01	809403	15.0	18.0	3.0	7.13	VALL-01	809410	10.0	12.5	2.5	nil
VALL-01	809404	18.0	21.5	3.5	0.71	VALL-01	809411	12.5	15.0	2.5	nil
VALL-01	809405	23.5	25.5	2.0	0.46	VALL-01	809412	21.0	23.5	2.5	0.223
VALL-01	809406	28.5	30.0	1.5	0.95	VALL-01	809413	25.5	27.5	2.0	0.002
VALL-01	809407	37.5	41.5	4.0	0.18	VALL-01	809414	27.5	28.5	1.0	0.545



In January, 2008, Wallbridge Mining and with Tanqueray Resources undertook an exploration program in Katrine Township which included the Misema Property. Canadian Mining Geophysics Ltd (CMG) was contracted to fly a 1,380 km helicopter-borne magnetic gradiometer and VLF-EM survey on the Wallbridge holdings. The survey provided high resolution (50 meter spacing) mapping of the strongly magnetic syenite intrusions near the Misema Lake area occurring on the Misema Property. Results are summarized in a report written by CMG, dated March 15, 2008

In September 2008 Abitibi Geophysics was contracted by Wallbridge to complete a 34 kilometre DCIP geophysical survey on the Property. The survey identified three strong multi-line chargeability anomalies that trend east-west and northeast-southwest. A number of weaker chargeability anomalies appear to map overburden thickness. It is possible that the survey did not penetrate through the thicker overburden areas. The Abitibi survey report is dated October, 2008. Several of the targets generated were later drill tested in January of 2009. (ref : AFRI 20005938).

Between August and November 2008 Wallbridge performed field work including locating and sampling the historic showings to confirm the presence of gold mineralization and identify structural controls. A total of 160 samples were collected for analyses. Minor manual stripping and limited sampling of overgrown trenches and shafts confirmed high grade mineralization at the Norwood Kirkland showing (grab samples up to 6.5, 6.0, and 3.8 g/t gold) and strongly anomalous gold concentrations (up to 0.7 g/t gold) at the Vallillee and Wood showings.

In January of 2009, Wallbridge, under contract to Tanqueray Resources, sub-contracted North Star Drilling Services to complete eight drill holes being MIS-01 through MIS-08, totalling 997.61 metres on the Misema Lake Property. (ref: AFRI 20007459). With the exception of holes MIS-03 & 04, the various drill hole summaries have been previously included in the various historic showings or areas targeted by the drilling, in the above sections.

MIS-03 was drilled at utm 594890E, 5341940N, at dip -45°, on azimuth 000°, to a 139.29 m depth. MIS-03 was drilled on L49E targeting ML-27(ref : AFRI 20005938), a strong two-line chargeability anomaly identified in the 2008 Abitibi Geophysics DCIP survey. It intersected a number of coarse accumulations of pyrite in the volcanic rocks, which explain the chargeability anomaly. MIS-03 also intersected epidote, hematite, carbonate and silica altered andesite and feldspar porphyry. A 0.61 metre sample from 35.05 to 35.66 returned 0.13 g/t Au. A mylonite shear zone associated with intense carbonate veining and pervasive carbonate alteration silicification occurred from 110.95 – 114.91 metres, including a 0.61 metre interval from 112.47 to 113.08 containing 0.33 g/t Au. This structure looks similar to that intersected in MIS-01, with many small high angle tensional carbonate (±quartz) veins outwards from the shear zone.

MIS-04 was located south east of MIS-03 at utm's 595309E, 5341663N, at a dip of -45°, on azimuth 000°, to a 145.39 m depth. MIS-04 was drilled on L53E targeting ML-24(ref : AFRI 20005938), a very strong chargeability that extends E-W across the grid for a strike length of 800 metres. It intersected coarse blebby accumulations and veinlets of pyrite in the volcanic rocks at the target depth, explaining the geophysics. MIS-04 also intersected altered andesite and syenite. These were cut by a ductile shear zone at a low angle to the core at about 90 metres depth. Within, and around the shear zone for tens of metres, abundant centimetre sized quartz-carbonate veins cut strongly carbonate and chlorite altered andesite and syenite. Again, tensional veins occur at a high angle to the core, shear veins parallel to the foliation occur at a low angle to the core. No significant assays were returned.

