YMIP 2015

FOCUSED REGIONAL

PROJECT 15-033

MOD LEAD-ZINC-SILVER PROSPECT

REPORT OF FIELDWORK

T. Liverton

W.D. Mann

December 2015

LOCATION

The Mod (Bom) property is located at the southwestern headwaters of the Swift River. Claim map sheet 105B-3 shows the Patience 1-4 claims (YE85697-YE85699) that cover the original Mod 1-4 claims and peripheral claims Patience 5-8 (YD10896-YD10899). The centre of the block is at 60°08'N, 131°13W. Access is possible using a four wheel drive road from the Alaska Highway via the Pine Lake airstrip.

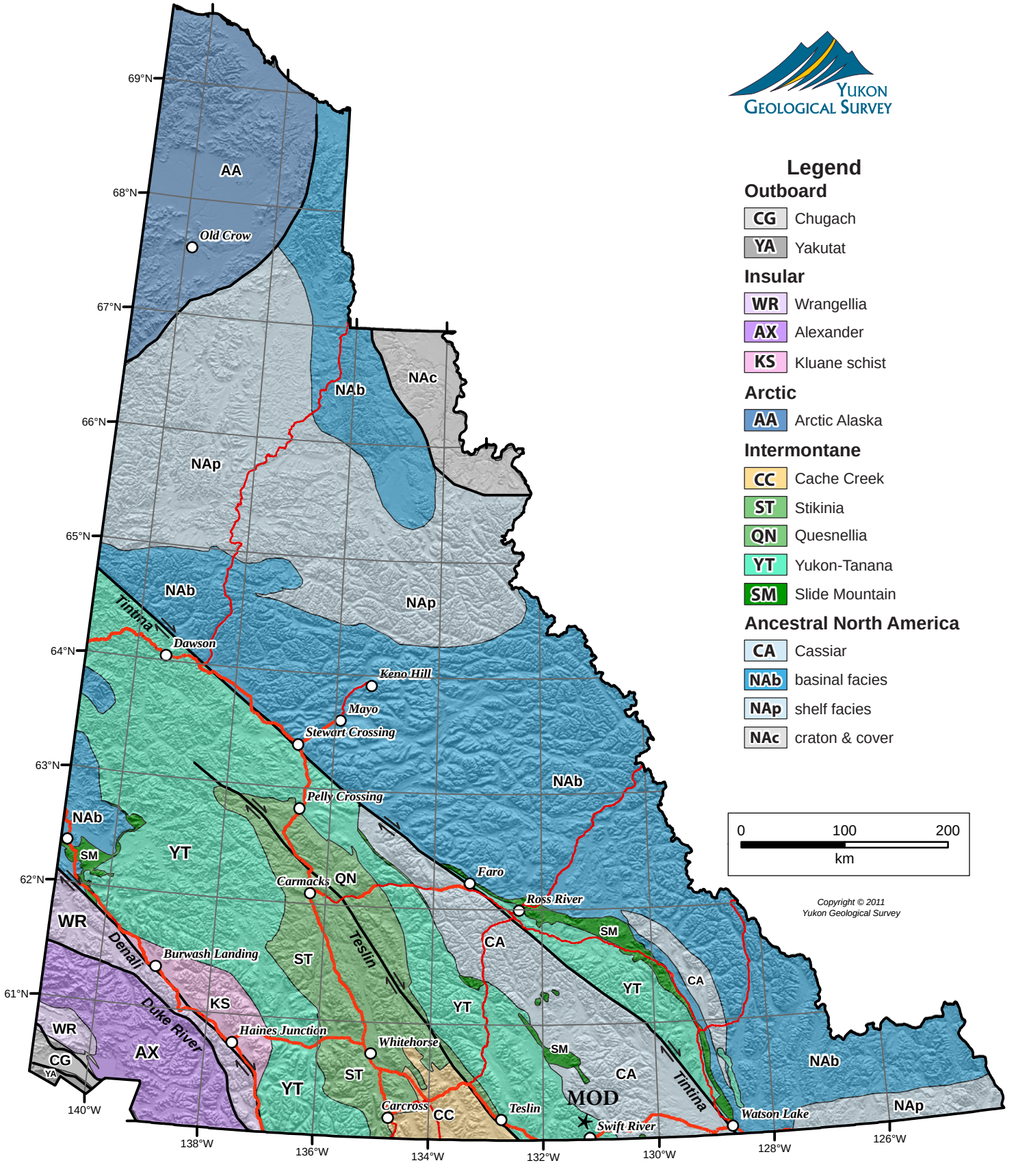
INTRODUCTION

The Mod property (Minfile 105B-028), originally called the Bom prospect, was discovered in 1946 by prospectors working for Hudson Bay Mining and Smelting. They drilled 18 diamond drill holes in the region in 1947, as well as trenching three localities. A map and some cross sections remain (Assessment report A092107), but no detailed logs are available. Drill core is no longer preserved. Boswell River Mines also drilled on the property, but documentation of this work is sketchy and no identifiable core remains. None of the drill sites are now recognizable. In more recent times the obvious showings were covered by four ('Mod') claims held by Henry Regehr until 2013. The prospect is now covered by the Patience claims held by Hardy Hibbing.

During the time that Henry Regehr held the property the only work done was bulldozer stripping. This obliterated the original Hudson Bay trenching and actually obscured much of the mineralization since the cuts were never cleaned down to rock surface. Less than one metre of sulphide was originally visible at either locality.

It was planned to uncover outcropping sulphide mineralization in existing bulldozer trenches at both the Mod property and the on-strike TBMB prospect 2km to the NW. The combination of an extremely rainy season and other work commitments resulted in just the work on the Mod prospect being carried out.

This present work consisted of using a Candig backoe and much pick-and-shovel effort to clean a small part of two of the original dozer cuts. The topographically lower showing was



LOCATION AND BEDROCK TERRANES - MOD PROJECT

Hibbing, Liverton & Mann

channel sampled using a jackhammer. The thickness of mineralization uncovered by this present work is consistent with that shown in the trenches drawn on the Hudson Bay 1947 map.

In addition the immediate region of the prospect was covered by a ground magnetic survey to investigate response of the mineralization.

GEOLOGY

The prospect occurs within the Yukon Tanana terrane in a sequence of siliciclastic sediments, volcanics and marble that are assigned to the Dorsey assemblage of Devonian age. The Mod mineralization is peripheral to a marble horizon that crops out intermittently along the local ESE strike of the metasediments. The metsediments have been polydeformed and metamorposed to greenschist facies. The style of folding is indicated in Silva (2000) and it would result in major folds with perhaps 200m wavelength. To the north and northeast of the prospect a granite stock that is an apophysis of the Cretaceous Seagull batholith is exposed in the deep canyon below the prospect and on the ridge to the northeast. The proximity of the stock has resulted in contact metamorphism of the greenschist grade metasediment forming abundant pyroxene around the prospect. Whether the original mineralization was of stratiform (VMS), high-temperature replacement of carbonate or skarn origin is currently debated. If the mineralized horizon is of regional extent, then repetition by folding is likely. Mineralogy at the Mod consists predominantly of pyrrhotite-sphalerite-tetrahedrite-galena in a pyroxene gangue. A kilometre to the east the on-strike mineralization consists of sphalerite with magnetite.

2015 WORK

The 2015 work was aimed primarily at cleaning up two the sulphide showings that had been partially exposed in the old bulldozer trenches. Two locations were chosen: the lowest being 20 metres above the creek and the upper showing immediately below the common corner of the Patience 1, 2, 3 and 4 claims. At the lower showing a 2.2m thickness of mineralization was exposed. The outcrop was drilled every 10cm or less with a cobra drill to define the channel

and the rock between holes removed with the breaker tool to yield a small channel sample of 80.2 kg total. These samples were passed through a jaw crusher to reduce particle size to a final ≤ 6mm and split three times with a riffle splitter. The final split was submitted to ALS for assay of base metals, silver and gold. The upper showing of 6.8 m exposed thickness remains to be sampled. Nine specimens of the mineralization and three from surrounding country rock were collected and sent to Vancouver Petrographics for thin and polished thin section preparation.

A ground magnetic survey was performed by Bill Mann, using base station and roving instrument with GPS location. Reduction and compilation of the data was carried out by Aurora Geophysics.

