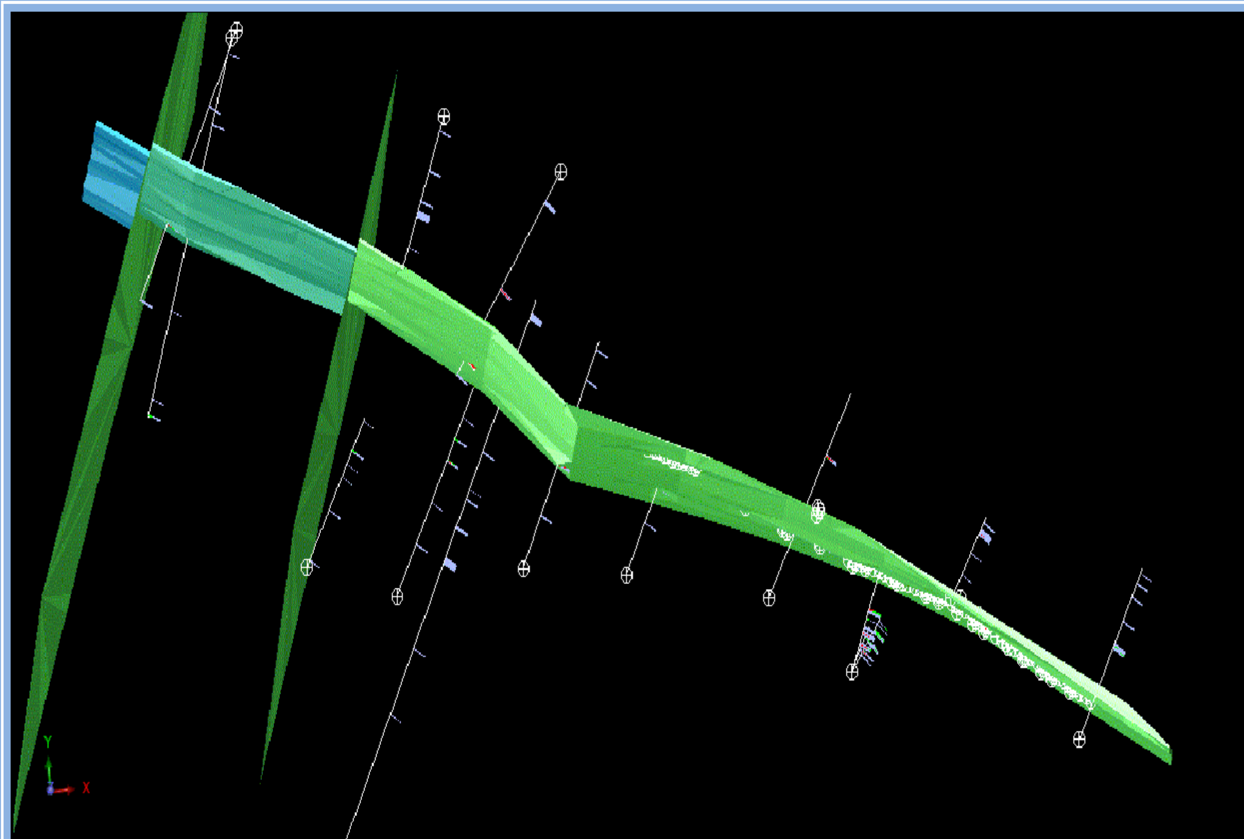
TARTISAN NICKEL CORP.

# NI43-101 Resource Report

## Sill Lake Lead-Silver Property, Ontario




*Prepared by:*
*SMX International Corp*
*Cheyenne, Wyoming*

*April 2021*

SM International

# EXECUTIVE SUMMARY

Tartisan Nickel Corp. commissioned SMX International Corporation to undertake an evaluation of the resource potential of the Sill Lake lead-silver deposit in southwestern Ontario. SMX's key personnel previously worked on the site during the period of 2008 through 2010 while working for its predecessor company Chemrox Technologies. Neither SMX or Chemrox has any equity interest in the property or its personnel.

This work has been done in accordance with NI43-101 standards by Qualified Persons, Sean C. Muller, P.Geo. and John Rae, P.Geo. The site was reexamined in December 2020 by John Rae of SMX and another field geologist who oversaw the geochemical sampling and drilling in 2008. SMX determined that no observable changes had been made to the mine and tailings areas in the past 11 years on the original 17 claims. Both of the QP's worked closely with the prior mapping (including underground), geochemical sampling, surface geophysical, coring and logging, interpretation, and resource calculations. SMX is less familiar with the newer claims acquired by Tartisan Nickel Corp. and will not report their respective potential in these in this report.

The Sill Lake lead-silver property consists of 47 unpatented mining claims in Vankoughnet Township about 30 km north of Sault Saint, Marie, Ontario for a total of 933.57 hectares. The database for this resource evaluation focused on 17 of these original claims and included geological mapping; geophysical surveys; geochemical data acquisition and analysis; core drilling; underground channel sampling and metallurgical testing from a 2008 program conducted by Gilead Minerals Corporation and RX Exploration Inc. Historical investigations were also evaluated including examination of available prior core in a Ministry repository. Computer modeling of this 2008 drill data utilized SURPAC for a combined indicated and measured resources of 458,333 silver troy ounces and 1,467965 lbs.

The Table ES-1 below, details the measured and indicated resources plus the value in today's market prices.

| Estimated Resources | Tonnes | Ag opt | Ag tr oz* | Pb ppm | Pb/Ag eq troy oz** | Zn ppm | Zn/Ag eq troy oz*** |
|---|---|---|---|---|---|---|---|
| | Average Concentration per Tonne in Place | | | | | | |
| Measured | 35,703 | 4.52 | 161,490 | 6,371 | 18,100 | 2,274 | 8,342 |
| Indicated | 67,941 | 4.37 | 296,843 | 6,452 | 33,879 | 2,177 | 15,186 |
| **Total >=60 ppm** | 103,644 | 4.42 | 458,333 | 12,823 | 52,979 | 4,451 | 23,528 |

| Estimated Resources | Silver tr oz | Silver value (USD)* | Lead lbs | Lead value USD** | Zinc lbs | Zinc value (USD)*** |
|---|---|---|---|---|---|---|
| Measured | 161,490 | $4,311,783 | 501,513 | $483,258 | 179,008 | $222,722 |
| Indicated | 296,843 | $7,925,708 | 966,452 | $931,273 | 326,118 | $405,756 |
| **Total >=60 ppm** | 458,333 | $12,237,491 | 1,467,965 | $1,414,531 | 505,126 | $628,478 |

* Silver price is LME spot price of Feb. 26, 2021 at $26.70 USD/tr oz
** Lead price is based upon 3-month LME average of $0.9636 USD/lb
***Zinc price is based upon 3-month LME average of $1.2442 USD/lb

Table ES-1. Estimated in-place troy ounces of silver and lead and zinc equivalents at an arbitrary 60 ppm cut-of-grade.

*Silver spot price as of February 26, 2021 was $26.70 USD but it is still subject to market. These values are not adjusted for prior mining depletion; mine dilution; process recovery and smelter costs*

Chemrox (2010) reported that their modeling showed about 660,000 ounces of inferred silver resources. The deposit will require a more comprehensive core drilling program to move these inferred resources into an indicated or measured category.

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# 1.0 INTRODUCTION

## 1.1 Terms of Reference and Purpose of the Report

SMX International Corporation and more specifically Sean C. Muller, P.Geo. and John Rae, P.Geo. are the authors of this NI43-101 compliant report. This report was prepared for Tartisan Nickel Corp. as an update to work done by Chemrox Technologies from 2008 through 2010. The site was visited by John Rae, P.Geo. in December 2020 but no new field work was undertaken excepting site examination and an SMX drone flight to observe any physical changes on the site since 2010. This report is essentially the validation and reinterpretation of the work previously done by Chemrox Technologies, documentation of newer claim data as provided by Tartisan, documentation of claims renumbering and transfer to Canadian Arrow Mines Limited (a wholly owned subsidiary of Tartisan Nickel Corp), plus examination of an airborne spectrographic report prepared by Steele and Associates. Detailed geological interpretations and modeling of resources are limited solely from the work done by Chemrox Technologies. Chemrox Technologies, LLC is the predecessor company to SMX International Corporation, so the principal Qualified Persons of both reports are the same.

In 2010, Chemrox Technologies from Denver, Colorado was contracted by Argentium Resources Inc. for the preparation of a NI43-101 compliant document for the Sill Lake silver-lead property near Sault Saint Marie, Ontario. No remodeling of the Chemrox Technologies data was undertaken by SMX International as it still meets today's standards under NI43-101. Updated metals market prices, land ownership and interpretation of other available reports and data were evaluated for the preparation of this report.

## 1.2 Reliance of Other Experts and Source for Information

The Qualified Person (QP) for this report is Sean C. Muller, P. Geo., registered SME Member, who is the Senior Resource Geologist for SMX International. Mr. Muller has a MS in Geology and Bachelors in Earth Science with nearly 50 years of exploration, mining, and International consulting experience with such firms as SRK, Behre Dolbear, WGM and others. For 10 years, he was also the Principal Geologist for 41 Indian tribes in the US and over 30 tribes and First Nations internationally with responsibility for mineral exploration, mine development and negotiations with industry for mineral development rights. Over a half of Mr. Muller's career has been in the exploration and development of base and precious metals internationally. His technical specialties include geochemistry, geophysics, ore microscopy and more recently computer modeling and mine planning. He is currently enrolled in PhD program for Mining

Engineering at the Colorado School of Mines. Mr. Muller first visited the site in 2007 to evaluate potential environmental risks and to negotiate with the Batchewana First Nations who have certain treaty rights on the property. While Mr. Muller has been on the Sill Lake property 4 times from 2007 to 2008, he was not able to revisit the site in 2020 with the SMX Canadian geologists due to border restrictions between Canada and the United States for Covid protection. Mr. Muller holds no economic interest in the Tartisan properties that are the subject of this report.

John Rae, P.Geo. (Ontario 0907) is a QP and author for this SMX report. Mr. Rae was a geological consultant to a prior interest owner, Gilead, in 2008. He no longer works for Gilead and has significant experience on the original Sill Lake claims. His son, Keegan Rae, another geologist, was on the property during the 2008-09 geochemical survey, geophysical surveys, and the drilling program. Both John and Keegan Rae re-examined the site again in December 2020 and found no indication of any surface disturbance since the 2009. Neither of the Rae's have any economic interest in the Tartisan study area for this 43-101.

During the preparation of the NI43-101 in 2010, Marc Melker, an experienced hard rock geologist and resource modeler, prepared the resource estimations with oversight of Mr. Muller. The underground sampling on the East drift of the underground lead mine was done by John Lufkin and Delio Tortoso, independent consultant and QP, did the sampling on the West underground workings of the lead mine. Petrographic work has been done under the direction of John Lufkin, Ph.D. an adjunct professor of mineralogy with the Colorado School of Mines. Sean Muller through Chemrox Technologies completed the resource 43-101 in 2010.

## 1.3 Sources of Information

Sources of information include published reports, historical accounts, prior assessment work, older consultant reports, historical non-NI43-101 compliant resource calculations, historical geophysical data; geophysical data compiled by Insight Geophysics in 2008; geochemical and core drill data collected by Chemrox Technologies, and other information provided by Tartisan, Canadian Arrow Mines, Gilead Minerals and RX Exploration. Limited drill hole data was available from the core repository at the Ministry from prior drilling programs for observation in 2009 but was not validated due to survey disparities and incomplete data sets. Attempts to locate these older holes was done on the ground with no success. Accordingly, such information could not be used in the 2010 NI43-101. All of the data for this 43-101 resource report was based upon the Chemrox drilling program in 2008 plus extensive channel sampling underground done at that time after the underground workings were dewatered. Permission to dewater the mine was procured from the local, Batchewana First Nations (BFN) prior to discharging the water into an evaporation pond to ensure that no environmental or jurisdictional concerns occurred. This was at the direction of the Ministry of the environment. Mine water was pumped to an existing holding pond above the tailings pond.

The analytical derived from the 2008 program meets the rigid QA/QC guidelines for a 43-101 resource report.

# 2.0 PROPERTY DESCRIPTION

## 2.1 Location and Access

The property is in the northeast quarter of Vankoughnet Township, District of Algoma, Ontario. From Sault Ste Marie, travel north on TransCanada Highway 17 to Vankoughnet township which is located about 30 km north of Sault Ste. Marie. to the community of Goulais River and proceed another 2 km further to a road marked "Buttermilk Hill" ski area. Proceed l km on this road to another road marked "Robertson Lake Road". Proceed about 4 km east on this road to the "Sill Lake Road" then 4 km on this road to the Sill Lake mine workings. (Figure 2-1).


**Figure 2.1 Access to the Sill Lake Property**

The prior claims in 2010 were located approximately 52 km north of the city of Sault Ste. Marie and 1.5 km south of Robertson Lake in Van Koughnet Township, Sault Ste. Marie Mining Division, District of Algoma (Figure 2-2).

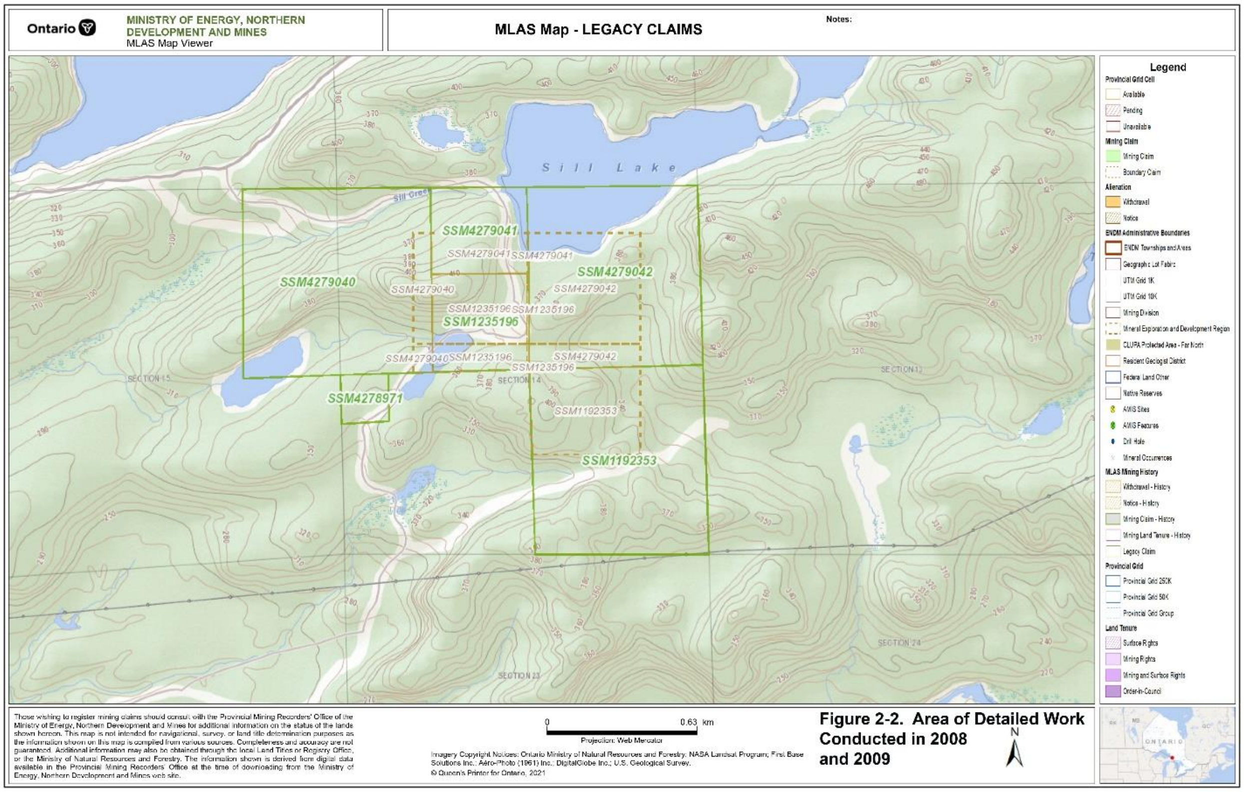


Figure 2-2. Area of Detailed Work Conducted in 2008 and 2009

## 2.2 Ownership Status, Royalties and Agreements

In 2008, Chemrox evaluated only claims within the boundaries at Sill Lake mine property referenced in their 2010 43-101 resource evaluation. At the time it consisted of solely claims 1192261, 1192330, 119333, 119334, 119335, 1192336 and 1235196 (Table 2-1).

| Claim Number (pre-2018) | Units | Recording Date | Prior Due Date | Assessment Work Required |
|---|---|---|---|---|
| SSM 1192261 | 2 | 2005-Apr-01 | 2008-Apr-01 | $800 |
| SSM 1192330 | 3 | 2007-Jan-23 | 2009-Jan-23 | $1200 |
| SSM 1192333 | 2 | 2007-Jan-23 | 2009-Jan-23 | $800 |
| SSM 1192334 | 2 | 2007-Mar-23 | 2009-Mar-23 | $800 |
| SSM 1192335 | 4 | 2007-Mar-23 | 2009-Mar-23 | $1600 |
| SSM 1192336 | 4 | 2007-Apr-4- | 2009-Apr-4 | $1600 |

**Table 2-1. Sill Lake Claim Detail from the Gilead-RX 2008 Agreement (source, Gilead 2010) and the Subject Area for this 43-101 Resource Estimate**

Since that time Tartisan acquired these older claim, also known as the Hicks Legacy claim, plus staked additional claims in 2021 as illustrated in Figure 2-3 below. These additional claims have not been evaluated by SMX and are not part of this NI43-101 document.