In the conclusions and recommendations of the Wallbridge program it is noted:

*"The strong chargeability anomalies identified in the 2008 Abitibi Geophysics survey appear to be explained by blebs and stringers of Fe-sulfide within the volcanic rocks. The survey does not appear to have "seen" through most of the areas covered in overburden. Despite the discouraging results of the recent drill program, the Misema Lake Property is still considered as prospective and underexplored. The presence of many gold occurrences on the Property (and in the area), the similarities with the geology and structure of the Kirkland Lake camp and the proximity to the Upper Beaver Deposit indicate that the Property is in the right environment for gold mineralisation.*

*Almost all work completed to date has relied on following up pits that were hand-dug in the 1930's. The swarm of syenite dykes and their associated magnetic anomalies extend over a four kilometre by two kilometre area, much of which is buried beneath clays and lakes that block geophysical imaging and "old-time" prospecting. Only a very small and shallow portion of this broad area of favourable geology has yet been tested".*



..... "A combination of field work and additional possible drilling is recommended at Misema Lake"..... "Drill Results from January 2009 should be carefully interpreted with respect to the historic Norwood Kirkland test-pits and gold showings in the surrounding area. The current interpretation of the orientation and extent of veining in the area is heavily reliant on several sketches from 1936 and 1938 and the possibility that the target has not been fully tested remains".

In the summer of 2015, the claim holders contracted to have exploration and prospecting work performed on the area of their claim holdings. The region of the Flood showing was chosed because of a lack of available submitted information. This is located on the north side of the north arm of Misema Lake, about 200 meters on the east side of the north-south Arnold - Katrine common township boundary. Mapping, light hand stripping and samples were taken of the rock types, alteration and mineralizations found, so as to report on the basic geology of the showings and the nature of the exposures.

## PRESENT WORK

After the initial summer of 2015 program done in the area of the Flood showing, the co-owner of the claim returned to make arrangements for boat transportation and an operator to visit the previous work site and take representative samples for assay purposes.

Descriptions of work areas from the September program are summarized to aid the reader. They are keyed to Figure - 5 (work area) at page 16 of this report. Sample numbers of this report coincide with the work areas they were taken from.

**A -** This likely is the Flood pit noted in the historical documents. The south side of the pit butts up to a 5 foot rock ledge which runs about east - west across the site for about 60 meters. The sides of the pit slope up 1 to 2 meters above water level with most of the broken rock material piled around the west and north sides. Outcrop in the pit area is previously mapped (Hogg et al 1962) as a diorite to quartz diorite. The pit appears to have been cited at an intersection of an east west deformation with a north-south quartz filled fracture set trending at about 355°, roughly paralleling a 350° to 355° trending diabase dike immediately to the west.

A rusty sheared section about 2 meters wide striking at about 063° and dipping at about 75° to the south is exposed at the south wall of the pit. Rusty oxidation occurs on the exposed shear surfaces and penetrates to about 5mm within the talus. Fresh surfaces appear somewhat bleached. The rock shows a grain or foliation as light to distinct mineral orientations or lineaments parallel to the 063° shearing. Within the shearing and to about 1 meter into the sides, the rock appears to be mildly bleached, with pale waxy sericite throughout. Less than 1% pyrite and chalcopyrite occurs as odd fine grains and aggregates, within the rock and some along veins and or random fractures. At the south west corner of the pit on the rock face, a strongly veined jointed section about 1.2 meters wide occurs. The section has about 30 to 40 - 2mm up to 3cm quartz veins/veinlets comprising about 50% of the section, trending at predominantly 355°. The veinlets pinch and swell to the south and are traceable up to the waters edge at the south end of the point of land but it appears that the rock face at the pit in proximity to the east west deformation is the most intense. This veining possible displacement along the 063° shear trend and projection north not resolved in the field at the time. Mineralization within this quartz filled fracture set is similar to the east - west shearing although no strong bleaching is noted away from the pit area. The veining decreases rapidly to the east and west of this section. Rocks encountered in the pit showed minimal magnetic attraction to a pen magnet. Some calcitic? sections of the quartz veins bubbled with dilute HCL (7%), none of the wall rock of the pit area showed bubbling. All wallrock was easily scratched with a common nail with some patches slightly harder or equal to a nail.