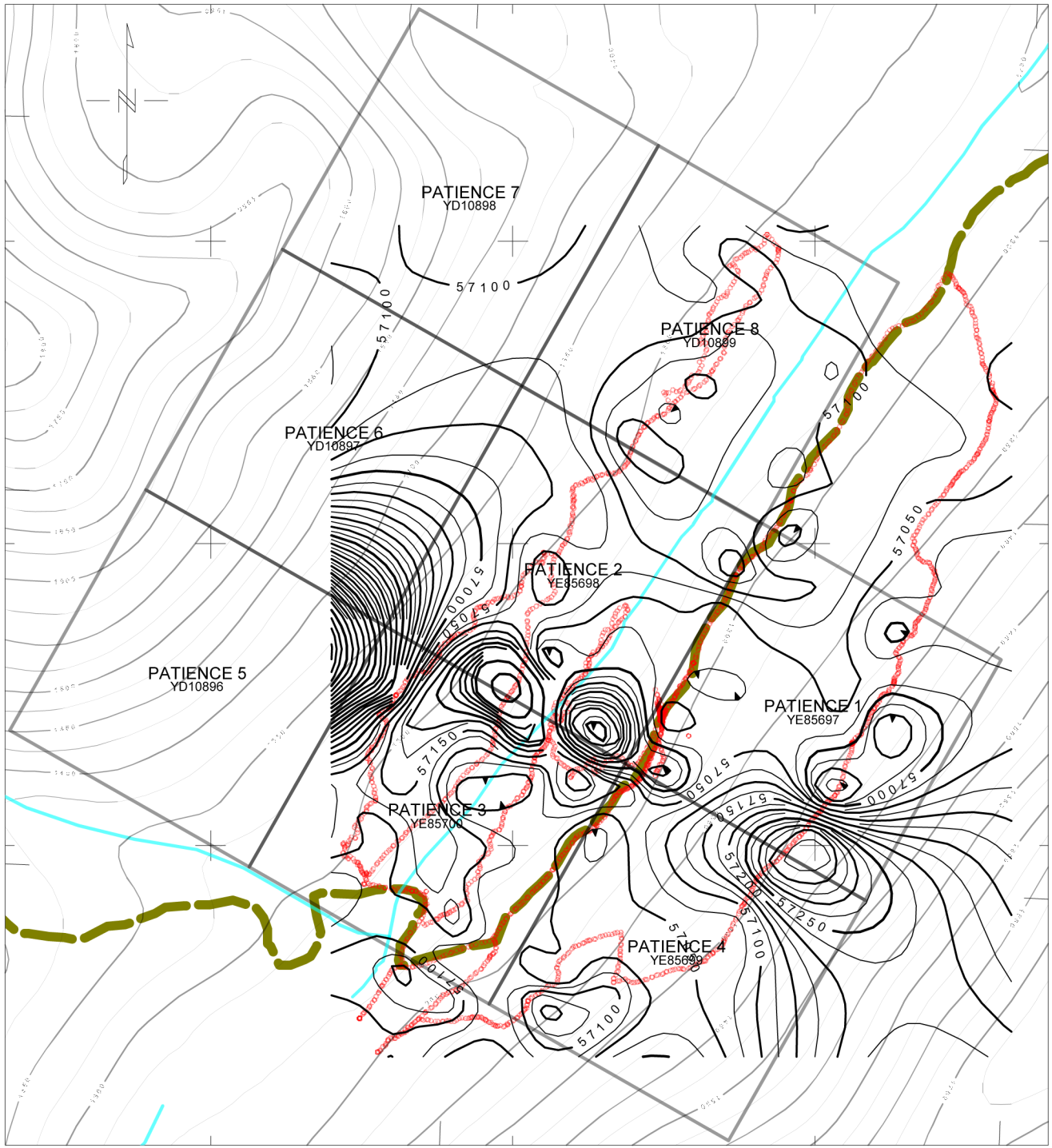
A preliminary topographic survey using theodolite and laser EDM equipment was performed to provide control for detailed mapping.

RESULTS

2015 Magnetometer Survey

A ground magnetometer survey was conducted between August 19 to 22 at the property by W.D. Mann. The survey was partly conducted along the roads and trails that cross the property for ease of travel. Much of the lower part of the claims is covered by very dense vegetation. Some traverses were also conducted roughly midway between trails in order to improve survey density. One upper level traverse was conducted on rocky terrain near treeline on the south side of the property.

The survey used a Gem Systems GSM-19 Overhauser unit as a base station and a GSM-19T Proton unit as a mobile unit. The equipment was rented from Aurora Geosciences Ltd., with instruction provided by Dave Hildes. The magnetometer system was time-synched with a Garmin handheld GPS, and the GPS track (with 10 second readings) used for mag station positioning. GPS location during the survey was generally accurate to within 3 meters. Magnetometer readings were collected at roughly 5m intervals. The magnetometer data was



LEGEND

TOTAL FIELD MAGNETICS

CONTOUR INTERVALS (nT)

25

50

250

REFERENCE FIELD : 57,113 nT

INSTRUMENT : GEM GSM-19T

GRIDDING ALGORITHM : MINIMUM CURVATURE

GRID CELL SIZE : 25 m

FILTER : HANNING FILTER

FILTER SPECS : 1 PASSES

DATA FILE : Patience_Mag.GDB

STATION SEPARATION : ~10 m

LINE-KM SURVEYED THIS SHEET : ~10 km

Scale 1:10000

100 0 100 200 300 400

(meters)

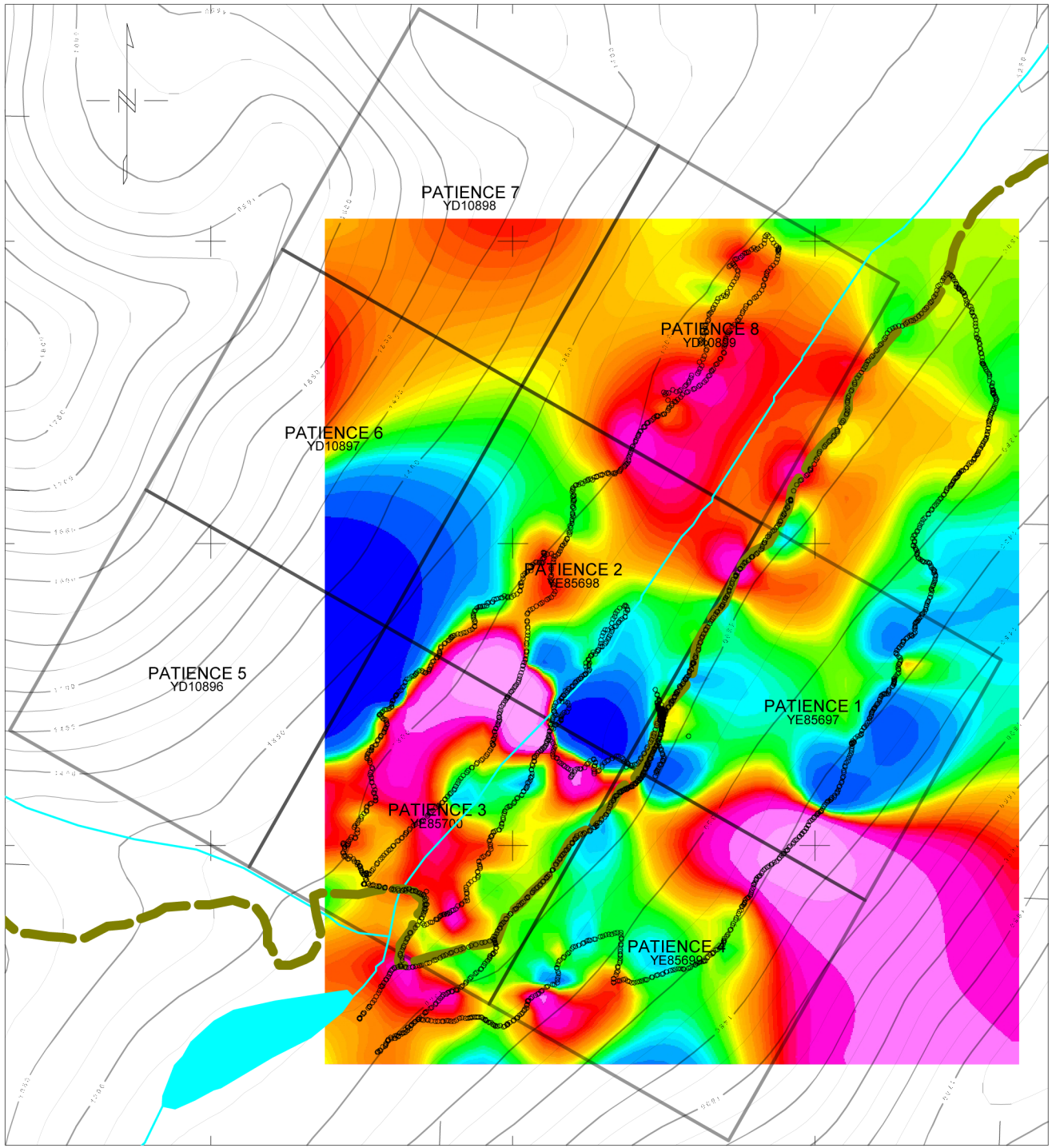
NAD83 / UTM zone 9N

HIBBING LIVERTON & MANN

TOTAL FIELD MAGNETICS SURVEY
PATIENCE CLAIMS
WMN_15530_YT

Date Surveyed: August 20-21, 2015
NTS Mapsheet: 105 B/03
Map Name: Patience_Mag_Contour.MAP
Drawn By: DE, MC, DH - 2015-12-02

Aurora Geosciences Ltd.