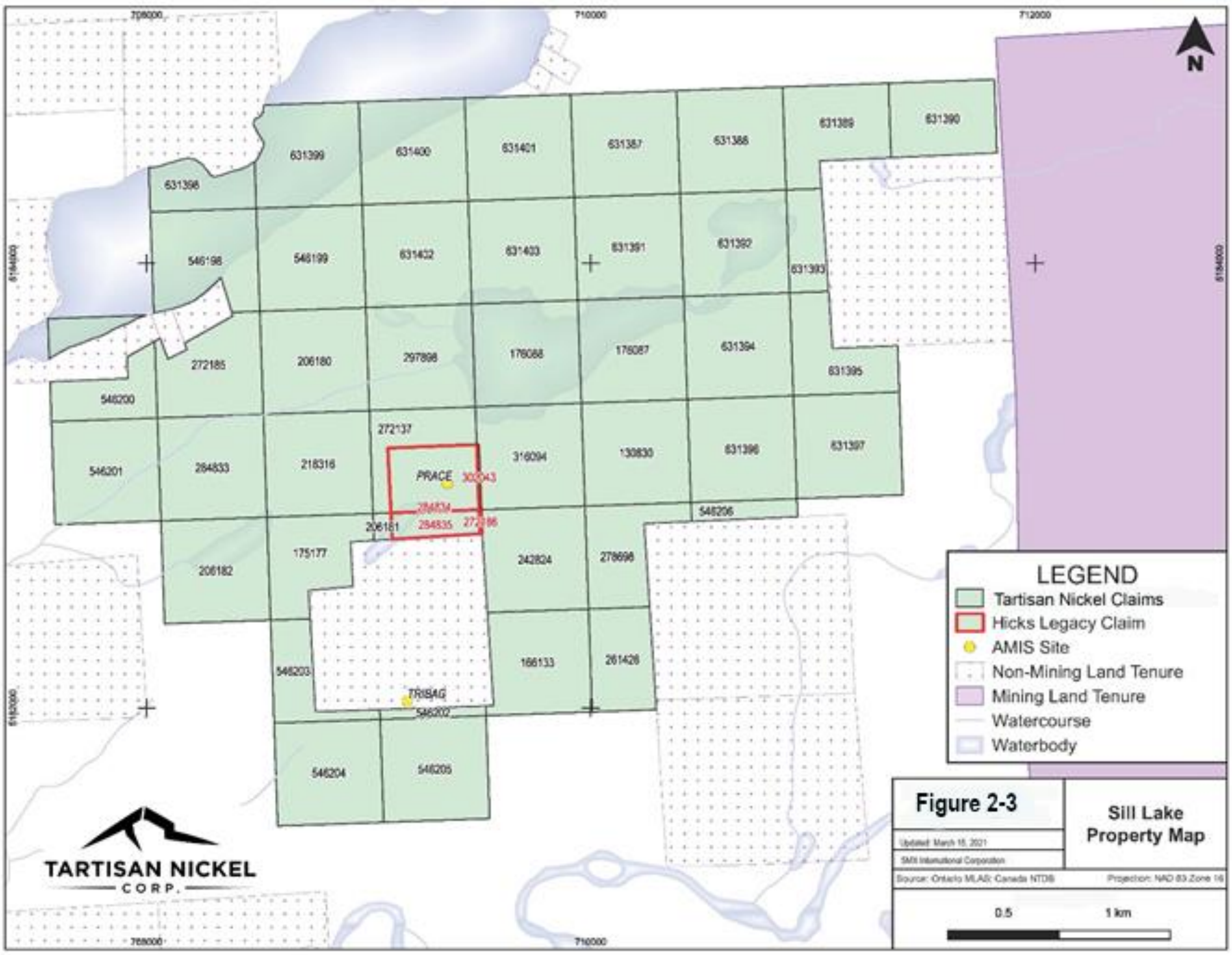


**Figure 2-3. 2021 Sill Lake Claims Staked by Canadian Arrow Mines Ltd., a Tartisan Company (as of January 2021)**

Table 2-2 below is a list of all of the claims now held by Canadian Arrow Mines, Limited with their respective expiration dates.

| Tenure ID | Project | Cell ID(s) | Tenure Type | Tenure Status | Anniversary Date | Due Date | Holder | Area (ha) | Township/Area | Work Required | Work Applied | Available Exploration Reserve | Total Approved Reserve |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 130830 | Sill Lake | 41K16B301 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 166133 | Sill Lake | 41K16C360 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.12 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 175177 | Sill Lake | 41K16C338 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 200 | $ 400 | $ 232 | $ 232 |
| 176087 | Sill Lake | 41K16B281 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 176088 | Sill Lake | 41K16C300 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 206180 | Sill Lake | 41K16C298 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 206181 | Sill Lake | 41K16C339 | BCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 0.98 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 206182 | Sill Lake | 41K16C337 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 218316 | Sill Lake | 41K16C318 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 242824 | Sill Lake | 41K16C340 | BCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 21.43 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 261426 | Sill Lake | 41K16B341 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.12 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 272137 | Sill Lake | 41K16C319 | BCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 10.45 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 272185 | Sill Lake | 41K16C297 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 278698 | Sill Lake | 41K16B321 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 284833 | Sill Lake | 41K16C317 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 297898 | Sill Lake | 41K16C299 | SCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 316094 | Sill Lake | 41K16C320 | BCMC | Active | 10/27/2021 | 10/27/2021 | (100) Canadian Arrow Mines, Ltd. | 21.82 | VANKOUGHNET | $ 200 | $ 400 | $ 123 | $ 123 |
| 272186 | Sill Lake | 41K16C340 | BCMC | Active | 1/8/2022 | 1/8/2022 | (100) Canadian Arrow Mines, Ltd. | 0.11 | VANKOUGHNET | $ 200 | $ 400 | $ 17 | $ 17 |
| 284834 | Sill Lake | 41K16C319 | BCMC | Active | 1/8/2022 | 1/8/2022 | (100) Canadian Arrow Mines, Ltd. | 11.66 | VANKOUGHNET | $ 200 | $ 400 | $ 17 | $ 17 |
| 284835 | Sill Lake | 41K16C339 | BCMC | Active | 1/8/2022 | 1/8/2022 | (100) Canadian Arrow Mines, Ltd. | 4.48 | VANKOUGHNET | $ 200 | $ 400 | $ 17 | $ 17 |
| 302043 | Sill Lake | 41K16C320 | BCMC | Active | 1/8/2022 | 1/8/2022 | (100) Canadian Arrow Mines, Ltd. | 0.29 | VANKOUGHNET | $ 200 | $ 400 | $ 17 | $ 17 |
| 546198 | Sill Lake | 41K16C277 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546199 | Sill Lake | 41K16C278 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546200 | Sill Lake | 41K16C296 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546201 | Sill Lake | 41K16C316 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546202 | Sill Lake | 41K16C359 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.12 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546203 | Sill Lake | 41K16C358 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.12 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546204 | Sill Lake | 41K16C378 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.12 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546205 | Sill Lake | 41K16C379 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.12 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 546206 | Sill Lake | 41K16B322 | SCMC | Active | 3/25/2022 | 3/25/2022 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ 400 | $ 123 | $ 123 |
| 631387 | Sill Lake | 41K16B241 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631388 | Sill Lake | 41K16B242 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631389 | Sill Lake | 41K16B243 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631390 | Sill Lake | 41K16B244 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631391 | Sill Lake | 41K16B261 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631392 | Sill Lake | 41K16B262 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631393 | Sill Lake | 41K16B263 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631394 | Sill Lake | 41K16B282 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631395 | Sill Lake | 41K16B283 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631396 | Sill Lake | 41K16B302 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631397 | Sill Lake | 41K16B303 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631398 | Sill Lake | 41K16C257 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631399 | Sill Lake | 41K16C258 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631400 | Sill Lake | 41K16C259 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631401 | Sill Lake | 41K16C260 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631402 | Sill Lake | 41K16C279 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| 631403 | Sill Lake | 41K16C280 | SCMC | Active | 1/18/2023 | 1/18/2023 | (100) Canadian Arrow Mines, Ltd. | 22.11 | VANKOUGHNET | $ 400 | $ - | $ - | $ - |
| | | | | | | | | | | | | | |
| **47** | | | | | | | | **933.57** | | **$ 16,400** | | | **$ 3,375** |

***Table 2-2. Tabulation of Sill Lake Claims under Canadian Arrow Mines, Ltd. Ownership (January 2021)***

## 2.3 Location of Mineralization

The known silver-lead mineralization, as of 2010, follows a NW-SE trend along a fault sheer on the central part of the holdings. This structural trend outlined in red on Figure 2-4 shows the surface the trend passing through the portal and vent shaft area with green lines representing geochemical sampling traverses. The mineralization trend extends at depth and has previously been developed by underground mining methods.

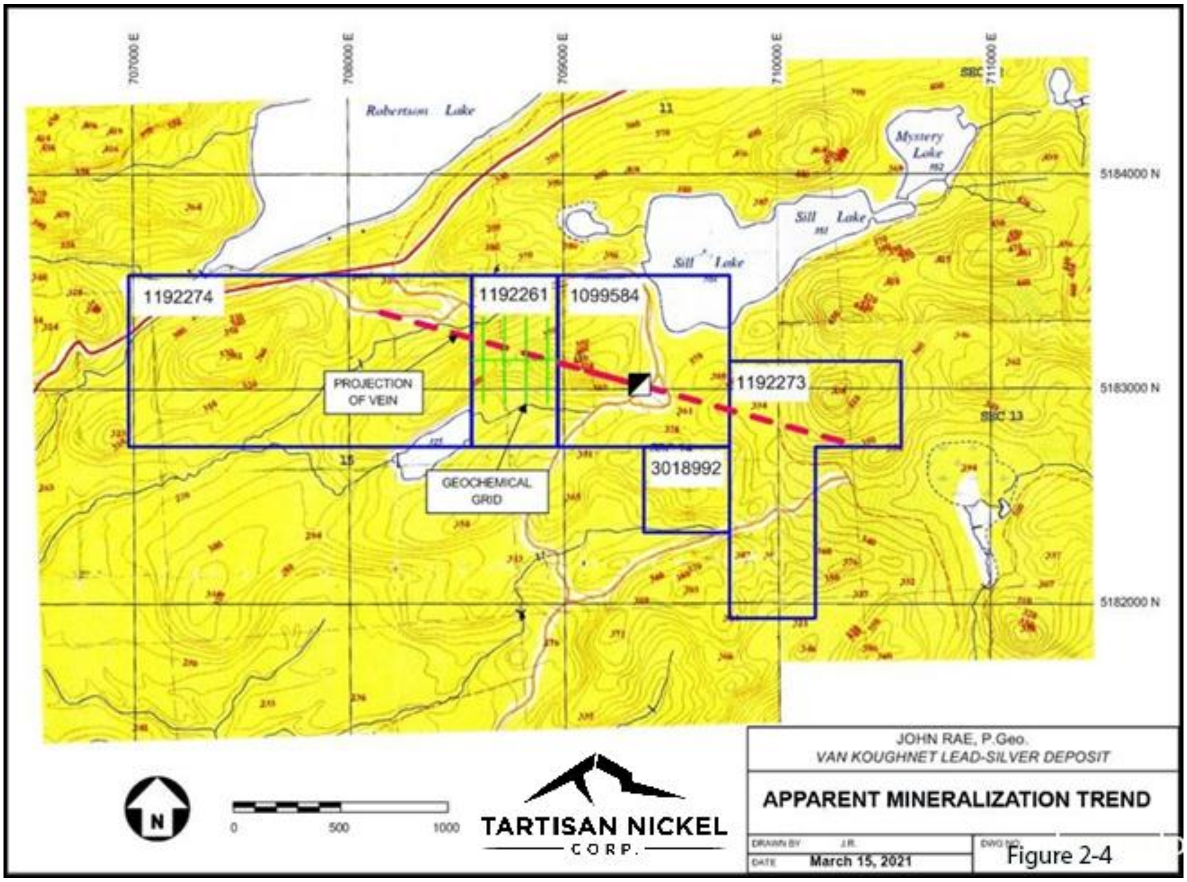


**Figure 2-4. Apparent Mineralization Trend on Land Holdings of Gilead (2008)**

# 3.0 ACCESSIBILITY, CLIMATE, LOCAL REOSURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

## 3.1 Topography, Elevation and Vegetation

The area generally consists of low, flat lying, clay covered terrain in the south-west and gently rolling hills to very rugged terrain on north and east half of the property. Elevations range from about 270 to 420 meters with the chief area of current exploration activity or drilling around 350 meters (Figure 3-1). Seasonal temperatures vary from below 0°C to 35°C with an average of 20°C. precipitation occurs both several metres of snow over the winter months to ¼ m of rain during the Spring and Summer months. Accessibility is often limited to snow machines during the winter months unless the access roads are plowed. Vegetation is comprised of deciduous and conifer trees with minor undergrowth. On the valley floor in vicinity of the old mill site and tailings impoundments, vegetation is sparse.

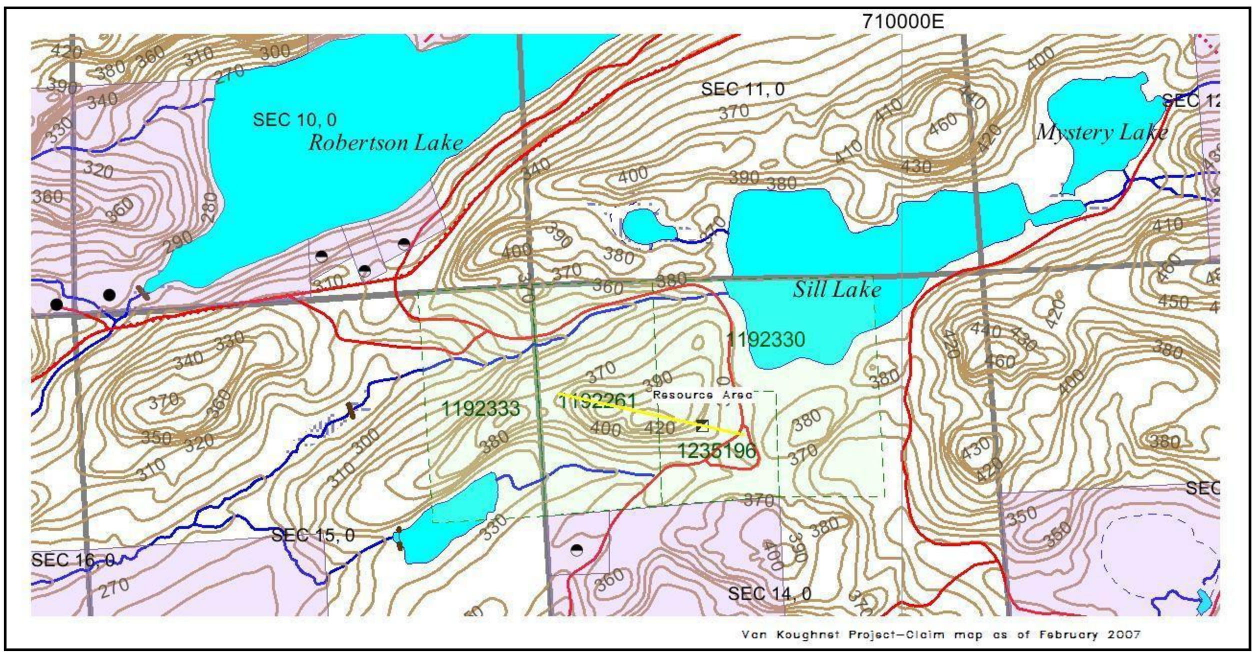


**Figure 3-1. Topography in Vicinity of the Sill Lake Mine**

## 3.2 Local Resources and Infrastructure

Access to the property is via Hwy 17 north of Sault Ste. Marie a distance of 20 km to Hwy 532, then east 8 km to the mine road which ends at the adit portal a further 8 km to the southwest. A power line runs east-west through legacy claim number 1192261 south of the vein. There is abundant surface and shallow groundwater on the site.

# 4.0 HISTORY

## 4.1 Pre-1983 Exploration and Development

Mineral exploration for copper and silver in the area dates back to about 1890 with shaft sinking and tunneling at the Sill Lake Silver Mines Limited Goulais River property in Vankoughnet Township and shaft sinking at the Lucinda Gold Mine Limited occurrence in Fenwick Township.

The Sill Lake mine is located was originally held by Montco Copper Corporation Limited in 1955. This property included 17 unpatented mining claims in sections 10, 11 and 12 of Vankoughnet Township. The company's prospectus reported copper mineralization in a quartz vein at the contact between the sediments of the Cobalt Group and the Nipissing diabase and recommended further exploration the location of which was not verified on the ground. The ownership of the property between 1956 and 1972 is not known to the author.

Teck Mining Group Ltd. optioned the property in August 1972. In a report by their geologist Ralf McGinn, the history of the property is summarized as follows:

- trenching, 90 ft. adit, 55 ft. of vertical shaft and 121 feet of lateral development in Section 14, circa 1892;
- geological mapping by Dr. F.R. Joubin Associates 1960-1963;
- 704.5 ft. of diamond drilling on 3 holes by Annoff Mines Ltd., March 1971;
- mechanical stripping and trenching by Mr. W. Doughty in Oct. 1971 and April 1972;
- geological mapping and line cutting by Geophysical, Engineering and Surveys Ltd. in 1972;
- geochemical survey and soil sampling by Geophysical, Engineering and Surveys Ltd in 1972;
- geophysical survey (VLF - EM (Radon)), magnetometer, self-potential, VLF and EM by Geophysical, Engineering, and Survey Ltd., 1972
- mechanical stripping and trenching as well as diamond drilling byGeophysical, Engineering and Survey Ltd., 1972

In 1972 Tribag Mining Co. optioned the property from Teck Mining Group Ltd. and began a geological and geophysical survey. They completed 32 diamond drill holes totaling

12,294 feet following a steeply dipping structure 2,800 feet long with Ag-Cu mineralized zones. These zones range from 5-15 feet in width and indicated 250,000 tons grading 3.5% Cu and 0.26 oz/ton Ag. A similar structure located 1,000 feet to the north was drilled and samples returned high grade lead and silver results.

In October 1973, Tribag leased its mining properties to Prace Mining Limited, a private company. In 1976, further exploration resulted in the discovery of mineable lead/silver Underground development began in 1979 with a decline reaching 30.5 m. A small mill was constructed, and stockpiled ore was milled (refer to Figure 4-1). The concentrate graded about 80% lead and 100 ounces of silver to the ton. In 1981 they reportedly shipped a total of 112 tons of Pb-Ag concentrates. The Prace Mining Company went into receivership in 1982.

Ground electromagnetic (VLF) and magnetometer surveys were completed in 1980 over six claims to the north and west of the mine. The results indicated two EM conductors, one of which corresponded to a westward extension of the mineralized zone located at the mine. A follow-up drill program of 9 holes totaling 1091 m (3579 ft) was completed by Prace Mining Co. Limited in 1981. The results indicated several sulfide mineralized intersections which correspond to the extension of the mineralized zone 400 m west of the mine portal. The intersections consisted of minor quartz and carbonate strings with disseminated chalcopyrite, galena, and pyrite in Gowganda Formation wackes approximately 30 m (100 ft) above the wacke-diabase contact.