**Sample # A** Somewhat bleached mildly sericitic fine to medium grain diorite? Generally medium to light green from the south west corner wall of the pit. Little pyrite visible. Whole rock analysis was done to determine the nature of the alteration present. Sample was taken to test the alteration type present. No significant metal values indicated as sampled for geochem.

**Sample # A2** This sample was taken about 2 meters south of the pit in a much fresher appearing medium green, fine to medium diorite and was intended as a comparison for sample A. Unfortunately sample A2 as the control sample was missed by the lab and the assay results were not available at time of writing. Results will be appended to a subsequent work report.





**B** - Historic trenching about 7 meters long by about 0.7 meters wide and average .8 meters deep oriented at about 045°. Two vertical quartz veins about 20cm apart, varying from about 2cm to 5cm wide striking about 045° occur in the trench. A thin reddish hematite? stringer is noted parallel between these veins. The quartz is a whitish glassy appearing with little to no pyrite in the pieces observed. The veins appear to occur at the contact area of a clumpy looking sericitic breccia to the northwest, and a porphyritic syenite? to the southeast. The contact area does not appear to be shear related as the syenite and breccia intermix for 10cm to 20cm rather than a sharply defined contact. The breccia is composed of much random variously sized fragments of somewhat smokey, cherty appearing, sparsely pyritic quartz, in a sericitized medium to coarse feldspatic material with minor small clots of fine grain chloritic or mafic mineral. Numerous clasts up to 2cm of semi massive fine grained pyritized rock occur within this breccia material. Random fine pyrite cubes grains and aggregates occur throughout but likely less than 2% overall. The light rusty brown exposed breccia surface shows much small pitting likely from dissolved carbonate minerals. The breccia is generally easily scratched with a common nail. Testing with 7% HCL bubbles well on many of the whiter appearing feldspathic grains in the matrix. The syenite porphyry shows up to 35% whitish irregular feldspars up to 4mm in size in a blackish fine grained matrix. Numerous of the feldspars show partly a fleshy pink tinge possibly lightly hematized. Odd fine yellowish pyrite cubes and grains occur in the syenite and there is a marked increase at the syenite/breccia contact area.

**Sample #B Breccia.** Mild sericitic, composed of much smokey, cherty appearing, sparsely pyritic quartz, in a sericitized medium to coarse feldspatic material with minor small clots of fine grain chloritic or mafic mineral. Several pea size semi massive fine grained pyritized rock of unknown protolith. Random fine pyrite cubes grains and aggregates. No significant values.

**C** - Two intersecting veins occur in a fine grained medium greenish diorite at this location. The larger vein at up to 20cm wide trends at about 330° and dips at about 75° to the west-south-west and the smaller vertical vein at up to 10cm wide trends at about 005°. Both veins show brecciation with a clearer fine quartz stringers healing a whitish glassy quartz. Quartz trends to an light fleshy pink randomly among the various veins. Both veins are traceable to the waters edge or until overburden covered. In the region of the intersection of the veins, visually striking random aggregates and clots of predominantly coarse chalcopyrite and fine odd pyrite grains occurs. Small flecks of malachite were also noted in the vein material. Relatively flat smooth outcroppings. Random various sized rock fragments are noted to occur within the veins.

Numerous quartz carbonate veins occur seemingly filling joint sets all over the rock point examined. The more north-south jointing appears more intense to the west of the pit between the pit and the diabase dike, and appears to be somewhat parallel. The veins are from 1 to 16 inches in width. Heavy concentrations of pyrites, with minor chalcopyrite and odd specks of malachite occur randomly through the veins in clots. The main trend of the northerly striking veins is about 335° to 355°ast, with another joint set at between 30° to 50° also evident. There does not visually appear to be a cross-cutting relationship with the two directions but rather it appears that the veining was the same event.