LEGEND

TOTAL FIELD MAGNETICS

REFERENCE FIELD : 57,113 nT

INSTRUMENT : GEM SYSTEMS GSM-19

GRIDDING ALGORITHM : GEOSOFT MINIMUM CURVITURE

GRID CELL SIZE : 25 m

DATA FILE : Patience_Mag.GDB

OPERATORS : BM

STATION INTERVAL : ~10m

LINE-KM SURVEYED THIS SHEET : ~10 Km

57205
57148
57131
57119
57107
57099
57090
57082
57075
57068
57063
57059
57053
57046
57038
57029
57018
56992
56854

Magnetic Field Strength
(nT)

Scale 1:10000

100 0 100 200 300 400

(meters)

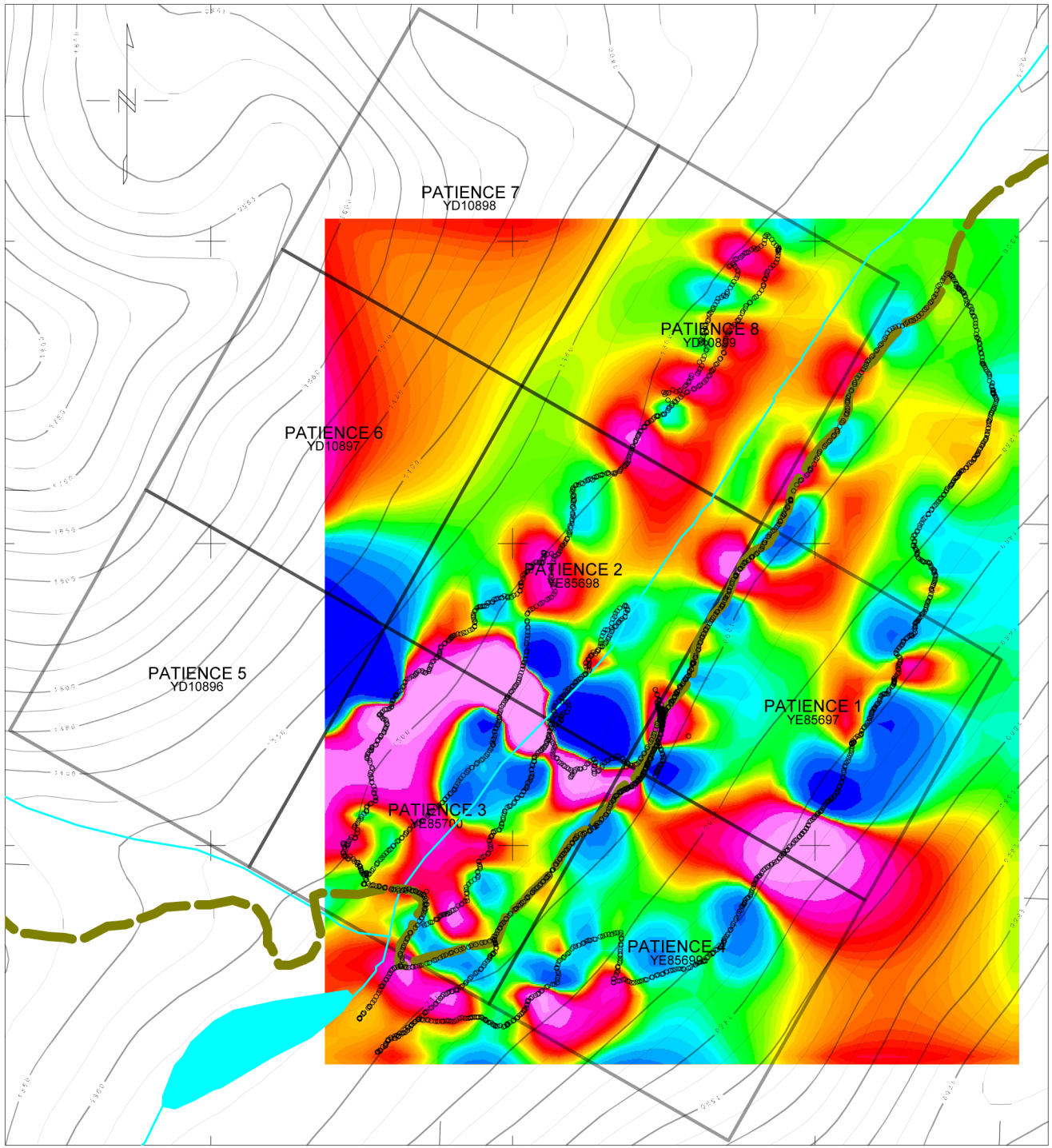
NAD83 / UTM zone 9N

HIBBING LIVERTON & MANN

TOTAL FIELD MAGNETICS SURVEY
PATIENCE CLAIMS
WMN_15530_YT

Date Surveyed: August 20-21, 2015
NTS Mapsheet: 105 B/03
Map Name: Patience_Mag_Grid.MAP
Drawn By: DE, MC, DH - 2015-12-02

Aurora Geosciences Ltd.



LEGEND

TOTAL FIELD MAGNETICS

REFERENCE FIELD : 57,113 nT

INSTRUMENT : GEM SYSTEMS GSM-19

GRIDDING ALGORITHM : GEOSOFT MINIMUM CURVITURE

GRID CELL SIZE : 25 m

DATA FILE : Patience_Mag.GDB

OPERATORS : BM

STATION INTERVAL : ~10m

LINE-KM SURVEYED THIS SHEET : ~10 Km

2
1
1
1
1
0
0
0
0
0
0
-0
-0
-0
-0
-0
-0
-1
-1
-1
-3

Calculated First Vertical Derivative of TMI
(nT/m)

Scale 1:10000

100 0 100 200 300 400
(meters)

NAD83 / UTM zone 9N

HIBBING LIVERTON & MANN

TOTAL FIELD MAGNETICS SURVEY
PATIENCE CLAIMS
WMN_15530_YT

Date Surveyed: August 20-21, 2015
NTS Mapsheet: 105 B/03
Map Name: Patience_Mag_Grid.MAP
Drawn By: DE, MC, DH - 2015-12-02

Aurora Geosciences Ltd.

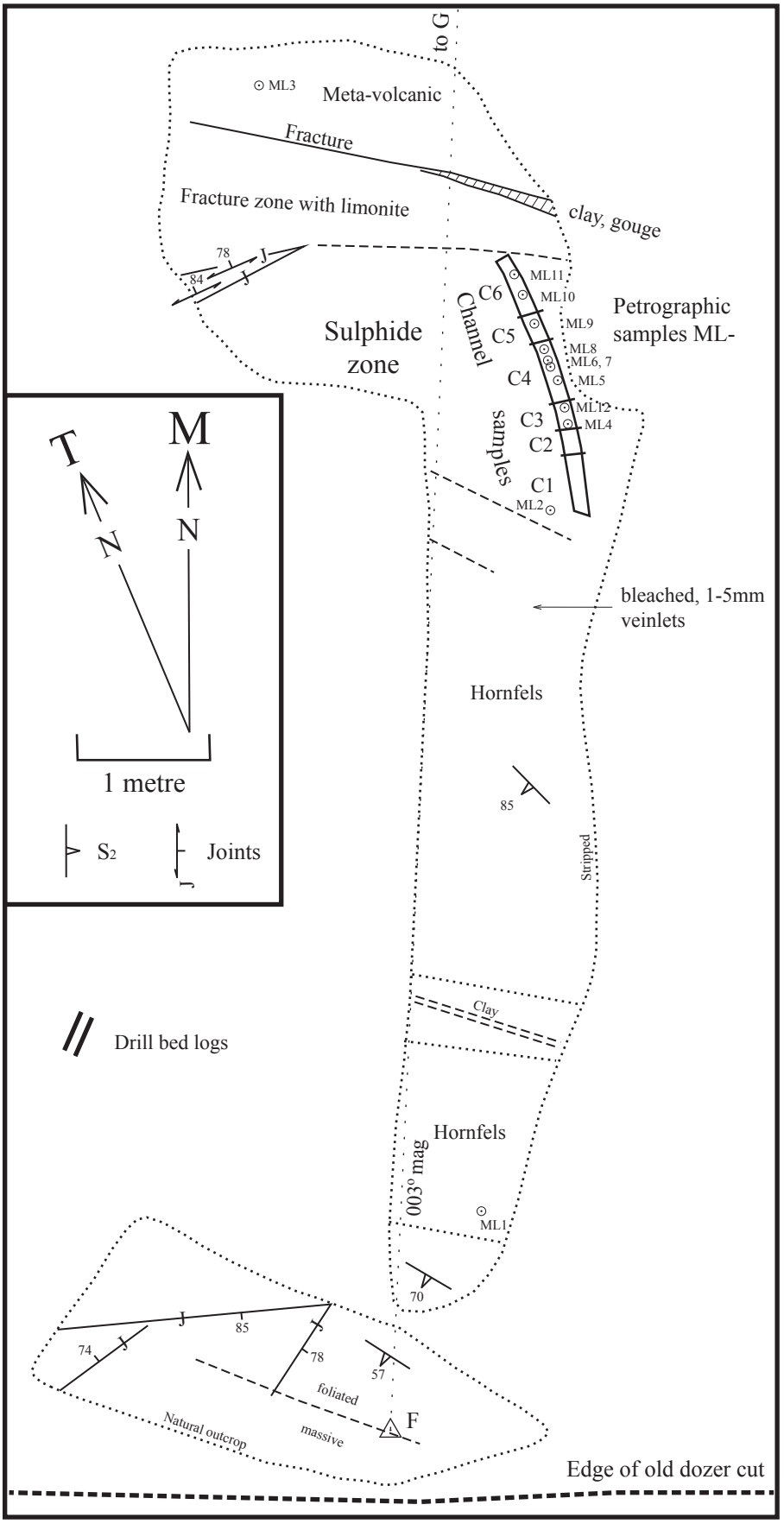
downloaded into Gemlink V5.3 software, and the results processed, reviewed and plotted by Aurora Geosciences Ltd.