Some disseminated galena and sphalerite/tetrahedrite were encountered in narrow carbonate stringers in the Archean mafic volcanic rocks underlying the wacke at this locality. Additional mineralization consisting of disseminated pyrrhotite, sphalerite, galena and chalcopyrite occurs in fine fractures in the diabase. However, the main host rock for silver-bearing sulfides such as galena and perhaps sphalerite/tetrahedrite appears to be the sheered sometimes hematized and carbonate gangue veins within argillitic rocks.

## 4.3 Post 1982 Exploration, Development and Mine Production

In 1983 Royal Gold and Silver Corporation entered into an agreement with Sill Lake Silver Mines, a private Sault Ste. Marie based mining company, to treat 4000 tons of silver-lead ore and tailings at the former Prace Mine, Van Koughnet Township. The operation was reported to have closed due to a fall in metal prices. A production capacity of 100 tons per day began in late 1984. Sill Lake Silver Mines Limited started the development of a second underground level in 1985.

In the fall of 1985, Sill Lake Silver Mines Limited resumed mining and milling operations. In the fall of 1986 when Dr. Temple visited the site the mine was shut down due to inadequate working capital to develop the mine. There are no indications that there has been any further work since this time. It is estimated a total of 7000 tons of high-grade ore has been mined and processed from the workings.

The ore shoot has been mined by a surface open cut and an adit drift for a length of 360 feet, and a decline adit has been driven on the vein at a grade of 20 percent for a total length of about 500 feet, of which 440 feet was actually on the vein.

Mining continued until 1982 at which time, Prace went into receivership. In 1984, production resumed under the name of Sill Lake Silver Mines and a second underground level was installed. At this time, l/2 tons of vein material with an average grade of 64% lead and 85 oz of silver were removed. The property was allowed to lapse until George Lucuik restaked the property in July, 1995.

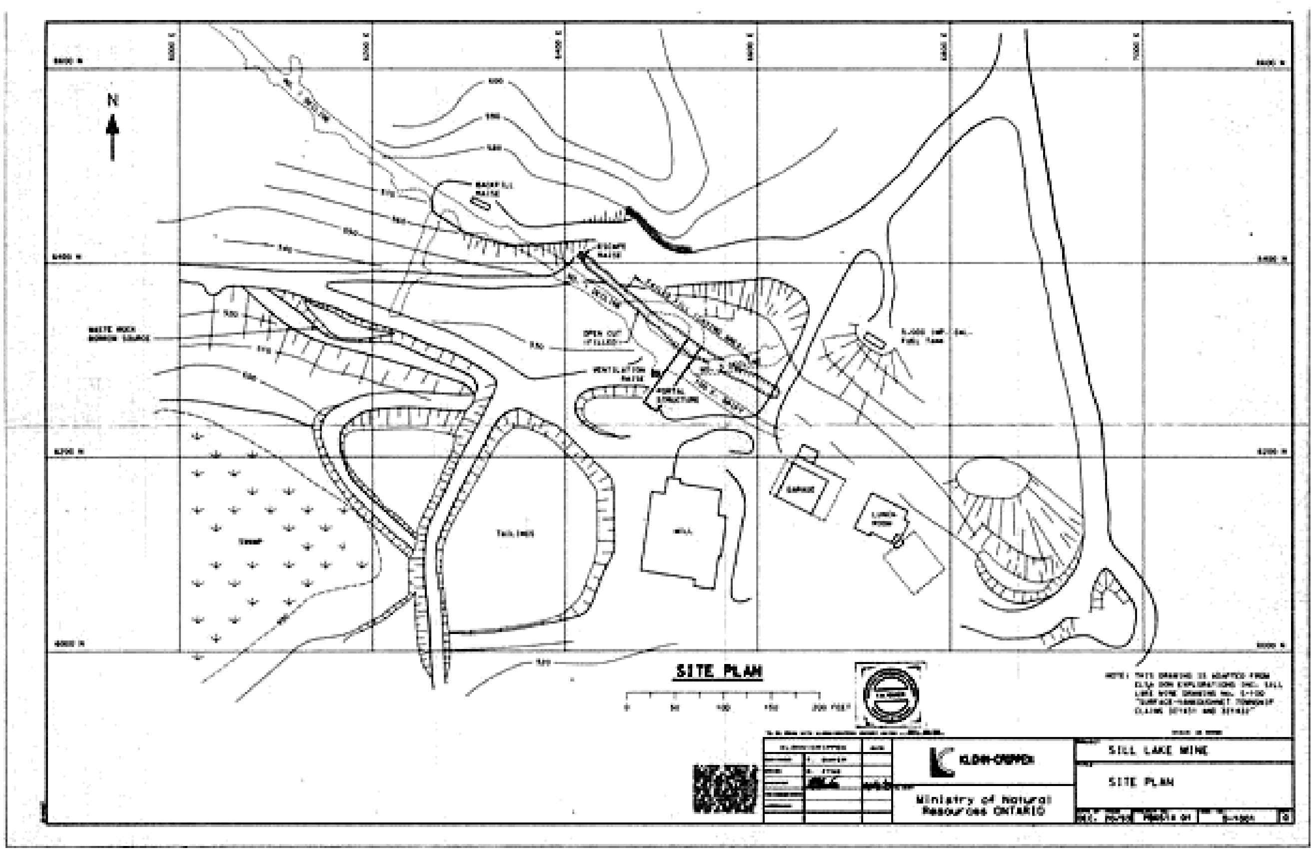


**Figure 4.1 – Schematic of the Prior Mine and Mill Layout at Sill Lake**

## 4.2 Milling

In 1981, there was limited production of lead-silver concentrate and 112 tons were shipped. In 1982, Prace went into receivership and the property was acquired by Sill Lake Silver Mines Limited. Royal Gold and Silver Corporation entered into an agreement with Sill Lake Mines Limited in 1983 to process in excess of 4000 tons of silver-lead ore and jig tailings. In 1983 Royal Gold and Silver Corporation entered into an agreement with Sill Lake Silver Mines, a private Sault Ste. Marie based mining company, to treat 4000 tons of silver-lead ore and tailings at the former Prace Mine, Van Koughnet Township.

A 75 ton per day modular ore beneficiation plant was installed using crushing, grinding, gravity and flotation cells. In the fall of 1985 Sill Lake Silver Mines Limited resumed mining and milling operations. Their mill consisted of crushing, grinding in a ball mill and a recovery circuit consisting of flotation cells and two Reichart spirals. The mill had a rated capacity of 120 tons/day and eighteen men were employed at the facility. Eighty tons of Pb-Ag concentrate was shipped in 1985. The operation was reported to have closed down in 1984 due to a fall in metal prices.

The mill in its entirety has been removed from the property.

## 4.3 Reclamation

Prior reclamation activities have been limited to removal of equipment and debris. No reseeding or addition of soil cover was noted in disturbed area although the mill site appears to have been graded. Unreclaimed features that remained on the property at the time of the staking of the claims by Gilead were:

- a small, dammed tailings pond containing tailings with elevated lead and iron values;
- an open portal with a collapsed timbered entrance;
- a large detention or clarifying pond that was also used for a water supply to the mill and for make-up water below the tailings pond;
- a large trench and opening to the underground workings above the open portal and discharging mine waters during the spring from the portal underneath a road to the tailings pond;
- two concrete pads in the former mill site area;
- access roads in and around the site that have been in current use by recreationists; and,

- small amounts of ore scattered in and around the mill site and likely stockpile area.

The open portal and trench presented a health and safety risk and the discharge from the portal to the tailings pond could impact minor portions of the watershed. The sulphide bearing ore scattered on the reclaimed mill and prior ore stockpile site likely has impeded the development of vegetation due to acidity and metal content although there is no evidence of oxidation that might cause acid mine drainage. The tailings in the pond appeared to be covered with fine silt presumable from the milling operation although vegetative growth was very sparse indicating either acidic or metallic conditions. Further, the extent of underground reclamation such as backfilling and buttressing is still under investigation while the workings are being dewatered and stabilized for reentry. Generally, except for the health and safety risk of timbers around the portal and the deep open cut above the portal, the site appeared fairly clean before exploration activities commenced this year.

# 5.0 GEOLOGICAL SETTING

The Sault Ste. Marie District is underlain by rocks of both Archean and Proterozoic age. Paleoproterozoic sedimentary rocks of the Huronian Supergroup (2.2 – 2.4 billion years old) were deposited on an Archean basement, into an initially active and later passive rift system in a glacial environment. The Huronian Supergroup is exposed in a west trending, 50 km-wide belt along the north shore of Lake Huron, between Elliot Lake and Sault Ste. Marie.

Keewenawan rocks (1.11-1.09 billion years old), associated with the formation of the Mid-continent Rift along the axis of Lake Superior, consist of basalt and rhyolite that are overlain in an angular unconformity by fluvial sediments of the Jacobsville formation. Keweenawan subvolcanic felsic stocks and breccias intrude Archean volcanic rocks of the Batchawana Greenstone Belt and Archean gneissic granitoid terranes. Keweenawan Rocks host the past producing Tribag and Coppercorp mines which, combined, produced 59 million pounds of copper and 474 thousand ounces of silver between 1968 and 1972.

Overlying the Precambrian rocks in the Sault Ste. Marie area are Paleozoic, Ordovician shales and dolostones that are exposed on St Joseph Island. On Serpent Island, a smaller island to the east of St Joseph, the unconformable contact between Huronian quartzites and overlying Paleozoic limestones is exposed along the north shore of the island.

Structurally, the area is quite complex, with early, westerly, Proterozoic rift-related structures being reactivated as thrust faults during Penokean compression. The regional, east-trending Murray Fault, which has been traced between Sudbury and Thessalon, along the north shore of Lake Huron, is an expression of this tectonic activity. The broad anticlinal and synclinal fold axis of the Huronian sediments were also developed during the Penokean collision event.

Keweenawan rocks were deposited in asymmetrical grabens bounded by normal faults, that were subsequently reactivated as reverse faults in late Keweenawan times. Arcuate, northeast-trending reverse faults, which are transcurrent to Midcontinental rift axis faults, offset late Keweenawan sediments. The origin of these compressional structures is not known, but they appear to parallel the Kapuskasing structure to the northwest.

The Figure 5-1 depicts the general geology of the Sault Saint Marie Mining District while Figure 5-2 is a more detailed geologic map of the Sill Lake property prepared by Marc Melker (2008). In his rendering, Mr. Melker refers to Huronian metasediments that more appropriately should be called Elliot Lake metasediments.

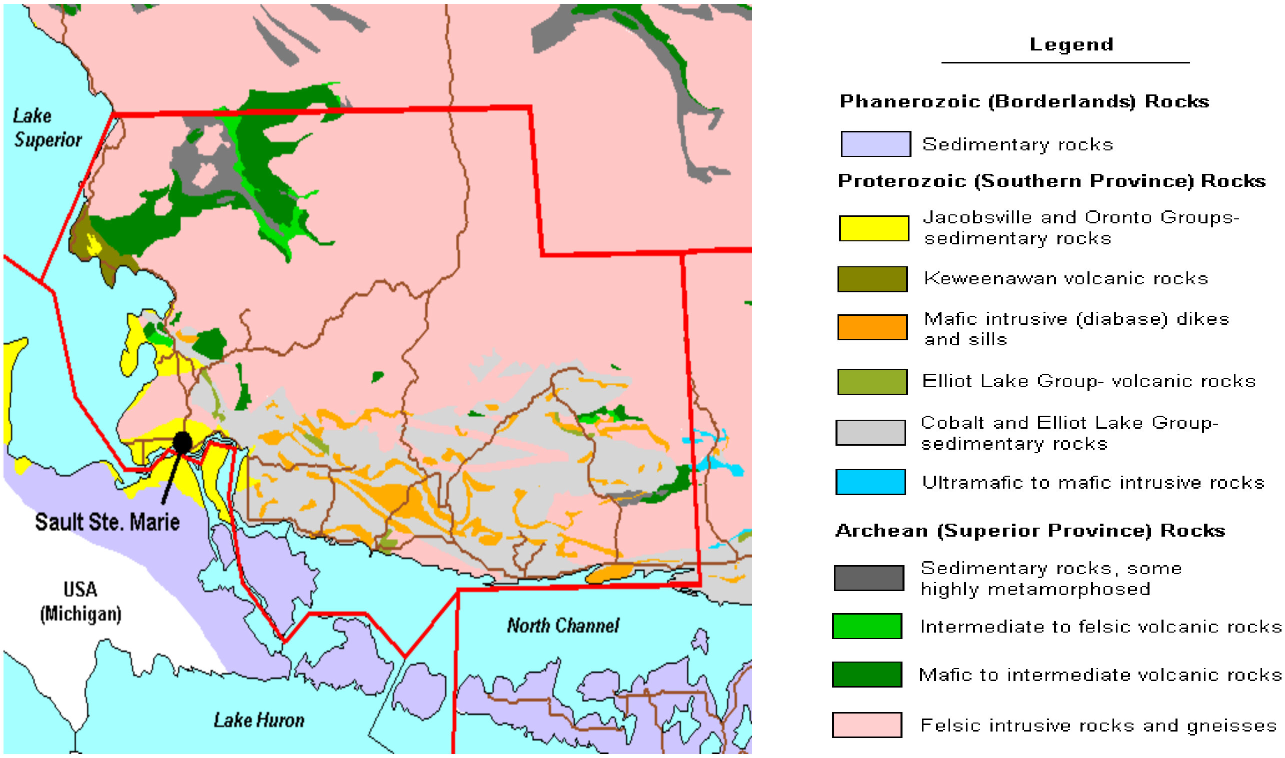


**Figure 5-1. Regional Geologic Map**

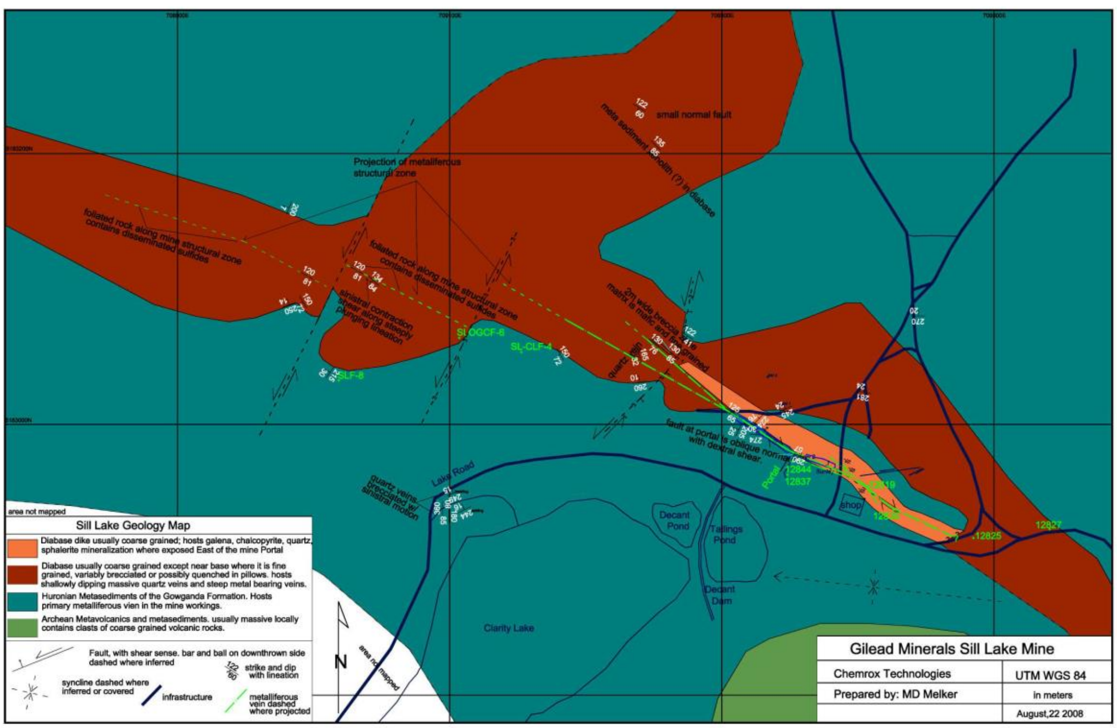


**Figure 5-2. Generalized Geologic Map of the Sill Lake Property (Melker, 2008)**

# 6.0 DEPOSIT TYPE

The deposit is very typical of a sulphide-vein occurrence in Precambrian greenstones with a likely intrusive source. Veins of this nature are generally fault controlled laterally and vertically. Often there are multiple veins which appears to be the case at Sill Lake. However, in the case of Sill Lake, only one vein has been previously mined.

## 6.1 Geological Model

The deposit appears to be both structurally controlled and associated with the contact of metasediments and later age intrusive sills. Generally, along the contact of argillitic greenstones and diabase sills, there has structural sheering and fracturing of the argillites that has allowed for the introduction of hydrothermal fluids carrying locally massive and sometime occasionally disseminated sulfides. In this sulphide mix of predominately galena, sphalerite and tetrahedrite, there are silver values presumable in the matrix of the sulphides. The mineralization as known thus far trends on the NW-SE structure that appears to have been off-set based upon geophysical interpretation. It is not known with any certainty whether these potential NE-SW trending faults, post- date mineralization. The source for the hydrothermal fluids is also not known with any certainty but the contact relationship with the argillite and the diabase cannot be discounted. While the primary target for exploration is along this known and previously mined trend, it is also unknown how deep and laterally extensive this trend persists. Currently this model is the basis for current exploration but there exists the potential for other targets similar to this on the property that have yet to be tested off of this structural trend as seen in Figure 6-1.