**Sample #C Quartz vein** at location of intersection noted above. Whitish to almost transparent somewhat crystalline appearing with about 10% to 20% sharp to partly eroded greenish wallrock fragments. Random aggregates and clots of predominantly coarse chalcopyrite with odd 1-2mm cube pyrite grains at about 15% to 20%, Odd malachite specks and wisps.

This sample showed greater than **10% copper** with about **9.6 grams** per tonne associated silver and a little lead. At surface the 10cm to 40cm veins may be too dispersed to be of significant potential. If the veins coalesce into a larger mass or if any breccia type pipes or shoots are identified these would make interesting targets.

More work at this site is recommended to further assess the mineral potential here. Perhaps a tight geophysical survey to target chalcopyrite accumulations for drill testing would be beneficial.





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# Swastika Laboratories Ltd

Assaying - Consulting - Representation

Page 1 of 1

## Assay Certificate

**Certificate Number: 15-2083**

Company: **David Vallillee**

Project: **Misema**

Report Date: **01-Oct-15**

Attn: **David Vallillee**

*We hereby certify the following Assay of 4 rock/grab samples  
submitted 28-Sep-15 by David Vallillee*

Sample Number		Au	Au Chk	Sample
		FA-MP	FA-MP	Prep
		ppb	ppb	
A		10		
A2	1			
B		5		
C	1	2		

1. No Reject

Certified by *J. Lin*  
Jing Lin, M Sc.

1 Cameron Ave., P.O. Box 10, Swastika, Ontario P0K 1T0  
Telephone (705) 642-3244 Fax (705) 642-3300



**Date Submitted:** 05-Oct-15  
**Invoice No.:** A15-08407  
**Invoice Date:** 29-Oct-15  
**Your Reference:** MISEMA 15-2083

Swastika Labs  
Box 10, 1 Cameron Ave.  
Swastika ON P0K 1T0  
Canada

ATTN: Colleen Chouinard

## CERTIFICATE OF ANALYSIS

3 Pulp samples were submitted for analysis.

The following analytical package was requested:

Code 1E3 Aqua Regia ICP(AQUAGEO)  
Code 4B (1-10) Major Elements Fusion ICP(WRA)

REPORT      **A15-08407**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

**Notes:**

Total includes all elements in % oxide to the left of total.  
Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

A handwritten signature in black ink, appearing to read "Emmanuel Esemé".

Emmanuel Esemé , Ph.D.  
Quality Control

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## Results

## Multi - AR- ICP

Analyte Symbol	Th	Ag	Cd	Cu	Mn	Mo	Ni	Pb	Zn	Al	As	B	Ba	Be	Bi	Ca	Co	Cr	Fe
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%
Lower Limit	20	0.2	0.5	1	5	1	1	2	2	0.01	2	10	10	0.5	2	0.01	1	1	0.01
Method Code	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP
A	< 20	< 0.2	< 0.5	77	1010	< 1	78	< 2	70	2.06	< 2	< 10	36	< 0.5	< 2	3.91	25	82	5.55
B	< 20	< 0.2	< 0.5	11	180	1	10	4	30	0.65	3	< 10	84	< 0.5	< 2	2.23	4	177	1.45
C	< 20	9.6	< 0.5	> 10000	56	< 1	14	13	25	0.16	< 2	< 10	26	< 0.5	< 2	0.52	3	259	2.00

	Ga	Hg	K	La	Mg	Na	P	S	Sb	Sc	Sr	Ti	Te	Tl	U	V	W	Y	Zr
	ppm	ppm	%	ppm	%	%	%	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	10	1	0.01	10	0.01	0.001	0.001	0.01	2	1	1	0.01	1	2	10	1	10	1	1
	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP
A	< 10	< 1	0.16	< 10	2.08	0.075	0.055	0.04	3	9	61	< 0.01	< 1	< 2	< 10	51	< 10	4	4
B	< 10	< 1	0.24	< 10	0.17	0.017	0.017	0.55	< 2	2	45	0.06	< 1	< 2	< 10	3	< 10	9	28
C	< 10	< 1	0.06	< 10	0.09	0.015	0.012	1.61	2	< 1	5	0.03	2	< 2	< 10	7	< 10	< 1	8