The valley bottom on the claims is covered with thick buckbrush and thickets of balsam fir. There is little outcrop present in the valley, though the ridges on each side have abundant outcrop. The valley vegetation overlies glacial material that is sometimes boggy, but mostly very sandy soil with large, rounded boulders. Soil geochemistry is not likely to be very useful in this type of surficial material, which led to the decision to try geophysics. The main mineralized zone contains variable quantities of both magnetite and pyrrhotite, so a strong magnetic response was expected. It was hoped that additional magnetic anomalies would be present under the valley cover, indicating repetition of the mineralized horizon.

The results of the Total Field Magnetometer survey are presented in three maps. The first shows the magnetic field strength in contours, the second shows the results in colour coded grid, and the third shows the Calculated First Vertical Derivative of TMI in colour coded grid. The survey locations are shown as dark circles, and the main road is a dashed gold colour. The main mineral zone is located near the boundary between the Patience 1 and 4 claims and the 2 and 3 claims. The strongest, most continuous anomaly follows the zone. In addition to this anomaly several other anomalies are evident on the claims. Additional work to follow up on these anomalies is recommended.

Mapping

The lower and upper showings are shown in sketches (Figs. 5 & 6) which were prepared using tape and offset measurements. The control survey is presented as Fig. 7. The surveying was performed using a Kern K1-S theodolite and DM502 laser distance meter. For this equipment precision in turning angles is ≤ 0.2 minutes and distance is typically {± 1cm ± 2ppm}. This is of course far more precise than is needed for the present work, but use of this instrument allowed rapid measument from a single set-up at station ‘A’ and if vertical contol is needed in the future, this will be accurate. Orientation was obtained from a measurement with a tripod-mounted surveyor’s compass (± 15 minutes angle). A peak to the west of station A was found to bear 204° magnetic. UTM coordinates were calculated for station A as origin using a long-


to G
ML3
Meta-volcanic
Fracture
Fracture zone with limonite
clay, gouge
78
84
J
Sulphide zone
Channel samples
C6
C5
C4
C3
C2
C1
ML11
ML10
ML9
ML8
ML6, 7
ML5
ML12
ML4
ML2
Petrographic samples ML-
T
M
N
N
1 metre
S2
Joints
J
bleached, 1-5mm veinlets
Hornfels
85
Stripped
Clay
Drill bed logs
Hornfels
003° mag
ML1
70
74
J
85
78
57
foliated
massive
F
Natural outcrop
Edge of old dozer cut

377190E

6669,150N

72

60

148

E

Rock
exposures

80

T

N

MOD UPPER SHOWING

ROAD

15.8m 160 deg. mag.

Ferricrete

Sulphide
exposure

6.8 m

Specimen
MU1

Mullock
heap

Ferricrete

Specimen
MU2

Sulphide
exposure

1 m

MOD PROSPECT CONTROL SURVEY

6,669,500N

6,669,000N

377,000E

377,300E

Patience 1

Patience 2

Patience 3

Patience 4

L

A At edge of moraine

I

J

K

Control points I, J & K are on the east bank of the creek

G

F

Lower showing

Old dozer cut

Camp

H

E

D

Upper showing

C

B

Road surveyed by compass & tape

100m grid squares

T

N

averaged reading with a hand held GPS intrument. Magnetic variation and convergence were calculated using the NRCan interactive program. GPS readings with the hand-held instrument at several of the other stations were compared to the calculated coordinates. All agreed to within 5 metres. Detailed geological sketches were prepared using tape and offset measurements from survey stations E, F and G.

At the lower showing the southernmost rock exposure was mapped as a hornfels. The petrographic examination (specimen ML1) indicates that it has a quartz-muscovite-chlorite-biotite mineralogy and it is considered to be a meta-tuff. The prominent foliation in the surrounding metasediments and tuffs is designated S_1 and it dips steeply WSW at the lower showing and to the SW at the upper excavation. Country rock immediately adjacent to the mineralization is pyroxene-rich and possibly is a replacement of original carbonates.

Assay

The sample from the lower showing was taken in six portions (lengths are shown on Fig 2 and on Table 1). The assay certificate is appended. Table 1 gives results and calculation of an average grade.

A weighted average of 8.42 oz/ton Ag, 5.12% Pb and 7.49% Zn results for the whole 2.2 m interval. Gold values were $\leq$ 0.09 g/t.

The upper showing was not sampled this season due to difficulty in breaking the rock with a chisel. It will be necessary to drill and blast out a channel sample next year to obtain representative results.

Table 1: assay results for channel sample, lower showing

SAMPLE	Ag g/t	Pb %	Zn %	S %	width metres	Ag width x grade	Pb	Zn
1	72	1.47	5.00	12.0	0.50	36.00	0.74	2.50
2	92	1.70	7.00	21.9	0.15	13.80	0.26	1.05
3	141	2.73	6.63	21.0	0.35	49.35	0.96	2.32
4	493	9.38	9.99	27.8	0.48	236.64	4.50	4.80
5	244	3.27	6.53	24.3	0.22	53.68	0.72	1.44
6	492	8.20	8.74	27.3	0.50	246.00	4.10	4.37
				Total	**2.20**	635.47	11.27	16.47
				Average	grade	**288.85**	**5.12**	**7.49**
					oz/ton	**8.42**		

Petrography / Mineragraphy

Twelve specimens were prepared: three were country rock; two were polished blocks from the upper showing and the remaining seven were from the channel sample at the lower showing (Fig. 2). Sulphide mineralogy consists of pyrrhotite-sphalerite-tetrahedrite/tennantite-galena±arsenopyrite in a diopside-hedenbergite gangue. A coarse layering (dm –scale) across the lower showing was evident from the channel sampling and proportions of tetrahedrite/tennantite and galena vary considerably. The sulphosalt has a distinct brownish tinge in polished section, so it is likely close to the tetrahedrite end member. Whether this mineral is the principal source of the silver content is not confirmed at present but possible. Of the various channel samples, sample C4 from which petrographic specimens ML5 to 8 were collected does show the highest Ag content and notable tetrahedrite in two of the polished sections; sample C6, from which specimens ML 10 and 11 were also high in tetrahedrite, showed the next highest grade in Ag. In some of the mineragraphic specimens a mm-scale layering is evident, most often as elongated galena grains. This would represent S_2 foliation. Notes and photomicrographs are appended.

CONCLUSIONS AND RECOMMENDATIONS

The historical bulldozer workings at the Mod property when cleaned down to outcrop demonstrated sulphide mineralization of 2.2m thickness at the lower and 6.8m at the upper showing, which is a considerable improvement on the original exposure of ≤ 1m. Average grade over the lower showing was 8.4 oz/ton Ag, 5.1% Pb and 7.5% Zn, which is potentially economic. Examination of hand specimens from the upper showing indicates that Pb grades should be higher there. The highest content of tetrahedrite is found at the lower showing. If the Ag content is primarily in the sulphosalt, then mineralogy variation along strike should be investigated.

The magnetic survey showed an obvious anomaly over the known showings and also a smaller response close to the northeren boundary of claims 1 and 2. This could represent the same mineralized horizon on a northern limb of a fold.

Work that should be attempted in the 2016 season is:

a) drilling and blasting at the upper showing to obtain a channel sample of, say, between 1 and 2 tonnes weight. This should be crushed and split to provide a manageable representative assay sample. Sampling for mineragraphy should be carried out according to observed mineralogy.

b) In the ancient bulldozer cut at the lower showing there is room to clean up the eastern end and allow a further channel sample to be taken.

c) Mapping of the hillside to the west of the showings is needed to locate the marble unit as a stratigraphic marker. Detailed mapping westward to the TBMB prospect is needed to investigate whether the marble unit at the TBMB is within a different structural unit to that of the Mod.

d) Another limb on a major fold may exist to the north of the known mineralization. Some sulphide float has been reported (H. Hibbing, pers. comm.) close to the No. 2 post of the Patience 1 and 2 claims. There is a historical bulldozer trench in that locality, but outcrop is not visible. This excavation could be cleaned up with a backhoe.

e) If finances allow, further geophysical surveys are desirable. The coverage of ground magnetics could be extended westward and detailed I.P. work would be desirable to attempt to locate fold repetition of the obvious mineralization.