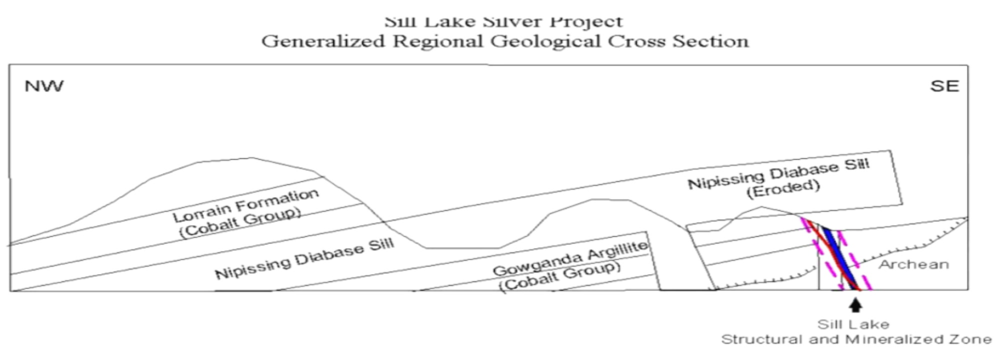


**Figure 6-1. Conceptual Cross Section Depicting Known Sill Lake Mineralization**

## 6.2 Ore Occurrence

The ore is massive argentiferous galena which replaces a tension fault which cuts 40 to 50 degree dipping beds of Huronian-age argillite and greywacke, which are in turn cut by a complex diabase dike that is several hundred feet thick. The mineralized fault strikes northwesterly and dips steeply to the southwest. The observable mineralization is massive galena with minor pyrite, hematite, sphalerite and with quartz-carbonate gangue.

The ore-shoot has been developed in the sedimentary rocks immediately alongside of the diabase for a proven length of more than 500 feet, with possible extensions identified by the recent geophysical survey for at about 1600 feet. The vertical range of the ore shoot is at least 200 feet in the area explored by recent drilling.

The main sulphide in the mineralized vein is argentiferous galena(gn) although sphalerite (sp), chalcopyrite (cp), pyrite and free silver is also present. Figure 6-2 illustrates a typical mineral association at the Sill Lake Mine.

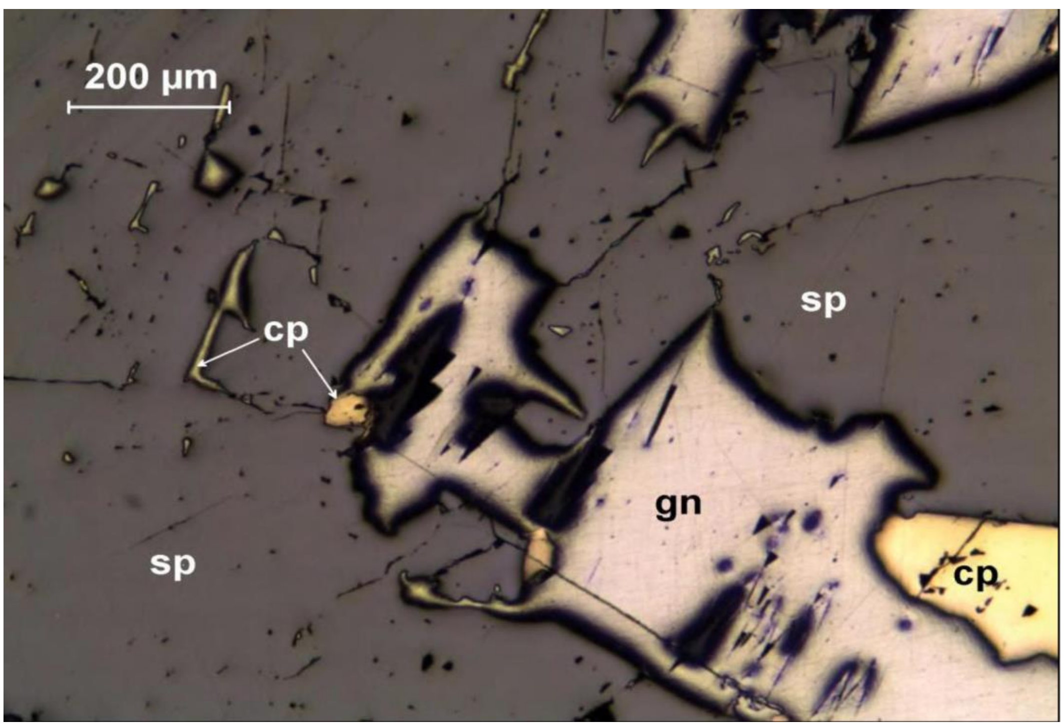


**Figure 6-2. Argentiferous Galena in Sphalerite Matrix with Exsolution Blebs of Chalcopyrite**

# 7.0 MINERALIZATION

Silver and lead vein mineralization at the Sill Lake Mine is along the contact of a steeply dipping gabbro-norite dike and wackes of the Gowganda Formation but is NOT in contact with the main Nipissing quartz diabase sill which is exposed 100 m north of the mine. The gabbro-norite dike is compositionally different from the Nipissing quartz diabase as it contains pseudomorphs of olivine and no quartz. Since it is less altered than the Nipissing diabase, it is assumed to be younger and to represent a Keweenawan diabase dike.

Shearing and fracturing are common along the strike of the vein and in the adjacent Gowganda wackes. The fracture system associated with the vein is traceable along strike for 120 m (400 ft) and to a depth of at least 43 m (140 ft).

The deposit consists of one major vein with a few sub-parallel veins. The argentiferous galena vein which varies from 1-3 m in width has ore grades of 40 ounces of silver per ton and 10-30% lead. The sulfide minerals present are galena, tetrahedrite, pyrite, chalcopyrite sphalerite and pyrrhotite (Robinson, 1977).

Important factors controlling the mineralization are believed to be (1) its proximity to Archean pillowed mafic volcanic rocks; (2) the presence of several northeast-trending faults; and (3) its proximity to dikes of probable Keweenawan age. Table 7-1 is a descriptive section of the geology of the site with emphasis on alteration and mineralization prepared by Marc Melker (2008).

| Structure | Mineralization or Alteration | Rock Type | Description |
|---|---|---|---|
| Exposed outcrop striated along 045 azimuth | sub-aerial clay and soil development | Glacial till | Typical glacial till. Erratic pebble to boulder size clasts contained in fine clays and sands. Striated outcrops suggest latest transport along 045 AZ. This unit covers much of the project area, and itself is covered by recent soil development. Surficial deposits were not specifically mapped. |
| Brittle NW trending dextral, NNE to NE sinistral faulting. Structures are steeply dipping and accommodate oblique extension or contraction. Dextral features are dominant for mineralization and are typically extensional also, as seen at the portal where the quartz vein is strained in a largely extensional fault with lesser dextral motion. | Galena, Chalcopyrite, Quartz, Sphalerite, calcite | | Massive galena in places up to 15 cm thick, lesser sphalerite, chalcopyrite and pyrite. Veins are strained and emplaced in typically local extensional secondary faults. Sphalerite is typically Fe rich and tending toward dark brown to black in color |
| contains some evidence of moderately dipping brittle strain but otherwise undeformed. Breccia pipe development located above drill hole D37 islocalized within the dike by cross cutting structure(?) | retrograde biotite and/or phlogopite alteration of mafics | Diabase Dike | Late Nippising or Keewanawan age diabase dike. The unit is typically coarse grained, but strongly weathered with variable retrograde biotite/phlogopite alteration. Typically, preferentially weathers compared to older diabase unit, a local cliff former. The dike hosts sub-vertical veins. Locally contains aligned chlorite micro veins 1-3mm thick. Near the Sill Lake camp and former process facility the dike hosts metalliferous quartz, carbonate veins. Galena, chalcopyrite, sphalerite are typical sulfide minerals. North of the mine workings the Sill Lake breccia pipe is localized within the dike margins. It is containing clasts of: jasperiod from the Laurain formation (not locally recognized), strained quartz from local shallowly dipping quartz veins, and other altered unrecognized, angular clasts. |
| shallowly dipping Quartz veins indicate sub vertical extension, possibly during Nippising emplacement event | Massive quartz veins and local albitization in Nippising | | |
| East of the Mine Portal at the top of the hill, the diabase contains foliated structures that are sub- parallel to the primary metal vein. Foliation indicates sinistral contractional motion along a steeply plunging lineation. These structures are likely older and formed deeper than the subsequent metalliferous veins which were developed in a brittle strain field. however, subsequent structural events have obviously taken advantage of pre-existingfabric. | | Diabase | Nippising intrusion. Usually, coarse grained except near base where it is fine grained, variably brecciated and re-welded, or possibly quenched in pillows. Basal fine-grained section is usually about 1meter thick but can be up to 3m. Transition to upper coarse-grained section can be abrupt, as at section below BM1. The intrusion appears to be injected into multiple levels of Gowganda meta-sedimentary rocks. Hosts early moderate to shallowly dipping massive quartz veins and later sub-vertical metalliferous veins. Quartz mineralization locally causes salmon colored albitization. |

| | | | |
|---|---|---|---|
| Contains bedding plane faults andhanging wall folding. Timing is uncertain; however sub- horizontal contractional features are found only in the Nippising sills and Gowganda units and is likely related to the sill emplacement structural conditions. | | Gowganda Formation Metasediments | Argillite usually well bedded and laminated. Contains local soft sediment deformation features. It is broadly folded and locally contains tight small scale folds developed above bedding plane faults. Small scale folds and bedding plane faults indicate NW directed contraction. unit hosts the primary metaliferous vein on the former Prace mine workings. |
| | Greenschist facies typical of Archean greenstone belt. | Metavolcanics | Massive metavolcanics of the Archean greenstone belt. Local unit is massive but contains rare clasts of porphyritic volcanic rocks. |

**Table 7-1. Sill Lake Alteration and Mineralization Association in Rock Units (Melker, 2008)**

## 7.1 Type, Character and Distribution of Mineralization

Peter Born of the Ontario Geological Survey (Open File Report 5602) in 1987 indicated that the silver and lead mineralization at the Sill Lake Mine is thought to occur along the contact of a steeply dipping gabbro-norite dike and metasediments (greywacke) of the Gowganda Formation in a vein system. Born believed that the mineralization was associated with shearing and fracturing that common along the plane of the vein and in the adjacent Gowganda Formation wackes. Born noted that fracture system associated with the major vein is traceable along strike for 120 m (400 ft) and to a depth of at least 43 m (140 ft). He noted that important factors controlling the mineralization appeared to be proximity to Archean pillowed mafic volcanic rocks; the presence of several northeast-trending faults; and proximity to dikes of probable Keweenawan age.

# 8.0 EXPLORATION

## 8.1 Geochemical Surveys

Historical soil surveys have been limited in usability as an exploration tool although anomalies have been detected close to mineralized outcrop. The reason that soil surveys have been of limited value is a function of the low mobility of lead in the soil profile and the fact that silver is bound to the lead matrix. While outcrop samples have been excellent indicators of mineralization at the surface, the requisite is that the sheer zone that covers the mineralization is exposed. Due to the sill-like nature of the meta-volcanics or diabase that covers portions of the lead-silver bearing argillites, the lack of lead-silver anomalies in outcrop is not a good indicator of the potential at depth. This essentially says that surface

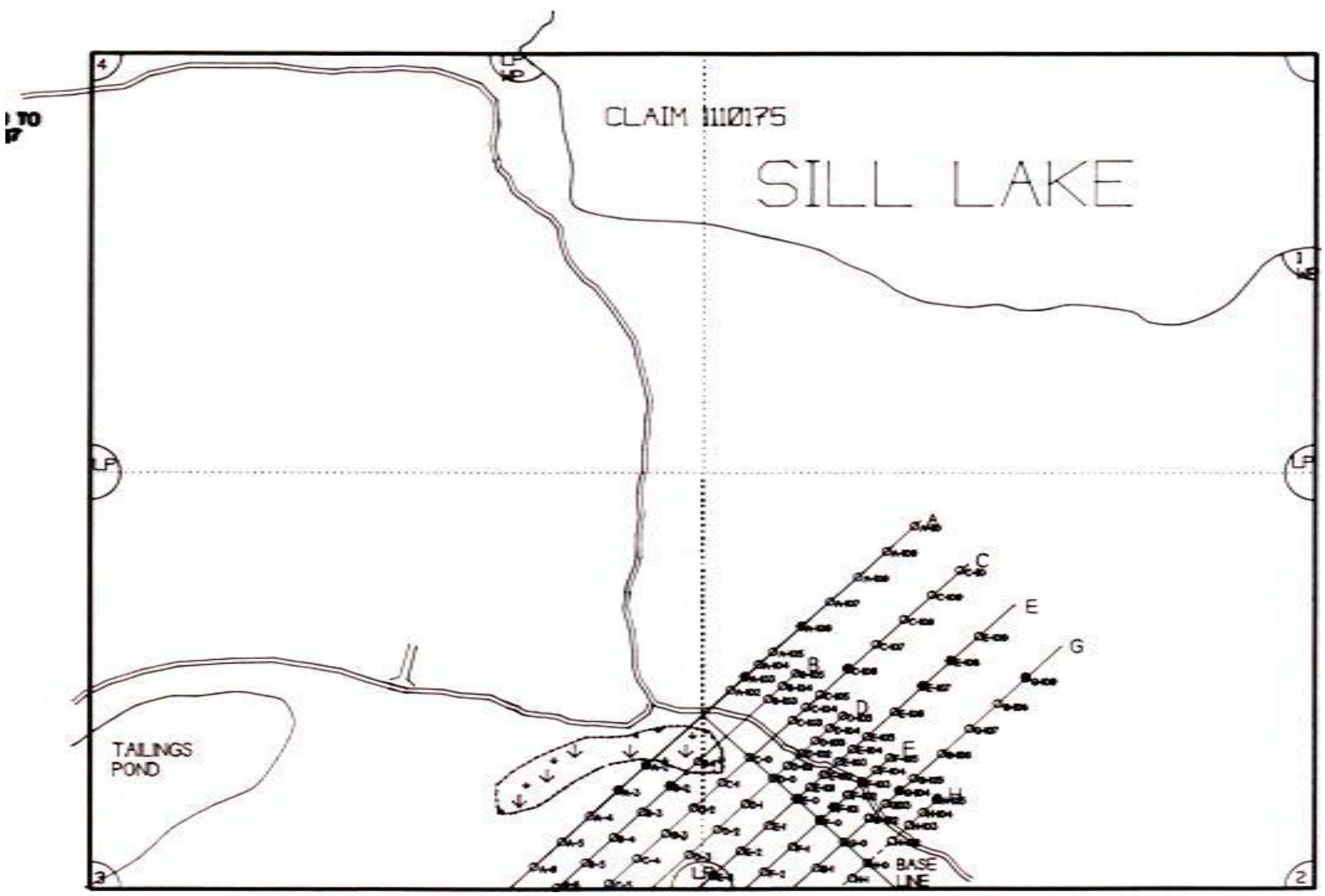


**Figure 8-1. Pre-1980 Soil Sample Survey Locations with only Limited Analyses**

and soil geochemistry at least for lead-silver, is not a good exploration tool. It is possible that more mobile potential pathfinder elements may be useful such as copper.

A more comprehensive soil sampling program was conducted in 2008 (Figure 8-1 above) on a systematic grid using the locations of geophysical survey points but the data has not been made available for this investigation. It is uncertain whether the chemical analyses were ever done for the multi- element scan proposed.

## 8.2 Geophysical Surveys

Magnetics had been utilized in the 1970's with mixed results. A potential positive anomaly had been observed along the trend of the mineralized fault trace. Follow-up traverse normal to the trend of this structure using a proton magnetometer had mixed results. While iron oxides exist at the surface along exposed segments of the mineralized trend, in the subsurface mine area, the iron is still in a sulfide form nullifying the usefulness of magnetic contrasts for delimiting faults. In 2008, Gilead did a focused survey with a proton magnetometer normal to the strike of the main vein. This was done in the area east of the portal where later there was some drilling and trenching. The results were discouraging with no obvious contrasts that could be used in finding mineralized structures of the Sill Lake mine variety.

Induced polarized (IP) in combination with resistivity was done on the property in 2008 and did produce some anomalies were exhibiting high induced polarization in combination with low resistivity were mapped (Appendix A). It was deduced from the geophysical company that the trends were masked in mine area due to water flooding, but this seems somewhat unlikely give the amount of sulfide still in the unsaturated bedrock. Either the sections are not properly located due to the lack of survey data or the data migration needs to be reworked. At any rate, the targets did not net any results in the later 2008 drilling program.

In cross-section (not illustrated in the report –Appendix A), below 100 feet, this negative IP anomaly becomes a positive anomaly suggesting continuation of the sulfide rich vein at depth in the immediate mine area as well as extensions to the west. The recent IP-resistivity also provided indications of discontinuities that may be attributable to faulting. The extent of the displacement and timing of the potential faulting relative to emplacement of the lead-silver mineralization is not known as yet and current drilling should expand the knowledge of the faulting and mineralizing events. The geophysical anomalies suggesting faulting have been corroborated with some surface mapping but the timing of the overlapping sill to mineralization and faulting also need to be investigated further because deeper faulting may not be manifested at the surface.