## WRA

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Ba	Sr	Y	Sc	Zr	Be	V
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	2	2	1	1	2	1	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP
A	46.02	17.86	9.54	0.156	4.39	6.00	1.23	2.51	0.971	0.17	11.73	100.6	217	148	16	26	103	< 1	199
B	68.59	13.86	3.77	0.047	0.80	5.03	0.41	3.73	0.290	0.06	3.82	100.4	668	187	36	7	200	1	15
C	91.48	1.50	2.97	0.011	0.22	0.70	0.03	0.42	0.132	0.02	1.62	99.09	107	6	12	3	17	< 1	30

## QC

Analyte Symbol	Th	Ag	Cd	Cu	Mn	Mo	Ni	Pb	Zn	Al	As	B	Ba	Be	Bi	Ca	Co	Cr	Fe	Ga	Hg	K	La
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm
Lower Limit	20	0.2	0.5	1	5	1	1	2	2	0.01	2	10	10	0.5	2	0.01	1	1	0.01	10	1	0.01	10
Method Code	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP
GXR-1 Meas	< 20	31.0	1.9	1200	780	15	31	601	709	0.31	371	< 10	239	0.8	1660	0.81	5	5	22.2	< 10	3	0.03	< 10
GXR-1 Cert	2.44	31.0	3.30	1110	852	18.0	41.0	730	760	3.52	427	15.0	750	1.22	1380	0.960	8.20	12.0	23.6	13.8	3.90	0.050	7.50
NIST 694 Meas																							
NIST 694 Cert																							
DNC-1 Meas																							
DNC-1 Cert																							
GBW 07113 Meas																							
GBW 07113 Cert																							
GXR-4 Meas	< 20	3.5	< 0.5	6390	134	313	35	39	69	2.25	103	< 10	39	1.3	14	0.83	12	47	2.90	10	< 1	1.56	34
GXR-4 Cert	22.5	4.0	0.860	6520	155	310	42.0	52.0	73.0	7.20	98.0	4.50	1640	1.90	19.0	1.01	14.6	64.0	3.09	20.0	0.110	4.01	64.5
GXR-6 Meas	< 20	0.3	< 0.5	60	844	2	18	75	103	5.49	182	< 10	1420	0.8	< 2	0.20	11	61	4.80	10	< 1	0.88	< 10
GXR-6 Cert	5.30	1.30	1.00	86.0	1010	2.40	27.0	101	118	17.7	330	9.80	1300	1.40	0.290	0.180	13.8	96.0	5.58	35.0	0.0680	1.87	13.9
W-2a Meas																							
W-2a Cert																							
SY-4 Meas																							
SY-4 Cert																							
BIR-1a Meas																							
BIR-1a Cert																							
B Orig	< 20	< 0.2	< 0.5	12	184	1	10	4	31	0.67	3	< 10	86	< 0.5	< 2	2.28	4	183	1.48	< 10	< 1	0.25	10
B Dup	< 20	< 0.2	< 0.5	11	176	1	11	4	30	0.64	3	< 10	82	< 0.5	< 2	2.18	4	172	1.41	< 10	< 1	0.24	< 10
Method Blank	< 20	< 0.2	< 0.5	< 1	< 5	< 1	< 1	< 2	< 2	< 0.01	3	< 10	< 10	< 0.5	< 2	< 0.01	< 1	< 1	< 0.01	< 10	< 1	< 0.01	< 10