REFERENCES

Hudsons Bay Mining and Smelting Co. Ltd. Maps and sections from 1947 drill programme. Assessment report 092107.

D'el-Rey Silva, L.J.H., Liverton, T., Roots, C. and Paradis, S. 2001. A structural analysis of the upper Swift River area (105B/3), Yukon, Part II: the TBMB claims and implications for the regional geology. *In:* Yukon Exploration and Geology 2000, D.S. Emond and L.H. Weston (eds.), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 301-310.

J.W. McLeod and P.H. Sevensma: Boswell River Mines Ltd., Dan Group. Watson lake M.D. 105B-3. 60°10' North, 131° 6' West. Summary of 1968 Work Program. July 7th. 1969

Timothy Liverton

QUALIFICATIONS

Timothy Liverton: Geologist

Qualifications: BSc in Geology & Geophysics, University of Sydney, conferred 1965
BSc (Hons) in Economic Geology, University of Adelaide, conferred 1968
PhD in petrology, structural geology & metallogeny, Royal Holloway, University of London 1992.
Chartered Geologist, Fellow of the Geological Society, Fellow of the Geological Association of Canada, Member of the Geological Society of America, Member of the Society of Economic Geologists

Experience: 49 years' experience in engineering geology, mine geology and mineral exploration for tin, tungsten, uranium, manganese, base metals, silver, gold and industrial minerals in Australia, Canada, U.S.A., Brasil, Guyana, Norway, Portugal and Egypt.

APPENDIX: PETROGRAPHY

The location of specimens is shown in Figure 2.

MU1 (polished block)

Consists of galena (60%) with mostly 0.25-1mm grains of pyrrhotite. There is little sphalerite (10%) in often 1mm grainsize and quite anhedral. It has occasional inclusions of euhedral arsenopyrite (<0.3mm size and <0.5% content) included in galena. Subhedral to euhedral tetrahedrite, 0.2-0.25mm is also present. [MU1-20ppin] shows arsenopyrite, sphalerite and pyrrhotite in galena with gangue; {MU1-10ppin] shows galena, sphalerite and pyrrhotite with a terahedrite crystal in the centre. [MU1-20ppin2] shows sphalerite with euhedral tetrahedrite with a little arsenopyrite and pyrrhotite in galena.

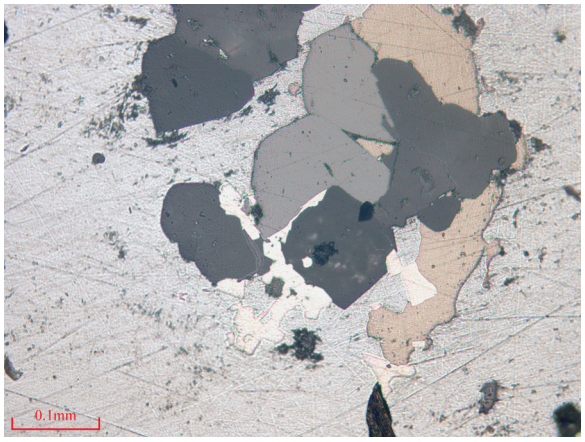
MU2 (polished block)

There is little gangue in this rock. Contains roughly equal proportions of sphalerite, galena and pyrrhotite. Sphalerite masses (layers) are up to 20 x 6mm. Galena is in layers 10mm thick that cross the whole section. The pyrrhotite forms some large fields, but is mostly is in 0.5-1mm rounded grains that are included in the galena and sphalerite. Tetrahedrite occurs as ≤0.3mm rounded grains that are included in galena and sphalerite (total ≤5%). There are no small oriented inclusions in either tetrahedrite or sphalerite such as are seen at the lower showing. A network of brittle fractures crosses the section. Where these cross the galena they step around cleavages. Fracture filling is probably carbonate. A few arsenopyrite crystals to 0.12mm are included in the galena. [MU2-10ppin] shows sphalerite, galena and pyrrhotite with small inclusions of subhedral tetrahedrite. Note: a trace of chalcopyrite is present as inclusions in sphalerite to 0.07mm long and also along sphalerite margins associate with pyrrhotite. One 0.03mm grain of (?) ruby silver, associated with chalcopyrite at the margin of sphalerite against galena was noted.

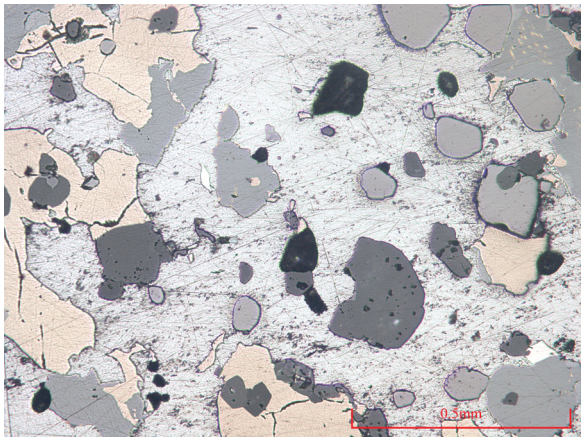
ML1 (covered thin section)

(Somewhat weathered).

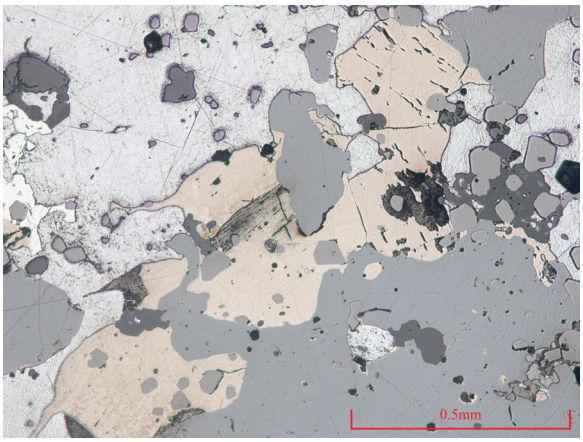
This is a fine-grained, highly foliated rock composed of quartz, muscovite and chlorite with some biotite layers [ML1-20pp]. In [ML1-20pp2] the slightly greenish layers are chlorite. No undulose extinction is seen in quartz and no plagioclase was noted in the thin section. 1-2mm wide quartz veins cut the rock at 80° to foliation.



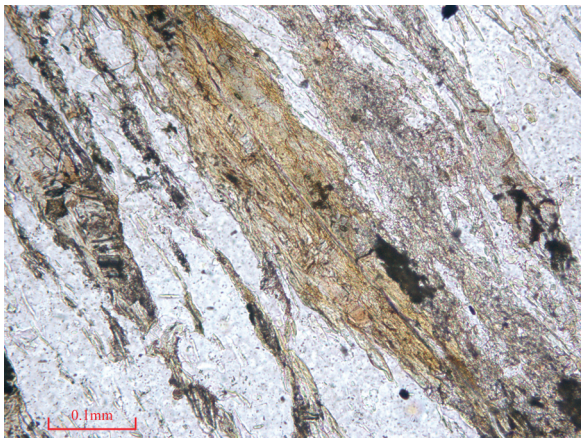
MU1-20ppin
Sphalerite, pyrrhotite, arsenopyrite & gangue in galena



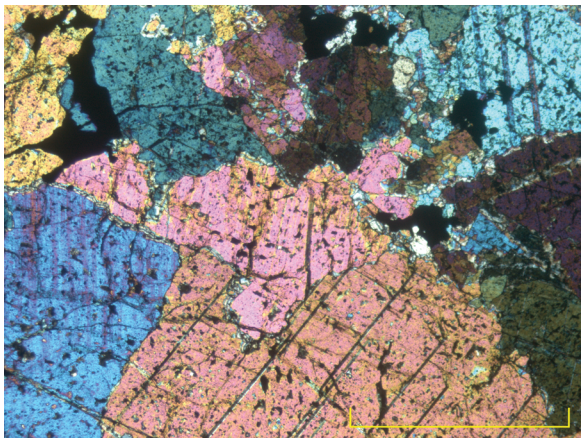
MU1-10ppin2
Pyrrhotite, sphalerite & tetrahedrite in galena



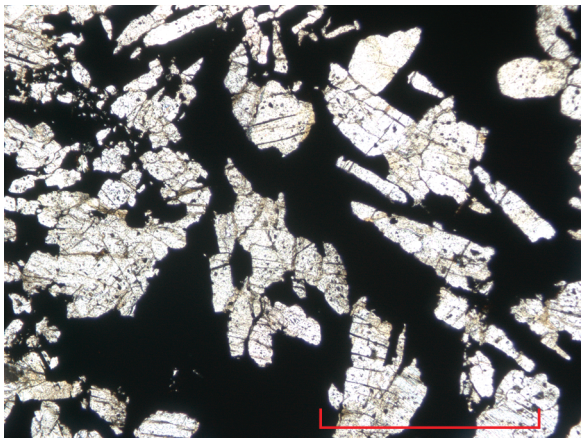
MU2-10ppin
Galena, sphalerite & pyrrhotite