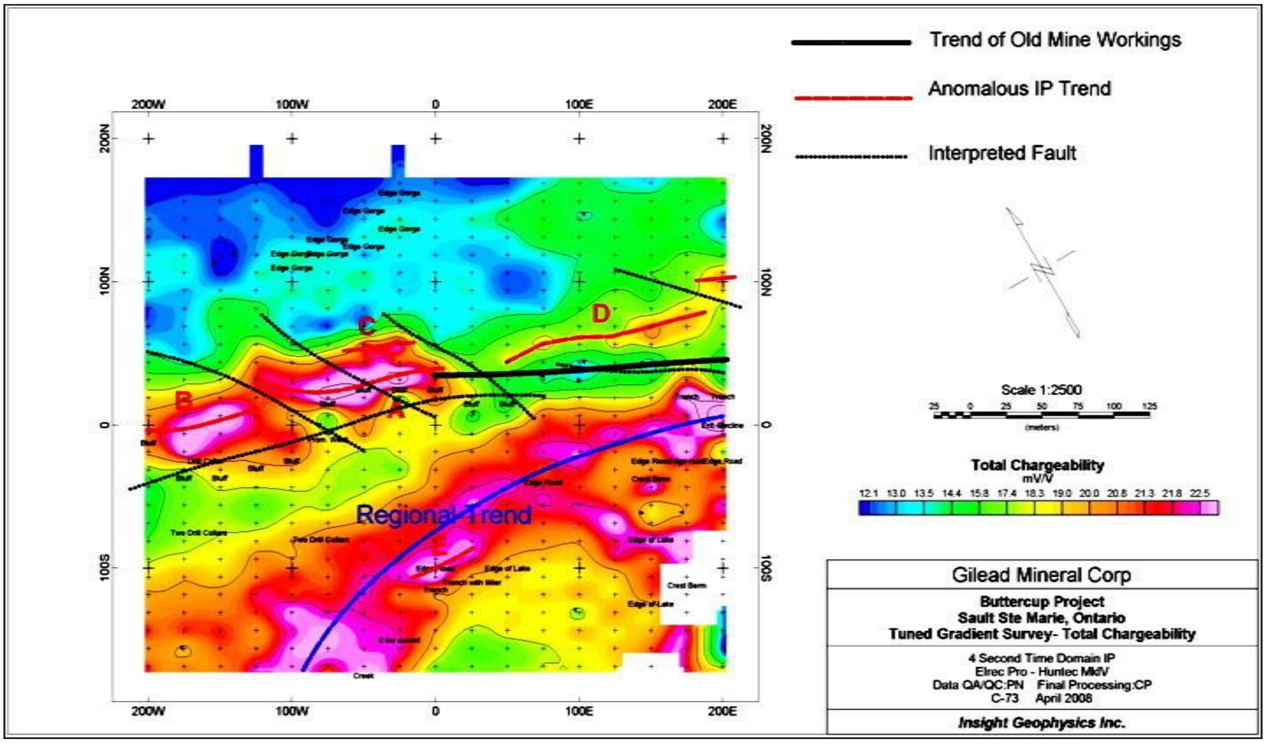


**Figure 8-2. Induced Polarization Survey with Interpreted Anomalies that did not overlap Known Mineralization**

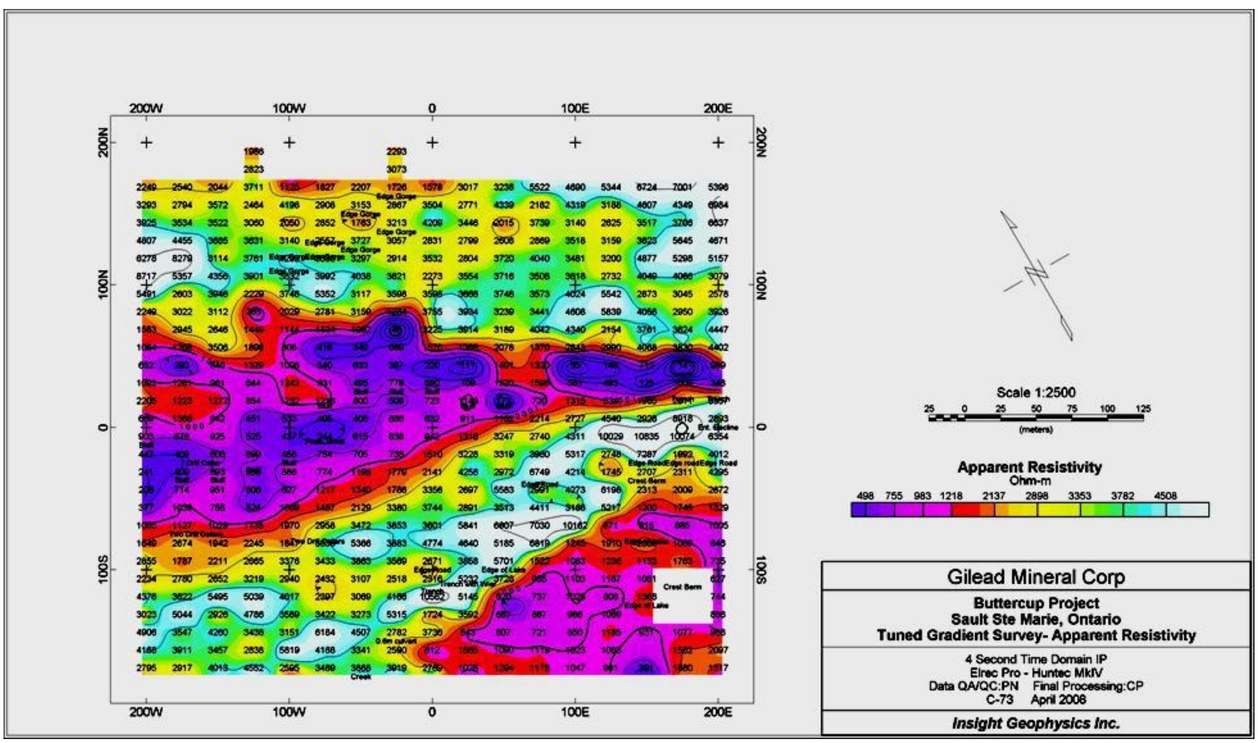


**Figure 8-3. Resistivity Survey that does appear to Correlate with a Fault Sheer**

## 8.3 Underground Channel Sampling

Following the dewatering of the workings during the summer of 2008, the mine was reconditioned to allow entry for sampling. Both Gilead and RX independently conducted sampling on the access ramp, the west back of the ramp also known as West Drift and the East Drift. For the back sampling on the West Decline and West Drift, Gilead Minerals took 3 samples at each station: a hangingwall sample, vein sample, and footwall sample according to Delio Tortosa (verbal comm., December 2010). RX took one sample - a vein sample. Bythe time Gilead sampled the East Drift water saturation on the floor was making the collection of representative samples questionable according to the Gilead geologist (Delio Tortosa, verbal communication, August 2010). This was due to washing and percussion sampling methods.

Samples were taken on the high walls and the footwalls and Gilead prepared a series of maps illustrating ranges of silver and lead anomalies for the different areas of the mine. The first of these illustrations is of the decline ramp sampling done by Gilead as seen in Figures 8-4 and 8-5. It shows that the vein thickens and thins, and the galena concentration is highly variable over a short distance.

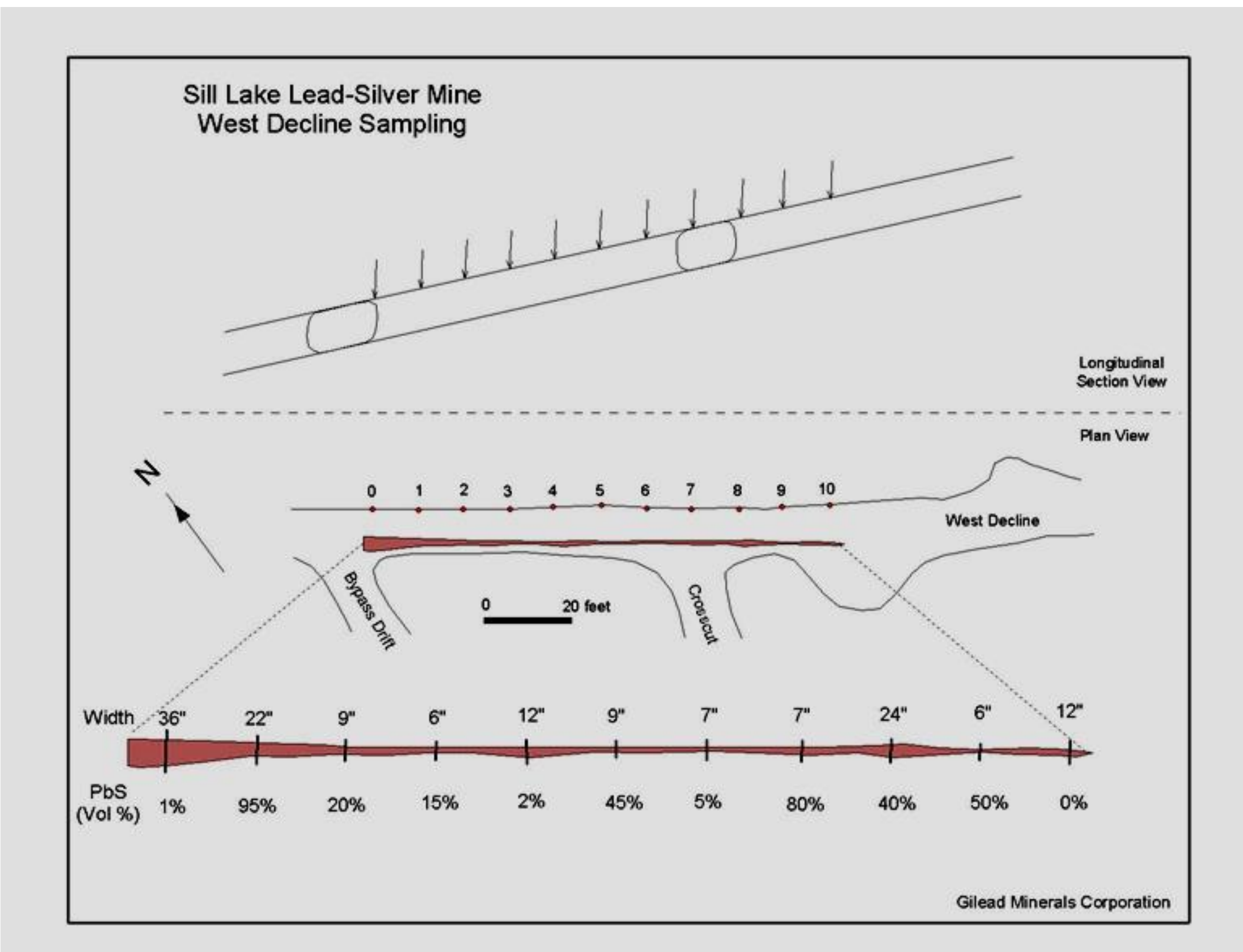


**Figure 8-4. Variability of Galena Values and Vein Thickness on the West Decline (Tortosa 2008 presentation to investment group in Toronto)**

Comparison of the silver data for the RX and Gilead programs (Figures 8-5 and 8-6) show some continuity of results but not in all cases. This makes the usage of sample data without QA/QC samples more difficult to interpret.

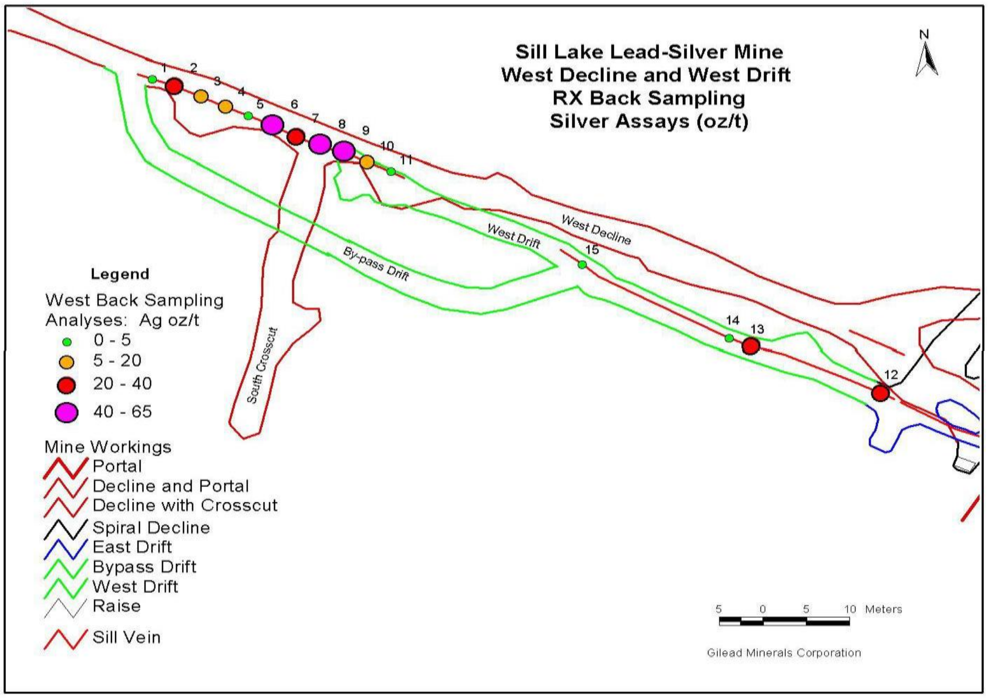


**Figure 8-5. RX Silver Values for the Decline and West Drift Channel Samples (Tortoso, 2008)**

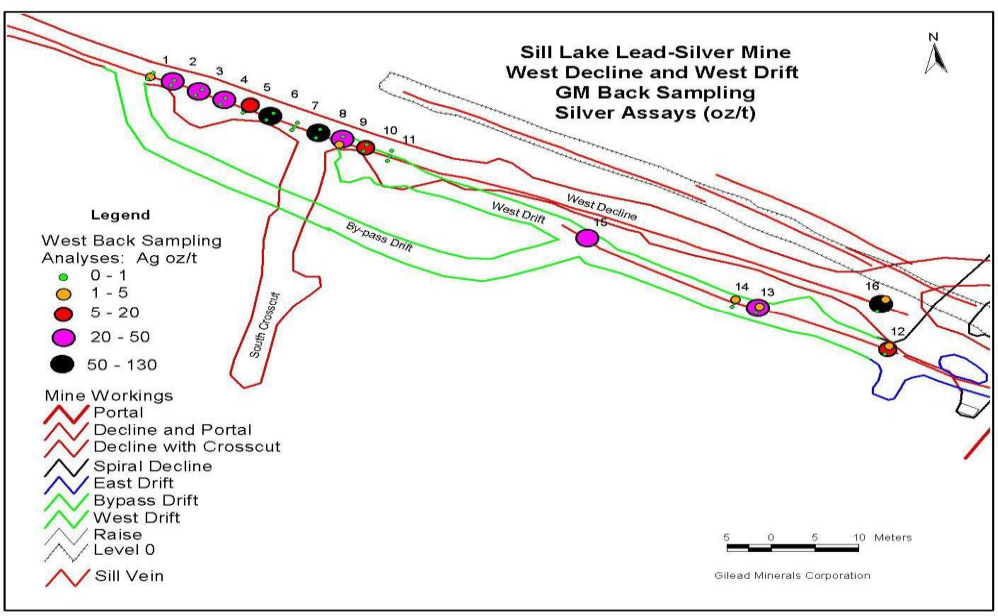


**Figure 8-6. Gilead Silver for the Decline and West Drift Channel Samples (Tortsota, 2008)**

A comparison of the lead values between those collected by RX and Gilead on the West Decline and West Drift again are relatively the same but not exactly consistent (Figures 8-7 and 8-8). This is likely a function of the different personnel collecting the samples and the sample locations not being exactly the

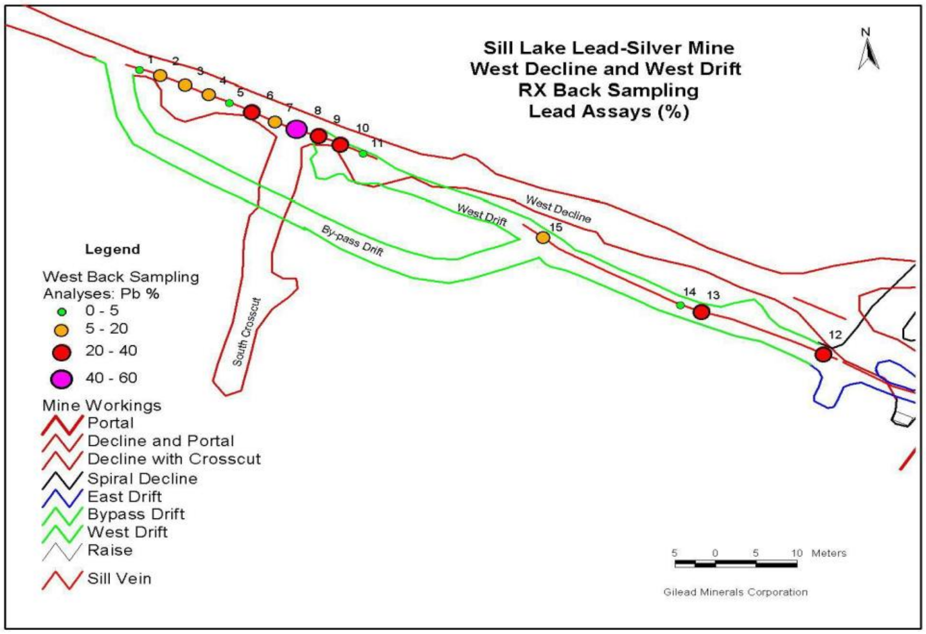


**Figure 8-7. RX Lead Values for the Decline and West Drift Channel Samples (Tortoso, 2008)**

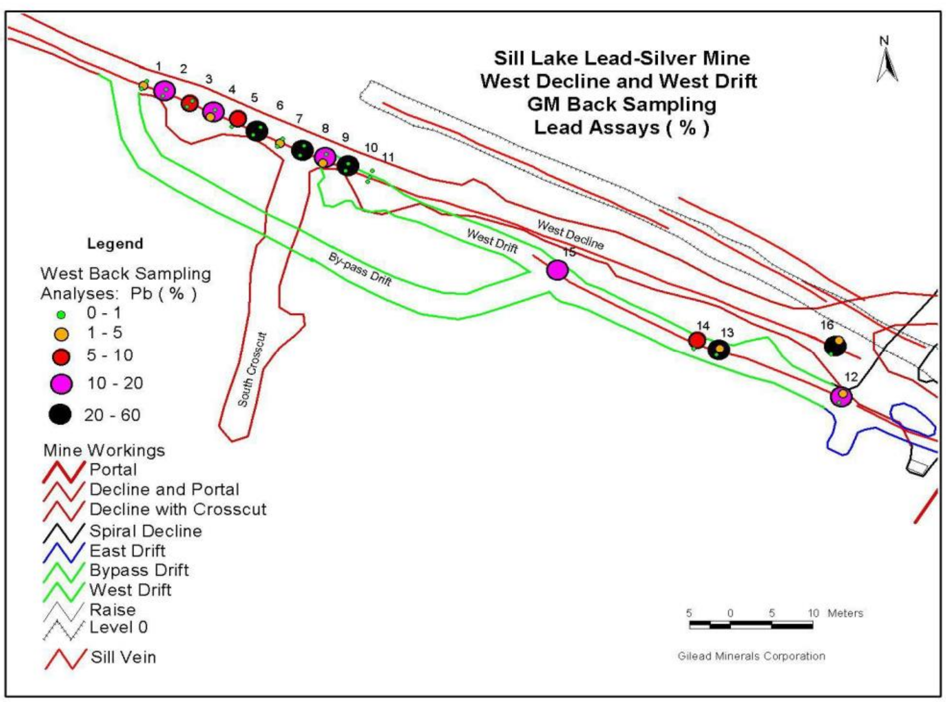


**Figure 8-8. Gilead Lead Values for the Decline and West Drift Channel Samples (Tortoso, 2008)**

same location.