## QC

Analyte Symbol	Mg	Na	P	S	Sb	Sc	Sr	Ti	Te	Tl	U	V	W	Y	Zr	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O
Unit Symbol	%	%	%	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.001	0.001	0.01	2	1	1	0.01	1	2	10	1	10	1	1	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01
Method Code	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP
GXR-1 Meas	0.13	0.050	0.033	0.19	82	1	141	< 0.01	14	< 2	27	76	130	23	16								
GXR-1 Cert	0.217	0.0520	0.0650	0.257	122	1.58	275	0.036	13.0	0.390	34.9	80.0	164	32.0	38.0								
NIST 694 Meas																11.80	1.91	0.74	0.010	0.35	43.35	0.90	0.58
NIST 694 Cert																11.2	1.80	0.790	0.0116	0.330	43.6	0.860	0.510
DNC-1 Meas																47.31	18.37	9.85	0.150	10.08	11.25	1.90	0.23
DNC-1 Cert																47.15	18.34	9.97	0.150	10.13	11.49	1.890	0.234
GBW 07113 Meas																70.50	12.38	3.18	0.140	0.14	0.59	2.31	5.27
GBW 07113 Cert																72.8	13.0	3.21	0.140	0.160	0.590	2.57	5.43
GXR-4 Meas	1.46	0.119	0.106	1.64	5	6	64	0.11	5	< 2	< 10	70	17	10	9								
GXR-4 Cert	1.66	0.564	0.120	1.77	4.80	7.70	221	0.29	0.970	3.20	6.20	87.0	30.8	14.0	186								
GXR-6 Meas	0.33	0.102	0.024	0.01	3	16	40		< 1	< 2	< 10	136	< 10	5	10								
GXR-6 Cert	0.609	0.104	0.0350	0.0160	3.60	27.6	35.0		0.0180	2.20	1.54	186	1.90	14.0	110								
W-2a Meas																52.91	14.98	10.68	0.170	6.22	10.98	2.17	0.64
W-2a Cert																52.4	15.4	10.7	0.163	6.37	10.9	2.14	0.626
SY-4 Meas																50.00	21.03	6.00	0.110	0.51	7.83	7.11	1.73
SY-4 Cert																49.9	20.69	6.21	0.108	0.54	8.05	7.10	1.66
BIR-1a Meas																47.55	15.73	11.51	0.170	9.59	13.64	1.77	0.02
BIR-1a Cert																47.96	15.50	11.30	0.175	9.700	13.30	1.82	0.030
B Orig	0.17	0.017	0.017	0.57	< 2	2	46	0.06	3	< 2	< 10	3	< 10	9	27								
B Dup	0.17	0.016	0.016	0.54	< 2	2	43	0.06	< 1	< 2	< 10	3	< 10	9	28								
Method Blank	< 0.01	0.010	< 0.001	< 0.01	< 2	< 1	< 1	< 0.01	< 1	< 2	< 10	< 1	< 10	< 1	< 1								



## QC

Analyte Symbol	TiO2	P2O5	Ba	Sr	Y	Sc	Zr	Be	V
Unit Symbol	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	0.01	2	2	1	1	2	1	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP
GXR-1 Meas									
GXR-1 Cert									
NIST 694 Meas	0.120	30.23							1633
NIST 694 Cert	0.110	30.2							1740
DNC-1 Meas	0.480	0.06	105	146	16	31	39		155
DNC-1 Cert	0.480	0.070	118	144.0	18.0	31	38		148
GBW 07113 Meas	0.270	0.04	493	41	47	5	403	4	6
GBW 07113 Cert	0.300	0.0500	506	43.0	43.0	5.00	403	4.00	5.00
GXR-4 Meas									
GXR-4 Cert									
GXR-6 Meas									
GXR-6 Cert									
W-2a Meas	1.050	0.13	174	193	19	36	95	< 1	273
W-2a Cert	1.06	0.130	182	190	24.0	36.0	94.0	1.30	262
SY-4 Meas	0.290	0.12	352	1195	119	1	544	3	10
SY-4 Cert	0.287	0.131	340	1191	119	1.1	517	2.6	8.0
BIR-1a Meas	0.990	0.02	7	110	13	43	17	< 1	335
BIR-1a Cert	0.96	0.021	6	110	16	44	18	0.58	310
B Orig									
B Dup									
Method Blank									

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