ML1-20pp
Biotite in muscovite-chlorite 'schist': meta-tuff



ML2-5,0xp
Diopside-hedenbergite



ML2-5,0pp
Pyroxene in sulphide

ML2 (covered thin section)

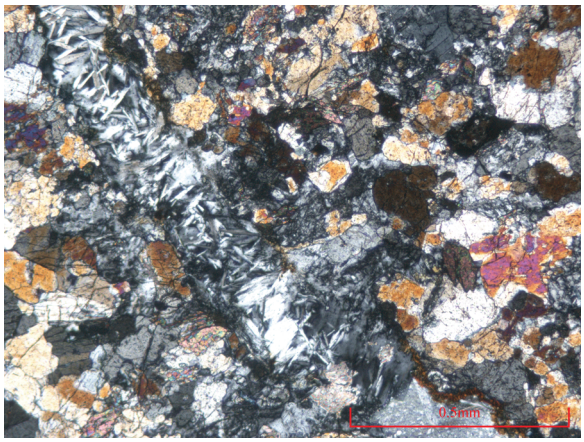
This is diopside-hedenbergite with some sulphides. Coarse pyroxene is granular and anhedral [ML2-5,0xp], but where individual crystals are totally included in sulphide they are subhedral [ML2-5,0pp].

ML3 (covered thin section)

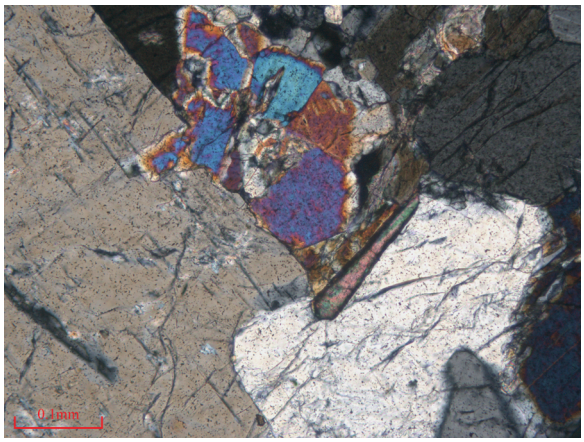
The rock is composed of pyroxene with some masses of anorthite and a few anhedral to euhedral sphene crystals. Fields of anorthite are up to 6mm across and include a few 0.04-0.2mm diopside crystals. The main pyroxene mass is of anhedral crystals to 1mm grainsize. Sphene occupies ≈0.5% of the rock. One 0.1mm wide chlorite-filled fracture cuts the rock. [ML3-10xp] shows pyroxene with small sphene grains in the SW and NE quadrants, plus the vein. [ML3-20xp] shows euhedral sphene. A little remnant carbonate is present, mostly within anorthite.

ML5 (polished block)

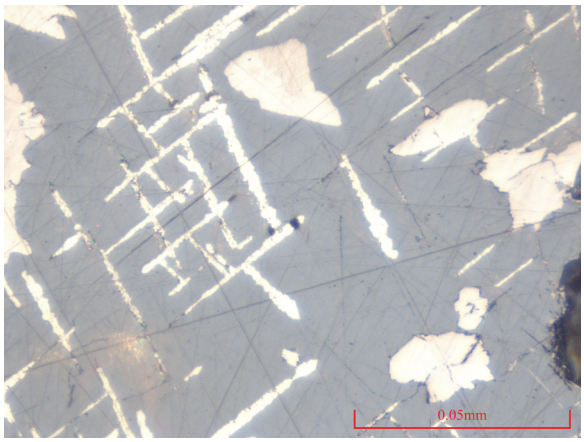
This has about 60% pyrrhotite, approximately 5% galena (but locally to 30%): the remainder is sphalerite and tetrahedrite (almost half tetrahedrite). Gangue (pyroxene) amounts to 15%. The grain boundaries of the sphalerite are marked by thin (0.005-0.25mm) fields of pyrite and rare chalcopyrite. Oriented inclusions occur within the sphalerite. Acicular inclusions are of pyrite (ML5-100ppin oil) and coarser short, anhedral inclusions are pyrrhotite. This differs from the upper showing in that the tetrahedrite forms irregular-shaped masses intergrown with the sphalerite, often constituting 15% of any field. The tetrahedrite occasionally has planar oriented inclusions of pyrrhotite as well as coarser anhedral inclusions to 0.015mm long. The smaller masses of tetrahedrite are found along sphalerite grain boundaries. Apart from internal grain boundaries within sphalerite masses the grains are mostly subrounded. Galena forms irregular elongate masses to 2 x 8 mm [ML5-10ppin]. About ten 0.6mm euhedral to anhedral arsenopyrite crystals were noted. [ML5-10ppin] shows pyrrhotite, galena, tetrahedrite and sphalerite. [ML5-10ppin2] shows arsenopyrite in pyrrhotite, sphalerite and tetrahedrite. The pyrrhotite grains define a weak foliation. [ML5-20ppin4] shows pyrrhotite, galena and sphalerite (with pyrrhotite inclusions) intergrown with tetrahedrite, plus little gangue.



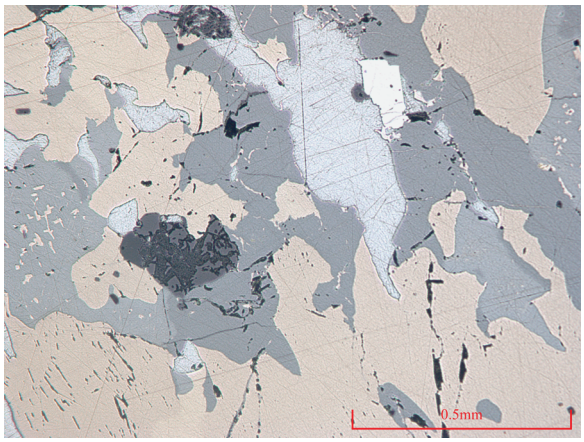
ML3-10xp
Chlorite vein



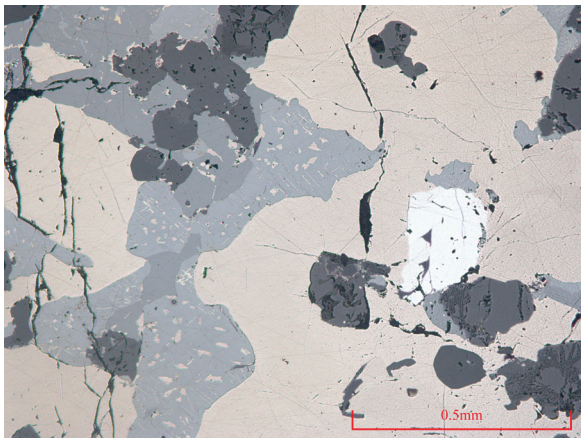
ML3-20xp
Pyroxene & sphene



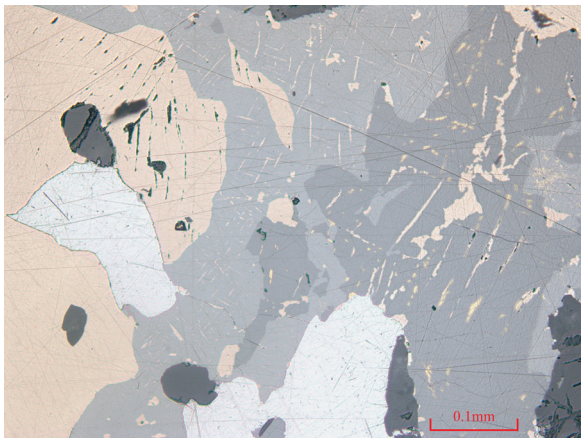
ML5-100ppin oil
Sphalerite containing pyrrhotite
and pyrite inclusions



ML5-10ppin
Pyrrhotite, sphalerite, tetrahedrite,
galena & arsenopyrite



ML5-10ppin2
Tetrahedrite included in sphalerite,
pyrrhotite and arsenopyrite



ML5-20ppin4
Tetrahedrite with pyrrhotite inclusions
in sphalerite, with pyrrhotite and arsenopyrite

ML6 (polished thin section)