Below in Figures 8-9 and 8-10 are the locations of the RX sampling in the East Drift. The Gilead samples were not included due to the water issue mentioned above.

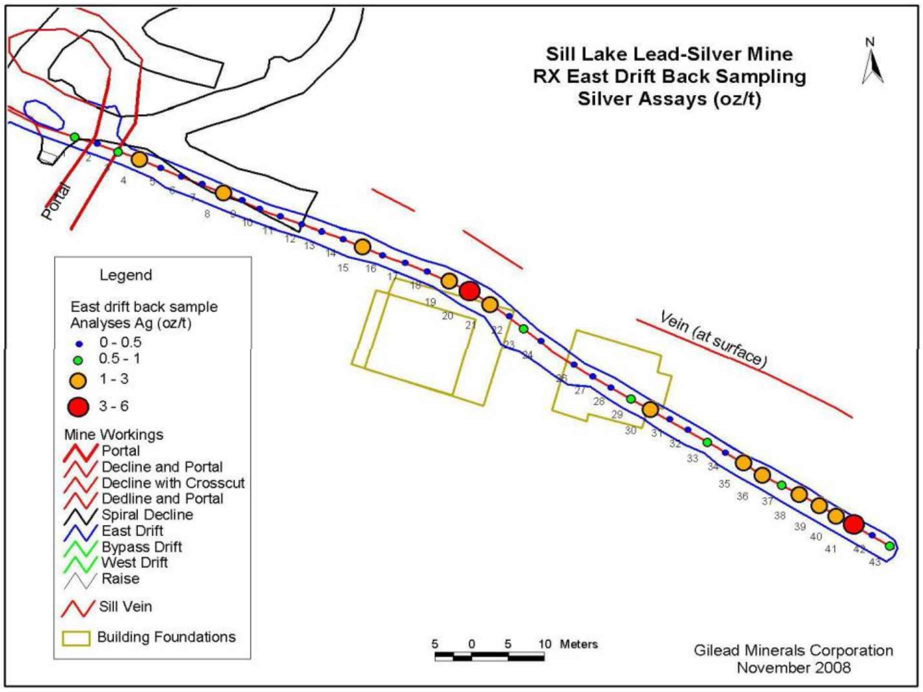


**Figure 8-9. RX Silver Values for the East Drift Channel Samples**

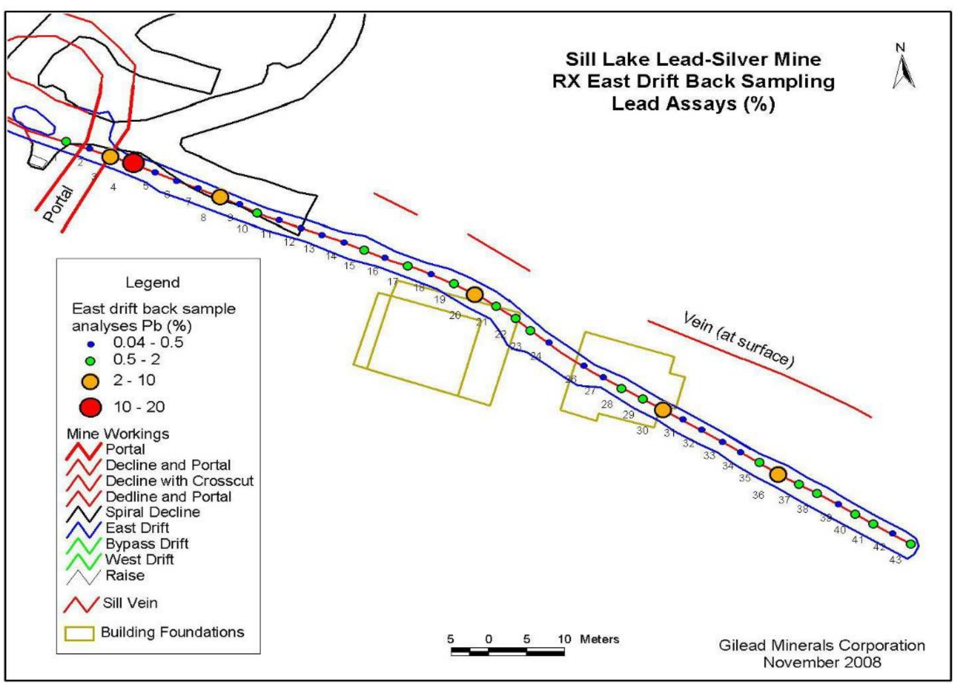


**Figure 8-10. RX Lead Values for the East Drift Channel Samples**

# 9.0 DRILLING

## 9.1 Prior Drilling Programs

Tribag drilled seven holes totaling 427 meters in and around the lead-silver vein. Prace and others also did drill in and around the mine area. Previous drilling efforts at the site have described possible projections of the primary galena vein exploited during prior operations. A similar structure located 1,000 feet to the north was drilled and samples returned high grade lead and silver results.

However, most drill logs and assay results for these holes have been lost and most collars could not be confidently located in the field due to survey datum irregularities. Unfortunately, these largely irresolvable uncertainties preclude relying on previous drill results. So, a new drill program was designed and implemented with the locations surveyed in Figure 9-1.

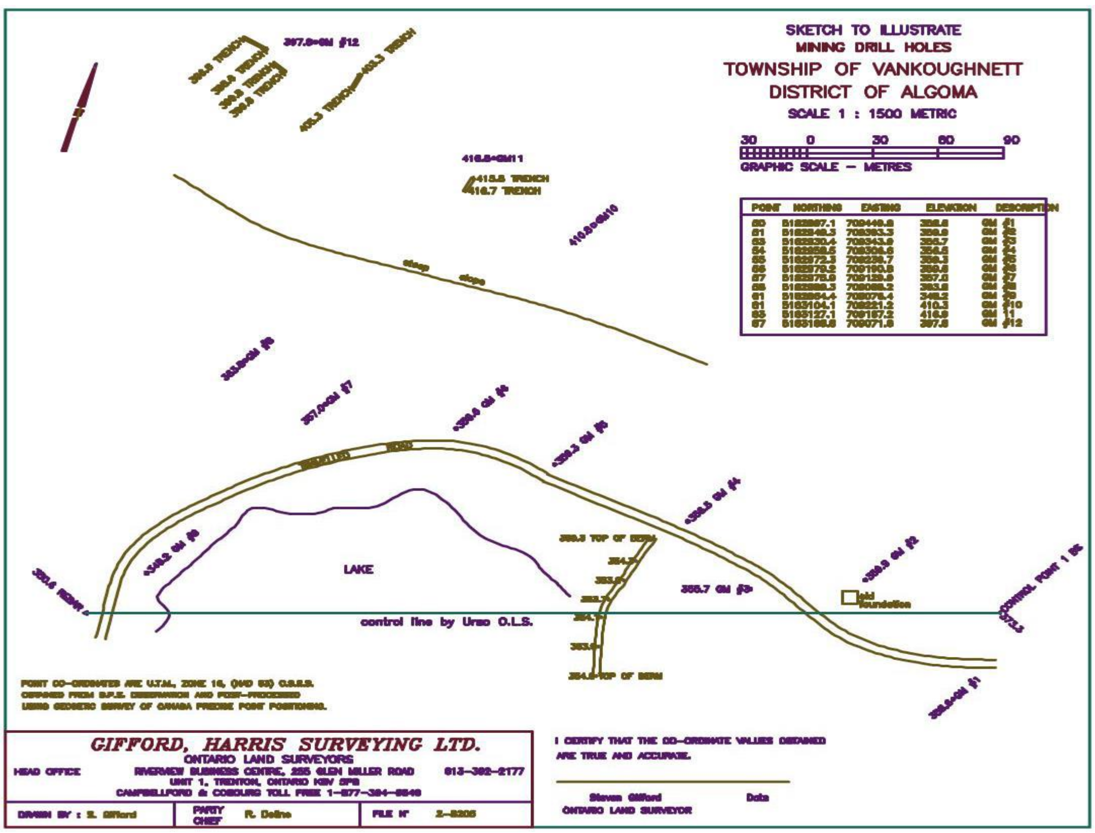


**Figure 9-1. 2008 Drill Hole Collar Locations**

## 9.2 2008 Drilling Program

Drilling was conducted along the projections of the vein to the southeast and northwest of the portal. Mapped surface expressions of the structural system indicate prospective ground in both directions and previous work suggests the zone continues down-dip of the vein, below the volume already mined.

Mapped and interpreted faults suggest that the vein appear to offset the main NE trending sinistral faults. Thirteen drill holes were drilled along this trend with a couple of holes on the eastward extension of the mineralization sheer. Due to the overall steep southwesterly dip of the primary vein structure, most holes have been placed south of the vein structure drilling toward the NE at azimuth 30°. Most holes were drilled down at 60 degrees from the surface, but 4 are at 45°.

Three drill holes were drilled from the north side of the primary vein to intercept mineralization structures associated with main zone of mineralization projected beneath the workings. The south side of the hill that hosts the projection of the vein structures is steep with numerous cliffs and large boulders and scree below making evaluation of the structures by drilling from the south side difficult. Access from the north side is easier and the orientation of the vein here is not well understood so two holes are currently planned to evaluate possibilities from this vantage point. However, access to the north side is also difficult in places and may require repositioning of hole locations to allow access. Holes on the north side will be drilled at 45 degrees to provide the highest likelihood of intercepting possible vein extensions.

## 9.3 Drilling Results

Thirteen core holes were drilled in 2008 on the Sill Lake property. One hole was lost in vicinity of the old mill due to scrap iron being encountered. The drilling results show good continuity of the vein/sheer zone even though the vein pinches to less than a few inches in places as seen in Figure 9-2.

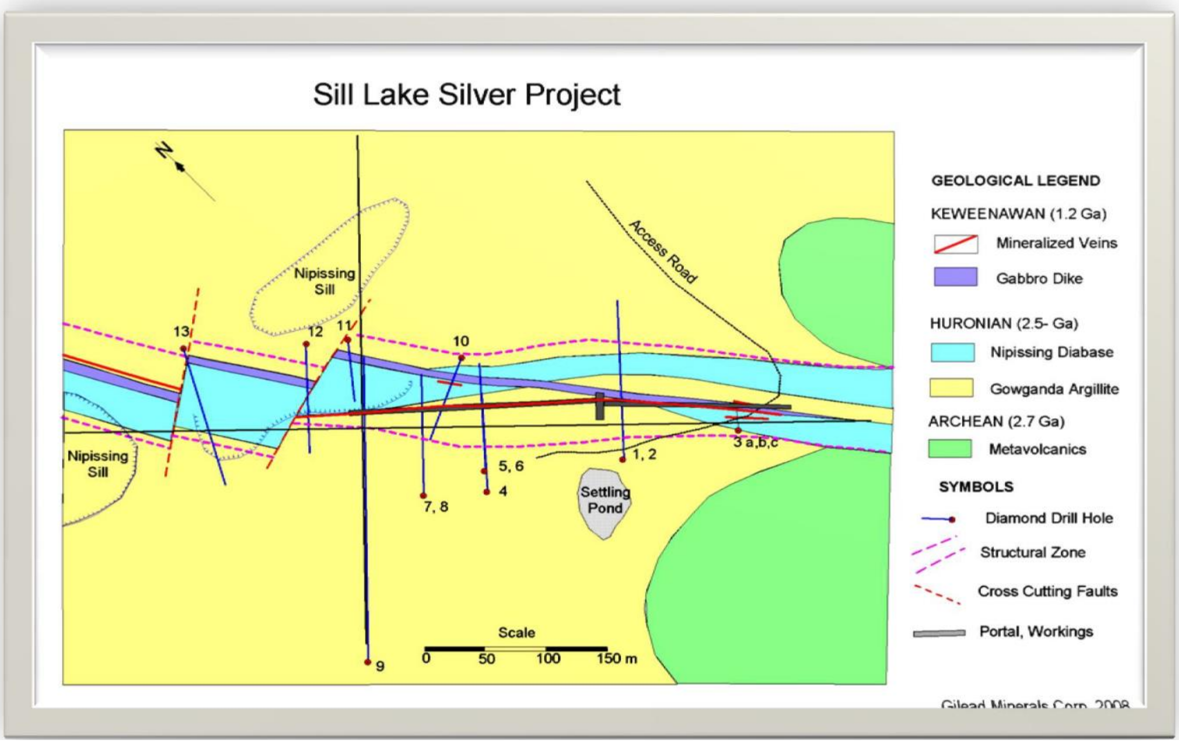


**Figure 9-2. Interpretation of the 2008 Drill Results in Plan View (Tortosa, 2008 Presentation in Toronto)**

# 10.0 SAMPLING METHOD AND APPROACH

## 10.1 Prior Sampling Methods to 2008

The records on prior sampling methods for prior drill holes and respective locations are incomplete and cannot be validated without new drill data. It is for this reason that excepting for regional geologic interpretation, that this data is not usable under NI43-101 standards. Further, such data does not contain supportable laboratory certificates to enable validation or QA/QC checks. Core, except for two drill holes to the east of the portal on the Hicks claims, are not available for examination.

Sampling methodologies were quite comprehensive for the ramp as overseen by Jim Bates, P.E. in 1997 by Dr. Temple on 800 feet of the vein (Figure 10-1). However, no details as to the laboratory utilized or QA/QC for the samples taken were available necessitating a spot validation program, Prior drill data, while discussed, was not available to confirm either from a location standpoint or analytical perspective and therefore have been qualified as unsuitable for this evaluation.

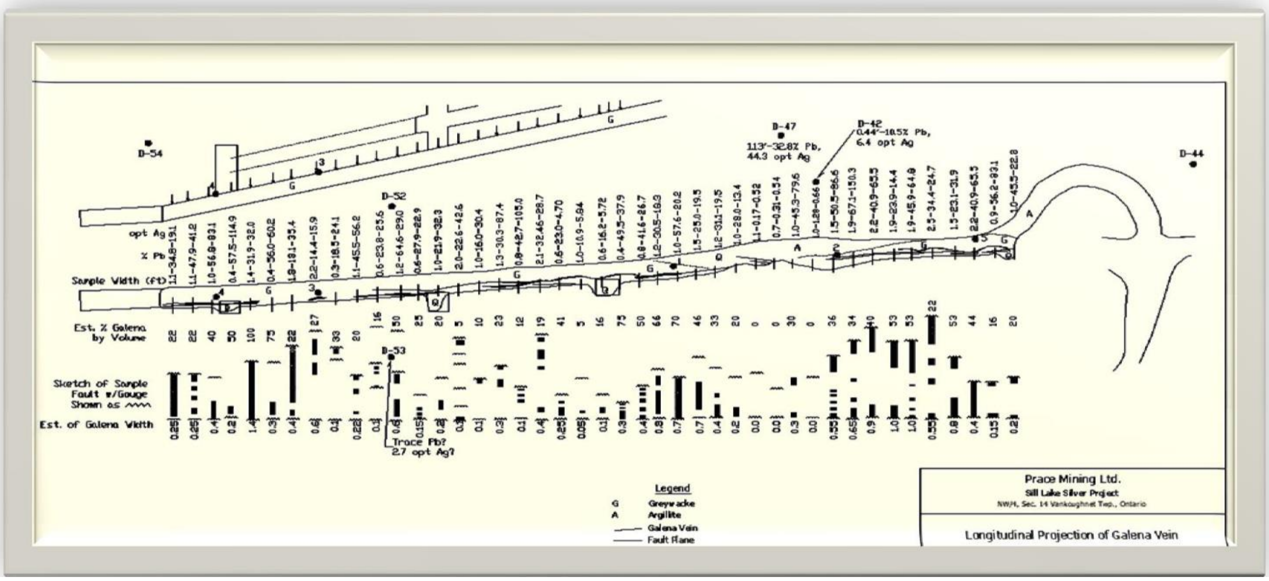


**Figure 10-1. Prior Sample Data Collected on the Decline by Temple and Bate's in the 1997**

## 10.2 Procedures Used for Core Logging and Sample QA/QC in 2008

These procedures were developed by the Qualified Person to provide for representative and defensible laboratory results under 43-101 guidelines for drill hole samples. Audits of these procedures ensured that the Gilead results are reliable for making important decisions about mining. These core logging and sample preparation procedures, in chronological order, were as follows:

1) The field geologist inspected the core runs during drilling to make sure the core was in proper order; fitted tightly together in the box; and made sure there were no depth errors on the wooden dividers in the core box. The rows of were placed in the box numbered from left to right from top to bottom. The field geologist also recorded the recovery and drilling time of the interval noting any unusual conditions such as slow drilling, loss of circulation, chatter, etc.

2) The core boxes were labeled by the drill crew with the drill hole and box number on the outside left-hand end of the box and later with a metal tag having the hole number, box number and interval in the box. Box lids were secured with rubber straps to facilitate secure transport from the rig to the logging area and to the on-site secure, storage shed. Drill core was delivered to the logging area at the end of each drilling shift.

3) The core was inspected and carefully cleaned by the sampling technician with water to expose rock units. Poorly consolidated material remained unwashed so as not to disturb the core.

4) At this point, the contents of each core box contents were photographed by a field technician with a digital camera. Prior to taking these photos, the core box was labeled with a piece of paper or marker board with a large marker identifying the drill hole, box number and sample interval. These photographs were uploaded each day on a computer with a back-up file being created for off-site storage.

5) The field geologist was responsible for logging the drill core on the appropriate company forms. These were often re-logged later by the site petrographer. At the end of each day, these forms were scanned for purposes of updating the geologists who are off-site. The plan was to only have copies of the drill logs should remain in the field.

6) Once the core was logged, the site petrographer was responsible for the establishing the core sample intervals in consultation with the field geologist. The site petrographer made the final decision on the sampling interval. These sample intervals were marked directly onto the drill core when possible and on the core box using a colored China Marker that will stay on wet core versus a magic marker. Assay tag numbers will be inserted at beginning and end of the core sample interval in the box to assist the sampler. One tag remained in the tag book and the other followed the core split for shipping to the lab. The Site Petrographer was asked to write the assay number on each piece of core. This helped to eliminate any mistakes in the sample cutting procedures.

7) Sample boundaries were to conform to geological contacts. A sample interval should straddle a geological contact. Sample intervals were 1.0 meter in length unless geological contacts require more or less. Samples of small, select mineral interceptions were not sampled separately as that will not address dilution for mine planning. In the case, for example, of a .75 meter zone of alteration of galena or other sulphide veinlets, the entire zone should be one sample. In the case of a 2-meter zone of the same, two samples of 1 meter should be taken.