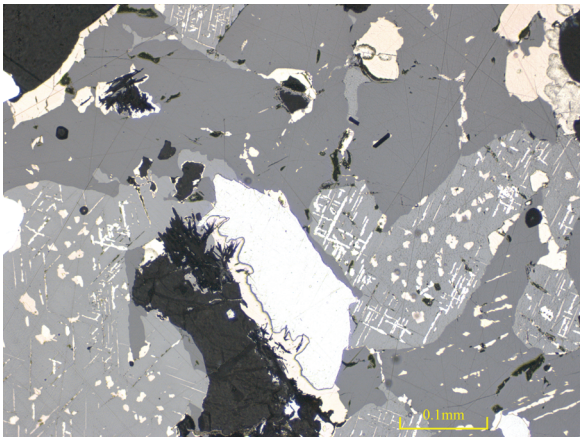
Contains sphalerite, tetrahedrite, pyrrhotite, galena and arsenopyrite. One end of the section has a field predominantly of sphalerite which contains oriented, elongate pyrrhotite inclusions and is intergrown with ≈20% tetrahedrite. Pyrrhotite also is found as thin masses along sphalerite grain boundaries. The remainder of the section is of coarse (≤7mm) masses of galena and pyrrhotite with lesser amounts of sphalerite. Some coarse anhedral arsenopyrite (3mm) with sphalerite inclusions is also found in this coarser grained section. Tetrahedrite is not prominent is the coarser material. [ML6-20ppin oil] shows sphalerite (mid grey) containing oriented pyrrhotite inclusions, tetrahedrite (upper part), galena in the centre with a pyrrhotite rim. The acicular black material is a weathering product. [ML6-20ppin oil2] shows galena with curved cleavages, pyrrhotite and sphalerite; [ML6-5,0ppin] shows a large arsenopyrite field with pyrrhotite inclusions with galena and pyrrhotite masses; [ML6-10ppin] shows detail of arsenopyrite with galena, pyrrhotite and sphalerite. The gangue is of subhedral diopside mostly in 0.5mm crystals. Much is included in the sulphide as individual grains. Total gangue is ≈30%.

ML8 (polished thin section)

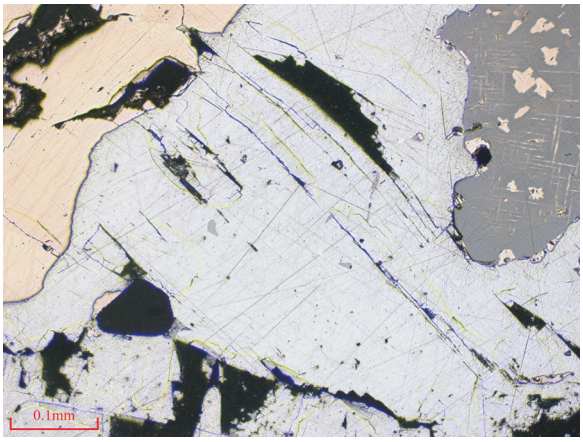
Coarse-grained. Consists of a field of sphalerite containing minor tetrahedrite (≤10%) and pyrrhotite along grain boundaries. Masses of coarse pyrrhotite (2mm) are also included in the sphalerite as well as elongate irregular shaped galena (layers to 15mm long). Two anhedral grains of arsenopyrite to 3mm long are included in sphalerite. [ML8-5,0ppin] gives a general view. The gangue is entirely pyroxene, ≈30%.

ML9 (polished thin section)

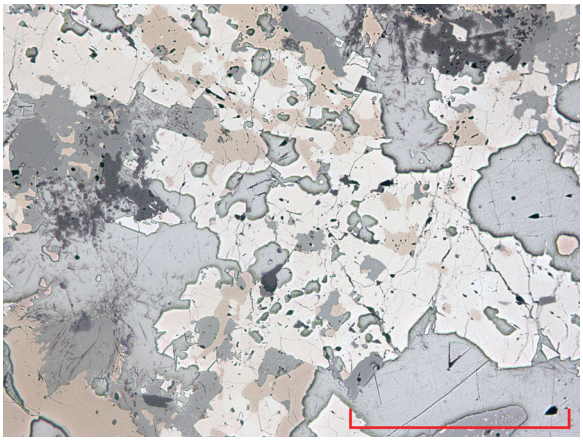
The gangue is up to 50% volume (average 40%). [ML9-5,0xp] shows this. Subhedral to rare euhedral pyroxenes are from 0.1-1.0 mm, with a little carbonate (1mm). Sphalerite and pyrrhotite are overall in equal proportion, but vary considerable as to individual fields. Only a little tetrahedrite (≈10% overall) is included in the sphalerite. Grain boundaries of sphalerite are invaded by pyrrhotite. Oriented, acicular inclusions of pyrrhotite are seen in the tetrahedrite. Coarser, elongate, pyrrhotite and occasional chalcopyrite inclusions are in the sphalerite. Only a few 1-2mm grains of galena are present. Anastomosing fractures (two sets at 70-80° apart) cut both sulphides and pyroxene [ML9-10-ppin].



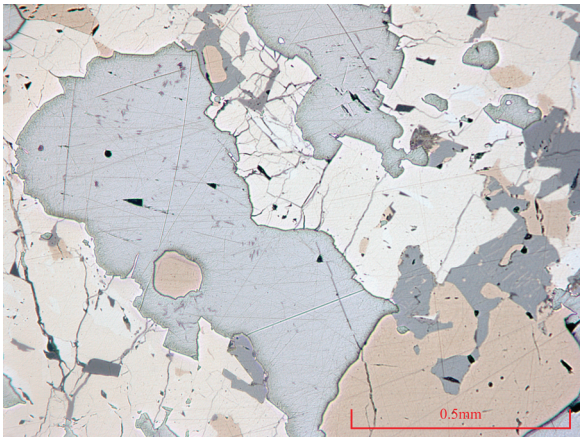
ML6-20ppin oil
Sphalerite containing oriented pyrrhotite inclusions, tetrahedrite, galena in the centre with a pyrrhotite rim



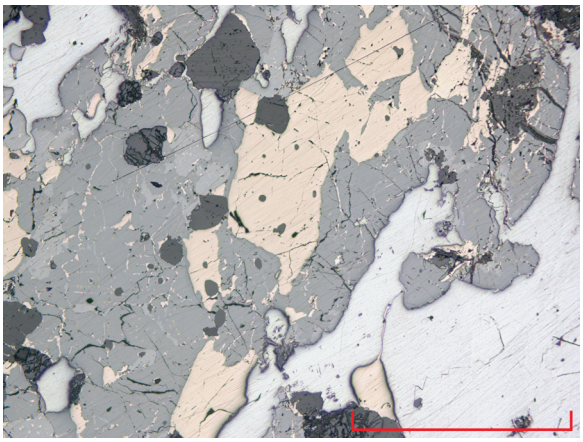
ML6-20ppin oil2
Galena showing deformed cleavages



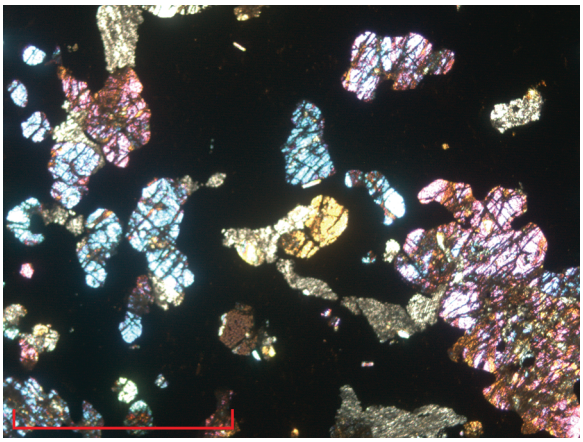
ML6-5,0ppin
Arsenopyrite with pyrrhotite inclusions with galena & a little tetrahedrite



ML6-10ppin
Arsenopyrite with galena, pyrrhotite and sphalerite



ML8-5,0ppin
Sphalerite with tetrahedrite, galena & pyrrhotite



ML9-5,0xp
Pyroxene in sulphide

ML10 (polished thin section)

Similar to ML9. Sphalerite with tetrahedrite and pyrrhotite form large masses. Only a little galena (six grains of 1-2mm) is seen and one subhedral crystal of arsenopyrite. [ML10-5,0ppin] gives a general view showing a little galena. Gangue amounts to ≈45%.

ML11 (polished thin section)

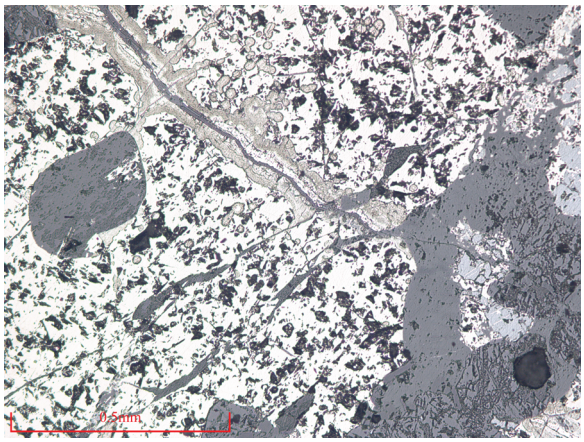
[ML11-20ppin] shows detail of tetrahedrite in sphalerite with pyrrhotite. Acicular crystals along cleavages are pyrrhotite. Contains about 35% pyroxene with some carbonate gangue. Diopside is anhedral to subhedral and 0.2-2mm grainsize. In the coarser pyroxene grains the boundaries are embayed [ML11-10xp]. Shows tetrahedrite rimmed with pyrrhotite and sphalerite with pyrrhotite inclusions. The section contains about 30% pyrrhotite as fine (0.05mm) to coarse (2mm long) masses. The remainder of the sulphides are tetrahedrite and sphalerite in subequal proportions. Galena forms only rare 0.1mm grains. A 2mm wide distinctly foliated layer of fine grained pyrrhotite is enclosed in the tetrahedrite and sphalerite. Fine fractures cross at 60-90° to this layering [ML11-5,0ppin]. One end of the specimen only shows a 2mm wide galena-rich layer [ML11-5,0ppin2]. Some fracturing follows this layer (but this may have been induced by breaking the rock).