8) The logging crew was directed to keep assays books stay in one secure location. Once the assays were ready to go to the lab, the books were to be forwarded go for the office for recording and permanent storage.

After the site petrographer was finished relogging the core, he stapled sample tags at the beginning of the sample breaks and mark the end of the interval. These are indicated in red with sample numbers as shown in Figure 10-2 below. The core box was forwarded to the sample splitting area. The stapled tags were retained in the core box with the core splits for future reference. Then the sampling technician inserted the second loose tag at the end of the sequence into the large plastic bag. Each core box is to be sequentially transferred to a table alongside the rock splitter, one at a time.

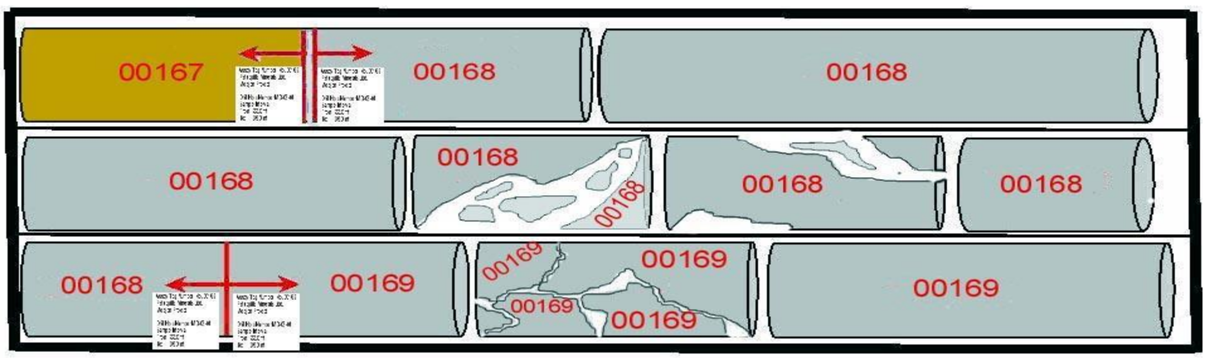


**Figure 10-2. Example of How to Choose the Sample "Breaks" and Identify Sample Intervals Prior to Splitting**

9) The sampling technician then prepared the large plastic sample bags (re: in advance of splitting each interval to be sampled) by labeling the bags with a permanent black felt marker corresponding to the intervals sample tag number. The technician removed one piece of core at a time starting in the upper left hand corner of the core box. The technician made sure half of the core from the hydraulic splitter was placed in the sample bag and the other half was returned to the box. Where samples required breaking the whole core to fit in the splitter, a hammer should be used to make the break.

10) The ½ piece of core to that was returned to the box was the half with the sample information marked on the rounded or curve part of the core. The core was then replaced in the box with the flat cut surface upwards in the box facing the same direction that it was before splitting.

11) When a sample interval contained pieces of broken core too small to split, the sampler removed approximately 50% of the material by hand into the sample bag.

12) Before and after splitting each interval, the sample splitting technician washed or blew-out the cutting tray to remove all loose rock fragments from the previous sample.

13) The ½ core was again photographed by the field technician using a digital camera. Prior to taking these photos, the core box was labeled with a piece of paper with a large marker identifying the drill hole, box number and sample interval. These photographs should have been uploaded each day on a computer with a back-up file being created for off-site storage.

14) When the sampling and core cutting of the interval has been completed, the sampler took the end assay tag from the core box and put it in the large plastic bag for shipping the uncrushed core split to the lab.

15) The sampling technician and geologist paid strict attention to the sample book regarding where Standards are to be inserted in the sample stream. Part of the label from the standard package was then cut and stapled to the sample tag book for a future record. Standards should be carefully placed in a small plastic bag with only the sample tag inside. Hands were cleaned when necessary before this transfer and placement of the label, so as not to introduce contamination.

16) Since the entire core length in a hole might not be analyzed, standards or blanks were submitted with each mineralized zone (at least two per zone) to ensure data quality from the lab. These were be selected by the site petrographer who relied upon his best judgment for using the standards below in Table 10-1.

| **Standard Reference Number** | **Pb ppm** | **Ag ppm** | **Cu ppm** | **Au ppm** | **Zn ppm** | **Mo ppm** | **As ppm** |
|---|---|---|---|---|---|---|---|
| Blank Standard (pure silica sand) | - | - | - | - | - | - | - |
| Standard Oreas 93 | 18.3 | 1.69 | 5817 | - | 118 | - | - |
| Standard Oreas 96 | 101 | 11.5 | 3930 | - | 457 | - | - |
| Standard Oreas 42P | 150 | - | 389 | .091 | 615 | 9.6 | 110 |
| Standard Oreas 61d | - | 9.27 | - | 4.76 | - | - | - |
| Standard Oreas 53Pb | - | - | 0.546 | 0.623 | - | - | - |

**Table 10-1. Certified Standards Utilized for QA/QC at Sill Lake in 2008**

17) Since core splits are being send to the lab not crushed pulps, there was no excess sample for providing duplicates without robbing the core box splits. To allow for duplicates to be sent to the lab and a QA/QC check lab, the primary lab was supposed to return all pulp rejects from their sample preparation process. Upon receipt of these rejects, Gilead can then choose what samples to resubmit for reanalysis (duplicates) with standards and blanks for check samples on laboratory precision.

18) The site petrographer ensured that chain-of-custody forms for sample shipment to the laboratory were appropriately documented with a transfer sheet (lab order form) signed by the

receiving agent. This should identify the analytes by above using ICP methods with gold and silver using graphic furnace. It is okay if Alex Rae takes the samples directly to the ASL Chemex for rush analysis provided that site petrographer completes the lab form and makes sure that the lab understands that standards and blanks should be analyzed sequentially (tag numbers) with the core splits to ensure that there will be adequate standards and blanks with each analytical batch.

19) Bulk density measurements were supposed be made on each rock type from the core splits. Ten (10) samples per major lithology (all core – NOT one core hole) were to be analyzed for density. There is no evidence that this was done.

20) Select small samples from the core splits remaining in the boxes were then collected by site petrographer for reflected and transmitted light optics for identification and to speculate paragenesis. Notes were put in the boxes as to what interval was taken for petrographic purposes.

21) The geologist or delegated technician ensured that the core storage area, shipping/receiving areas and handling areas are guarded at all times to ensure that tampering does not occur. Upon sampling and splitting, all remaining core boxes were covered securely with wooden lids or bottoms. This core shed area was to be secured so no unauthorized use of the facilities could occur. Only core and pulp rejects we supposed to be stored in this area to minimize the need for entry by more than a couple authorized personnel.

22) The site petrographer audited the samplers, rock splitters and sample preparation technicians, frequently during the day to ensure samples are being cut properly and the sample bags are appropriately labeled.

23) An authorized technician, who was trained in chain of custody and security procedures, delivered the samples directly to the laboratory with the appropriate analytical forms filled out by the site petrographer.

## 10.3 Channel Sampling Procedures in 2008

Walls were washed and then continuous vertical and ceiling samples were collected using a pneumatic hammer. QA/QC samples were not part of the channel sampling program. Separate samples were taken by Gilead at each station from the highwall, vein and the footwall on a frequency of 3 meter spacing (Tortoso, 2010) except for the feet Contrastingly, RX took samples only vein samples. Certain samples that had locational issues were screened or qualified from the resource calculations.

## 10.4 Soil Samples Collected in 2008

Soil samples were collected on the geophysical survey grid but there is uncertainty relative to the location of these samples and the completeness of the analytical as data is mixed with data collected on the nearby Goulais River prospect. These samples were not used for the resource investigation.

## 10.5 Soil, Rock and Trench Samples Collected in 2008

While significant data of potentially good quality exists for soil, rock and trench samples, the location and QA/QC of these samples is currently uncertain. This is a function of a variety of factors including a gap in the QP on-site. Some of this data and detail may be available through an interim QP who did not continue working for the company. Follow-up in this regard could prove very worthwhile for future exploration efforts but will not impact this resource investigation.

## 10.6 Factors Impacting Accuracy of Results

Underground survey data and methodology was not physically validated by the author. According to Delio Tortoso, (2010), an existing underground plan (1987 blueprint) of the mine workings and sample locations were based on known starting points for the more recent survey. A measuring tape was used to measure the location for each back sample. The underground workings were geo-referenced for GIS purposes to within 2 meters using several 3-minute GPS averages at known surface locations. The sample locations are estimated to be accurate relative to the mine working to within 0.5 meters and to within 2 meters in absolute (UTM NAD83) coordinates.

The geologists and geotechnicians conducting the effort appear to have followed standard industry practice, so instead of qualifying the entire dataset, an opinion was rendered by the QP that the replicate sampling by the two companies using separate laboratories and personnel was an acceptable QA/QC method for using the data for resource estimation purposes.

## 10.7 Sample Quality

The sample quality for the core appeared to be excellent with good core recovery. The standards utilized were certified by Analytical Solutions and were chosen specifically for this deposit. The RX channel samples taken underground, and the samples taken by Gilead on the Ramp and West Drift of the prior mine seem defensible and collected correctly. Gilead had problems in representativeness and dilution of their East Drift samples and so these were qualified for comparison of the RX samples only.

## 10.8 Sample Parameters

A 32 element ICP elemental suite was done on the samples by Chemrox for the hardrock and SGS Lakefield for soil samples.

## 10.9 Relevant Samples

All of the core samples taken in 2008 were relevant for this resource analysis. In addition, where channel samples were deemed as qualified for resource use, they were also considered relevant.

Trench samples without location and/or analytical verification would have been useful but excluded due to these issues from resource calculations. This was also the case with the Gilead East drift samples after talking with the geologist conducting the sampling. These samples appear diluted were compared with those collected in the same area by RX. According to the geologist sampling conditions were complicated by in-coming water and instability of the sample zone.

Soil samples while relevant for defining future exploration drilling targets could not be validated. Further a suite of outcrop samples collected during mapping could not be found by the QP.

For samples taken on the ramp in 1997, all these samples were relevant but not available to validate. There is evidence that post sampling, unrecorded mining occurred so the depletion will need to be characterized. New core samples will be collected using NI43-101 acceptable QA/QC methods in relevant mineralized zones.

# 11.0 SAMPLE PREPARATION, ANALYSES & SECURITY

## 11.1 Sample Preparation

Other than collection of either the core or channel sample interval, there was no sample preparation conducted at the site or under the direction of Gilead during the 2008 campaign. All of the respective samples that were collected and send to the laboratories for sample preparation and analysis. It is uncertain is the bulk reject were returned for future validation. Due to the lack of crushing and grinding outside of the laboratory facility, replicate sampling was not possible. If the sample rejects from laboratory preparation are available, such cross-checks could be undertaken in the future. Because in the experience of the QP's, SMX (previously Chemex) and SGS Lakefield have an extensive QA/QC program, the sample preparation methods would appear to be both adequate and defensible for resource usage under NI43- 101.

# 12.0 DATA VERIFICATION

Data verification was based upon a combination of oversight by the author and review of the analytical data and methods. Variance in the core sample data results with QA/QC samples was not over 10%, so all of the core sample results were deemed acceptable for resource calculation purposes. Reliance upon other qualified persons was necessary for the underground sampling methods. All were in accordance to standard industry practice suitable for incorporation in a 43-101 resource report.

Some of the field notes and the original drill hole records were not available in 2010 for review but the author did review these records when such was available in 2008.

# 13.0 ADJACENT PROPERTIES

The Goulais River copper deposit lie less than a half of a kilometer south of the Sill Lake deposit. The area had been previously mined underground on a limited extent. The sulphide association at Goulais River is quite different than Sill Lake in that the sulphides appear concentrated in layers within the host rock rather than controlled by structure. Several drill holes have been drilled in the area by previous investigators and it appears that the host rock for the copper is associate with a graphitic- looking schist.

The implication of this differing association of mineralization at Goulais River to the structurally, controlled sulfides at Sill Lake is not clearly understood. The host rock and concentrating mechanisms are so different that it implies that the area has undergone multiple mineralization events.

# 14.0 MINERAL METALLURGICAL TESTING AND PROCESS ANALYSIS

## 14.1 Petrographic Analysis

Petrographic work on fourteen representative samples collected from the Sill Lake area was done by John Lufkin, Ph.D. (Appendix B) and corroborates the rock type designations observed in the field. In general, coarse grained igneous rocks are classed as diabase with varying degrees of alteration even in the relatively fresh-looking rocks in the field. Typical pervasive alteration throughout the area is a greenschist facies assemblage of serpentine, actinolite/tremolite, epidote, and/or chlorite. The diabase dike near the mine workings is apparently very similar in composition to the Nipissing diabase sills that intrude the Gowganda metasediment package throughout the area. This similarity will make tracing the dike in limited outcrops difficult where it crosscuts the older Nipissing unit.

Metasedimentary rocks in the area comprise the Huronian Gowganda formation and the older Archean greenstone belt metavolcanic and metasedimentary rocks. Alteration in both units is similarly composed of greenschist facies mineralization of chlorite, serpentine, actinolite as well as quartz recrystallization.

Petrography of the metal bearing sulfide veins corroborates identifications made in the field, of pyrite, chalcopyrite, galena, sphalerite, and some tetrahedrite. Paragenesis varies from one sample to another suggesting contemporaneous development, or possibly several pulses of mineralization affecting different volumes of rock. Associated gangue mineralization comprises boxwork, limonite after pyrite and euhedral and rarely amethystine quartz and calcite. Supergene oxidation of the assemblage typically results in deep reddish to black clay vein filling.

## 14.2 Scanning Electron Microscope (SEM) using QEMSCAN

One high grade galena sample, referred to as “12844” was submitted SGS Lakefield for detailed mineralogical investigation using QEMSCAN™ technology (Quantitative Evaluation of Materials by Scanning Electron Microscopy). The work was under the direction of Tassos Grammatikopoulos, PhD. The goal was to determine the overall mineralogy; the type of silver minerals; silver liberation and associated minerals.

The sample was wet screened, and four size fractions were generated based on the weight% distribution of the material, including +106 um, -106/+53 um, -53/+25 um and -25 um. The mineralogical analysis was carried out using the QEMSCAN™. The sample consisted mainly of galena (91.5%) followed by quartz (6.8%). Other silicate minerals include trace amounts of mafic minerals (biotite, amphibole and chlorite), sericite/muscovite, K-feldspar, plagioclase. Other sulphides included trace amounts of Ag- minerals, sphalerite, chalcopyrite, pyrite, other Cu-Minerals, molybdenite and other-sulphides (mainly enargite). Trace amounts of Fe-Mn-oxides were also present.

The galena content increased from the coarse to the fine fraction by an average of 20% (13.2% to 33.9%). Most of quartz gangue occurred in the coarse fraction (4.5%) and significantly less in the finer fractions (0.9%, 1.1% to 0.4%). Silver minerals, although in trace amounts, occurred mainly in the - 25/+3 um fraction. The silver minerals included stephanite and freibergite.

The grain size of galena ranged from 90 µm, 64 µm, 29 um to 6 µm. Quartz size ranged from 96 µm, 50 µm, 23 µm to 8 µm. The grain size of discrete silver minerals ranged from 15 µm, 12 µm, 9 µm to 6 µm.

### 14.2.1 Liberation and Association of Silver Minerals

The overall liberation (Free and Liberated combined) of Ag minerals is 27.2%. Free and liberated Ag minerals increased by and average of 30% from the coarse to the fine fraction. The main association of Ag minerals is the form of middling particles with galena (77.4%) followed by complex (4.0%) and other Cu minerals (2.0%). Middlings with galena decreased by 22% from the coarse to the fine fraction.

### 14.2.2 Liberation and Association of Galena

The overall liberation (Free and Liberated combined) of galena in the sample is 98.4% and was high through all fractions. The main association of galena was the form of ternary, middling particles with sphalerite-pyrite (1.9%), other sulphides (1.5%), and complex particles (0.7%). Middling particles show minor variations across the size fractions.

### 14.2.3 Silver Distribution

Electron microprobe analyses were undertaken to determine the chemical composition of the Ag minerals. The analyses yielded two distinct Ag phases, stephanite $Ag_5SbS_4$ and freibergite $(Ag,Cu,Fe)_{12}(Sb,As)_4S_{13}$. The average Ag content of stephanite is 70.31wt% and that of freibergite 18.31 wt%. Electron microprobe analyses of galena are below or near the detection limit of the analyses (0.0095%).

Based on the electron microprobe analyses and the mineral mass of the silver minerals, it is estimated that stephanite accounts for 98% and freibergite for 2% of the total Ag in the sample (Figure 14-1).

| Mineral mass | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| Free AgS | 15.6 | 0.0 | 0.0 | 7.7 | 17.9 |
| AgS:Cpy | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Pyrite | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Sphalerite | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| AgS:Other Sulphides | 0.8 | 0.0 | 0.0 | 0.0 | 1.0 |
| AgS:Galena | 77.4 | 96.1 | 98.4 | 92.2 | 73.7 |
| AgS:Gn:Py:Sph | 0.1 | 0.0 | 1.1 | 0.0 | 0.0 |

| | | | | | |
|---|---|---|---|---|---|
| **AgS:Sph:Gn Tern** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Felsic Gangue** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Mafic Gangue** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Other Cu minerals** | 2.0 | 0.0 | 0.0 | 0.0 | 2.5 |
| **AgS:Ser/Musc** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Other** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Mo** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Complex** | 4.0 | 3.9 | 0.5 | 0.0 | 4.8 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

**Table 14-1. Sample 12844 Silver Mineral Identification using Electron Microprobe**

The significance of the SEM work is that silver is not only associated with galena but occurs as free silver and more complex mineral associations up to 20% of what visually was a high-grade galena sample.

# 15.0 MINERAL RESOURCE ESTIMATES

## 15.1 Previous Non-NI43-101 Resource or Reserve Estimates

In 1978, Dr. Halet, P.E. and Consulting Geologist, reported that estimated underground ore "reserves" were estimated over a mining width of four feet, with an average grade of 12 percent lead and 15 ounces of silver per ton.

Later in 1981, Halet reported that approximately 7,033 tons of the proven and probable ore (non-43-101 compliant) would be available for mining above the decline and the stope- subdrift. He noted at that time that the remainder can be mined when another decline is developed but there are no records of it ever being completed. He noted that "the westerly extension of the vein is covered by the diabase sheet which is believed to be relatively thin in this area. There is only one drill hole in this territory; it intersected typical vein material at a point 180 feet ahead of the present face of the decline, which suggests additional possible ore amounting to 7600 tons".