ML12 (polished thin section)

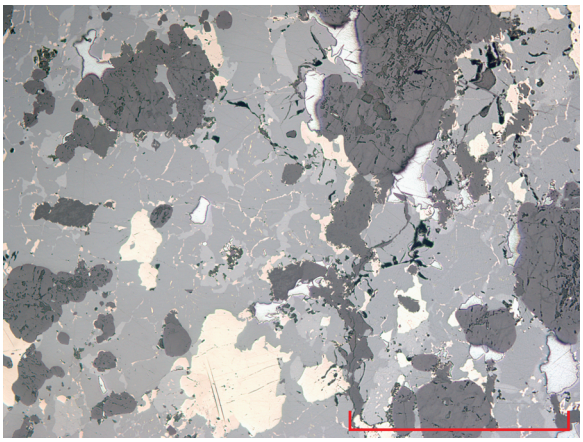
This specimen is predominantly of sphalerite-pyrrhotite, with only rare tetrahedrite and no galena [ML12-5,0ppin]. Pyrrhotite forms oriented inclusions in sphalerite [ML12-20ppin]. Gangue (pyroxene) comprises up to 70% of the volume in anhedral rounded and embayed forms. Sphalerite is often rimmed by pyrrhotite and contains frequent oriented inclusions. Pyrrhotite forms some discrete masses to 2mm size. Galena is seen as only rare 0.2mm grains. Gangue is ≈50%.

ML12 (polished thin section: second slide)

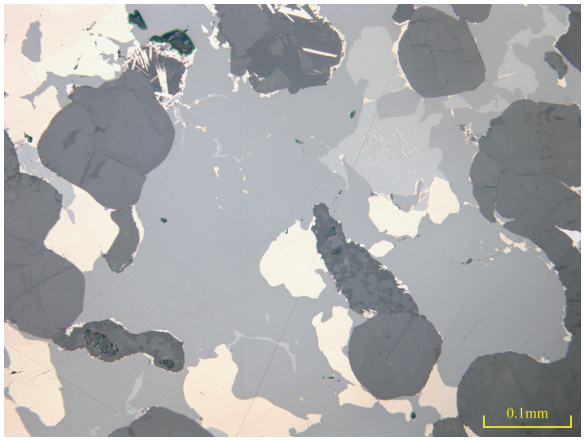
Similar to the above, but galena is seen as few elongate anhedral grains to 1mm long (still <1% total, however). No fabric is evident. [ML12b-5,0ppin]. Gangue is ≈50%.



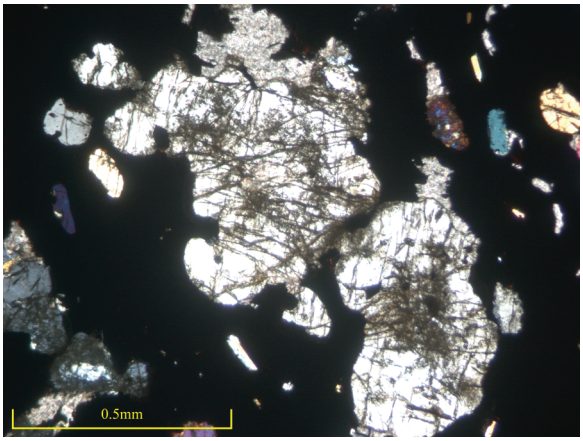
ML9-10ppin
Fractures



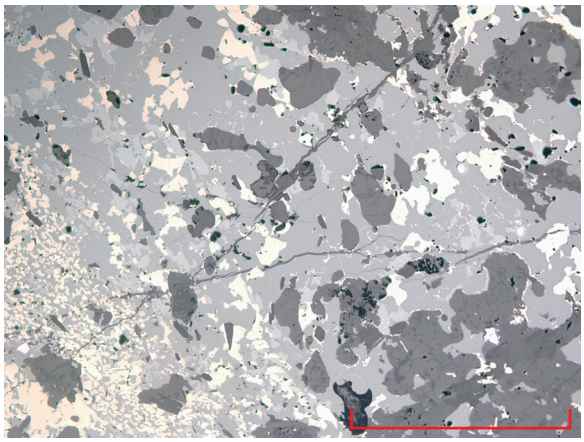
ML10-5,0ppin
Tetrahedrite along grain boundaries in sphalerite (with pyrrhotite, galena & gangue)



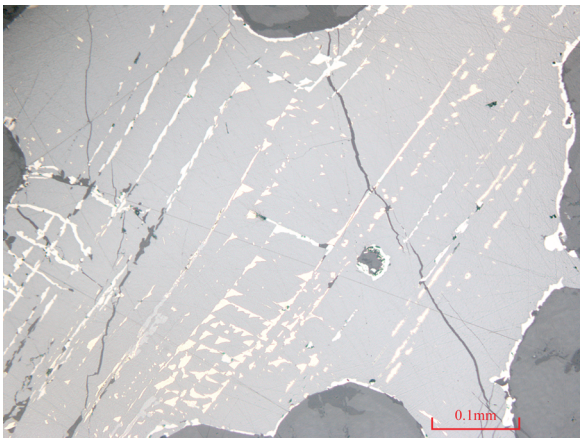
ML11-20ppin
Spahlerite, tetrahedrite & pyrrhotite



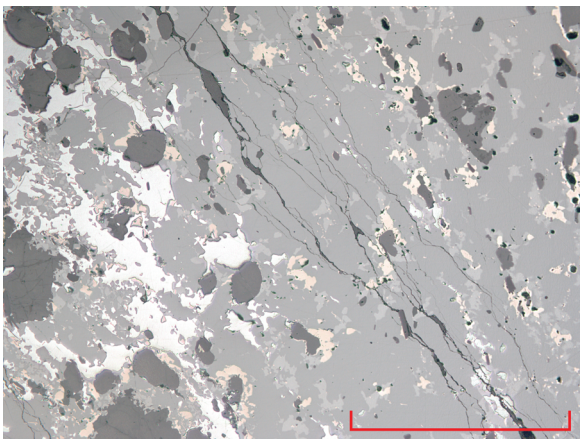
ML11-10xp
Rounded & embayed pyroxene in sulphides



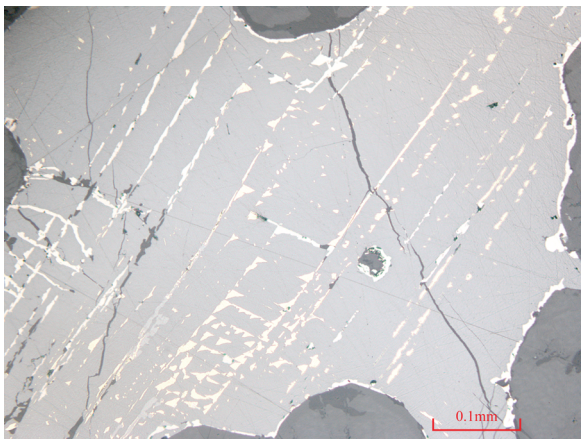
ML11-5,0ppin
Weak foliation and fractures



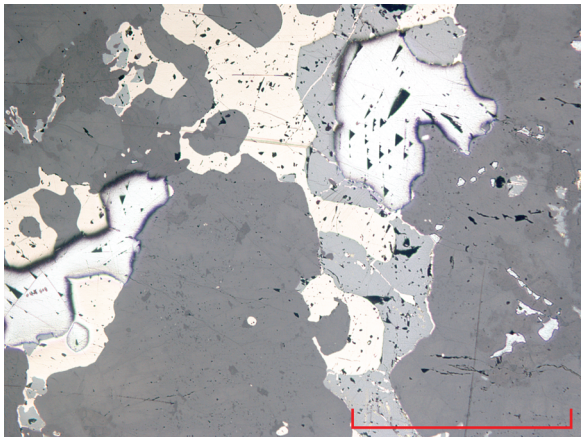
ML12-20ppin
Pyrrhotite inclusions in sphalerite



ML11-5,0ppin2
Foliation parallel fractures



ML12-20ppin
Pyrrhotite inclusions
in sphalerite



ML12-5,0ppin
Sphalerite, tetrahedrite, pyrrhotite
& galena