Ore reserves in 1983 were reported to be 20,000 to 60,000 tons grading 12 ounces of silver per ton and 10 percent lead over a mining width of four feet (Northern Miner, Dec. 1, 1983). A 1984 mine development plan (author unknown) found in the assessment records reported that the probable ore reserves were 20,000 tons of silver-lead ore with a grade of 41.5 oz/ton Ag and 33.7 pound Pb over a 1.13 ft. width. No certificates or lab references were available to document the assay values.

An independent resource estimate by Gilead prepared in 2008 (Table 15-1) that is not to 43-101 standards was 190 thousand short tons of ore in-place. No information was included as to the average grade assumption in this Company estimate. However, this calculation is the only recent estimate of the mine-out area for this report that will addressed in the Depletion Subsection 16.2.

| **Mined Areas** | **Area** | **Volume (4x Thickness)** | **Tons (10 ft3/ton)** | |
|---|---|---|---|---|
| Vent Stope | 415 | 1,660 | 166 | |
| Stopes 1, 2, 3 | 24,443 | 97,772 | 9,777 | |
| Decline | 6,657 | 26,628 | 2,663 | |
| **Piles** | 4,403 | | | |
| **In-Place Ore** | | | | |
| Stope 4 | 41,106 | 164,424 | 16,442 | |
| Stope 5 | 75,536 | 302,144 | 30,214 | |
| Stope 270-4W | 19,376 | 77,504 | 7,750 | |
| Stopes 270-3W, -2W, -1W | 74,294 | 297,176 | 29,718 | |
| Stopes 170-3W, -2W, -1W, -1E, -2E, -3E | 111,636 | 446,544 | 44,654 | |
| Stopes 170-1E, -2E, -3E | 51,596 | 206,384 | 20,638 | |
| Stopes 270-1E, -2E, -3E | 74,524 | 298,096 | 29,810 | |
| Stopes 170-4E | 28,518 | 114,072 | 11,407 | |
| | | | **190,634** | **Total tons** |

**Table 15-1. Gilead Reserve Estimate (2008)**

## 15.2 Density Assumptions

No density data was collected of the rock and generally when a heavy sulfide as galena is selectively mined, such data can be very misleading if a general average is assumed. Since the vein material carrying the silver will have a correspondingly higher amount of lead, the density assumptions for the ore tonnage were based upon the ratio of galena in the samples as outlined in Table 15-2 developed by Chemrox. Other tonnage factors would be more appropriate if a sufficient sample population of density data is measured.

| Qtz g/cc | Gn g/cc | Pb (Gn %) | in-place g/cc |
|---|---|---|---|
| 2.65 | 7.5 | 0.25 | 2.662125 |
| 2.65 | 7.5 | 0.5 | 2.67425 |
| 2.65 | 7.5 | 0.75 | 2.686375 |
| 2.65 | 7.5 | 1 | 2.6985 |
| 2.65 | 7.5 | 1.25 | 2.710625 |
| 2.65 | 7.5 | 1.5 | 2.72275 |
| 2.65 | 7.5 | 2 | 2.747 |
| 2.65 | 7.5 | 1.75 | 2.734875 |
| 2.65 | 7.5 | 2 | 2.747 |
| 2.65 | 7.5 | 2.5 | 2.77125 |
| 2.65 | 7.5 | 3 | 2.7955 |
| 2.65 | 7.5 | 3.5 | 2.81975 |
| 2.65 | 7.5 | 4 | 2.844 |
| 2.65 | 7.5 | 5 | 2.8925 |
| 2.65 | 7.5 | 6 | 2.941 |
| 2.65 | 7.5 | 7 | 2.9895 |
| 2.65 | 7.5 | 8 | 3.038 |
| 2.65 | 7.5 | 9 | 3.0865 |
| 2.65 | 7.5 | 10 | 3.135 |
| 2.65 | 7.5 | 11 | 3.1835 |
| 2.65 | 7.5 | 12 | 3.232 |
| 2.65 | 7.5 | 13 | 3.2805 |
| 2.65 | 7.5 | 14 | 3.329 |
| 2.65 | 7.5 | 15 | 3.3775 |
| 2.65 | 7.5 | 16 | 3.426 |
| 2.65 | 7.5 | 17 | 3.4745 |

| Qtz g/cc | Gn g/cc | Pb (Gn %) | in-place g/cc |
|---|---|---|---|
| 2.65 | 7.5 | 18 | 3.523 |
| 2.65 | 7.5 | 19 | 3.5715 |
| 2.65 | 7.5 | 20 | 3.62 |
| 2.65 | 7.5 | 21 | 3.6685 |
| 2.65 | 7.5 | 22 | 3.717 |
| 2.65 | 7.5 | 23 | 3.7655 |
| 2.65 | 7.5 | 24 | 3.814 |
| 2.65 | 7.5 | 25 | 3.8625 |
| 2.65 | 7.5 | 26 | 3.911 |
| 2.65 | 7.5 | 27 | 3.9595 |
| 2.65 | 7.5 | 28 | 4.008 |
| 2.65 | 7.5 | 29 | 4.0565 |
| 2.65 | 7.5 | 30 | 4.105 |
| 2.65 | 7.5 | 35 | 4.3475 |
| 2.65 | 7.5 | 40 | 4.59 |
| 2.65 | 7.5 | 45 | 4.8325 |
| 2.65 | 7.5 | 50 | 5.075 |
| 2.65 | 7.5 | 55 | 5.3175 |
| 2.65 | 7.5 | 60 | 5.56 |
| 2.65 | 7.5 | 65 | 5.8025 |
| 2.65 | 7.5 | 70 | 6.045 |
| 2.65 | 7.5 | 75 | 6.2875 |
| 2.65 | 7.5 | 80 | 6.53 |
| 2.65 | 7.5 | 85 | 6.7725 |
| 2.65 | 7.5 | 90 | 7.015 |
| 2.65 | 7.5 | 95 | 7.2575 |
| 2.65 | 7.5 | 100 | 7.5 |

**Table 15-2. Calculation of Density using Silver-Lead Ratios**

## 15.3 Geostatistics

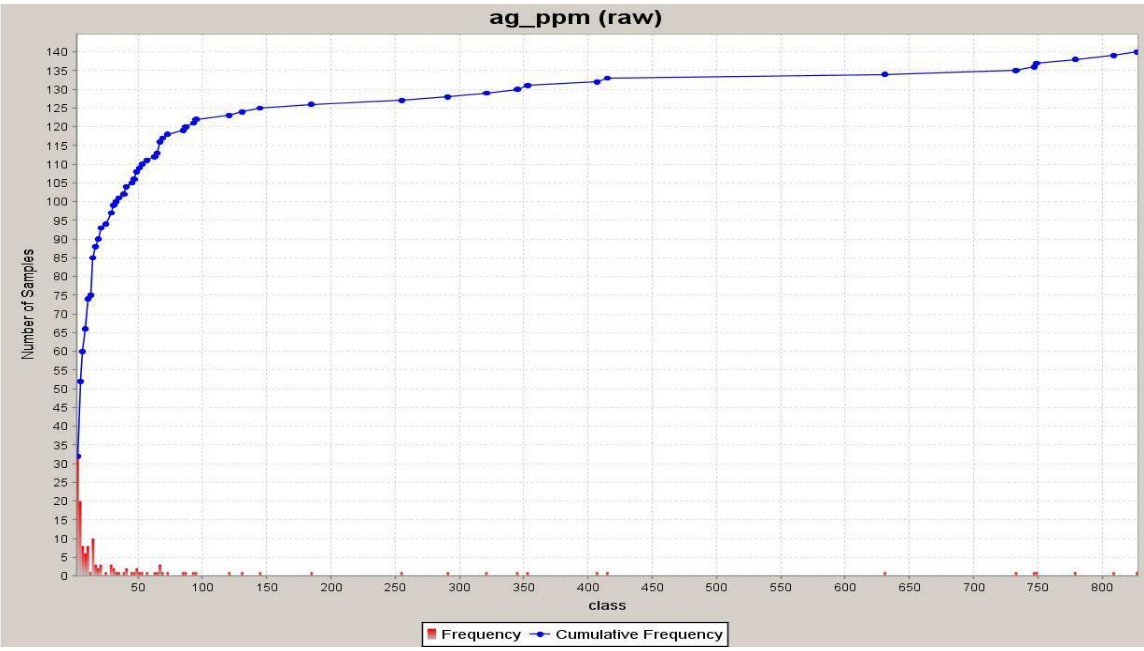


**Figure 15-1. Silver Distribution**

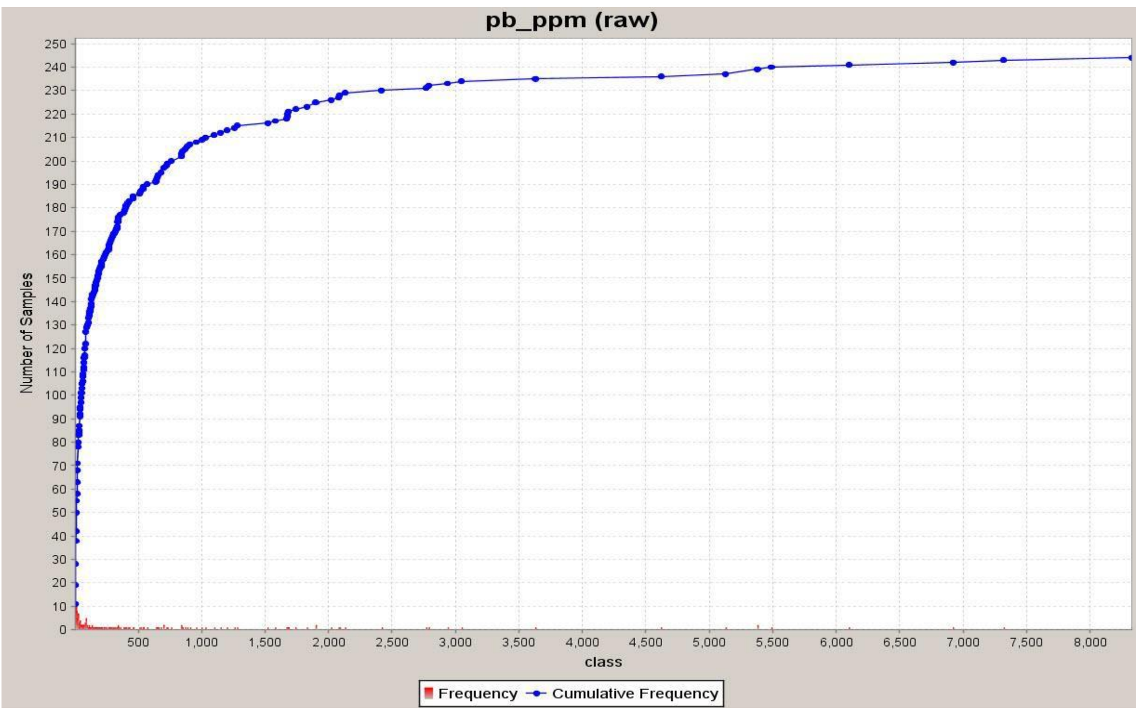


**Figure 15-2. Lead Distribution**

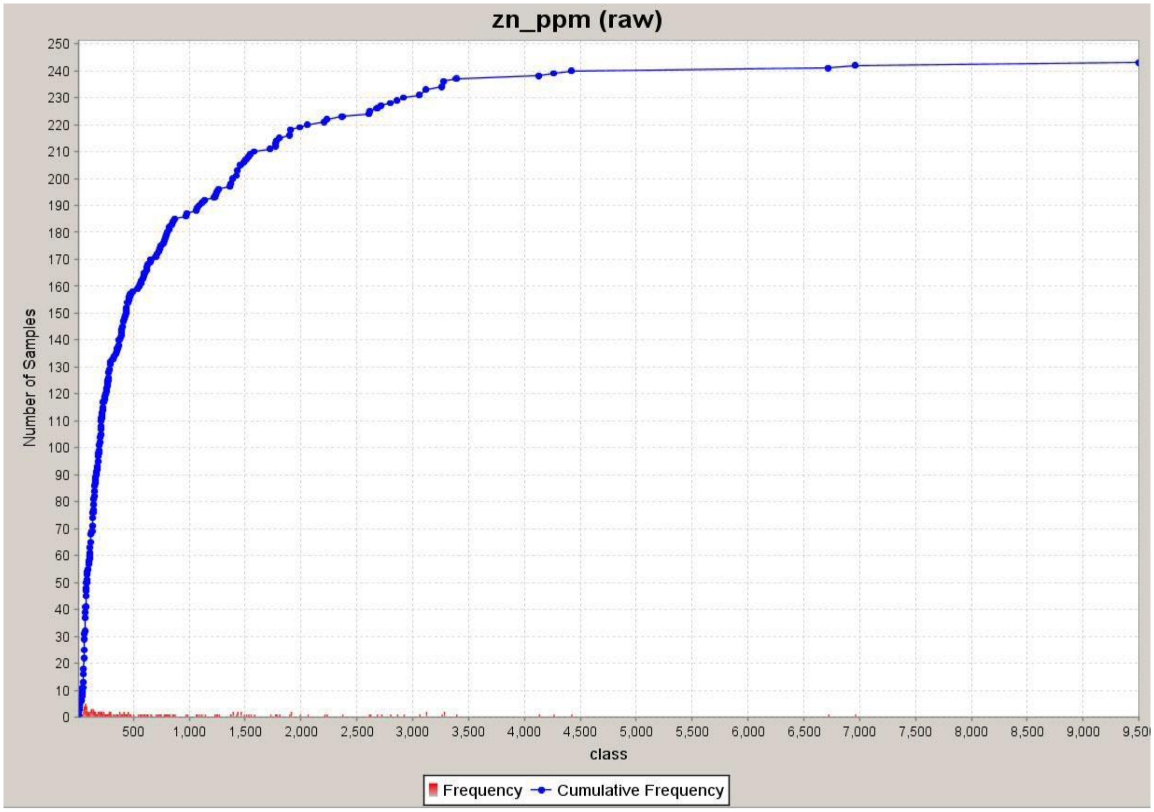


**Figure 15-3. Zinc Distribution**

## 15.4 Drillhole Database

The holes drilled in 2008 are illustrated below in Figure 15-4 in an west-east cross section below.

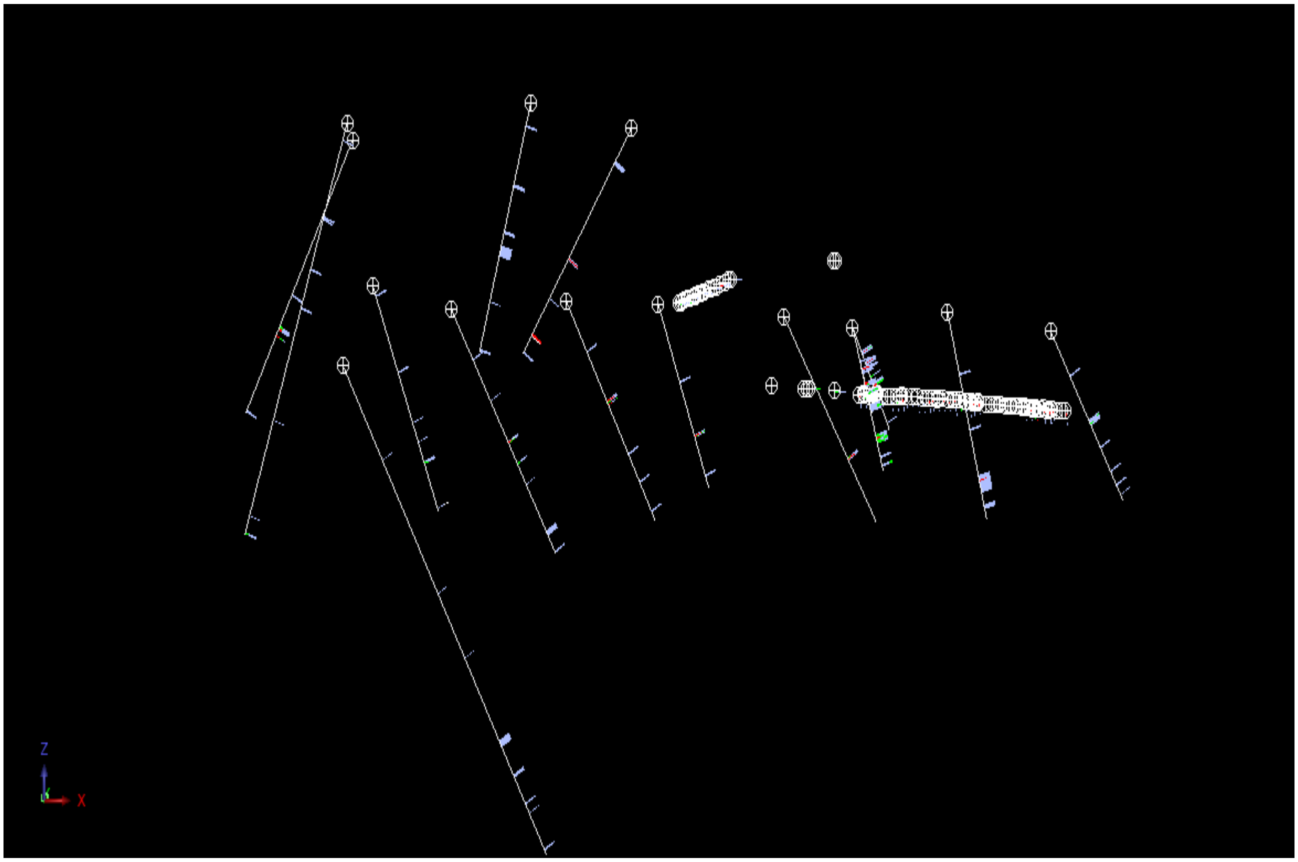


**Figure 15-4. Location of 2008 Core Holes Looking Northward with Underground Workings Showing Sample Locations**

## 15.5 Solids Interpretation

Based upon detailed interpretation of grade and rock type interception, a single solid for the Main Vein was constructed. There is evidence for other veins but the data is too limited for solid development at this time. Figure 15-5 depicts the west-east distribution of this solid that was utilized for block modeling.

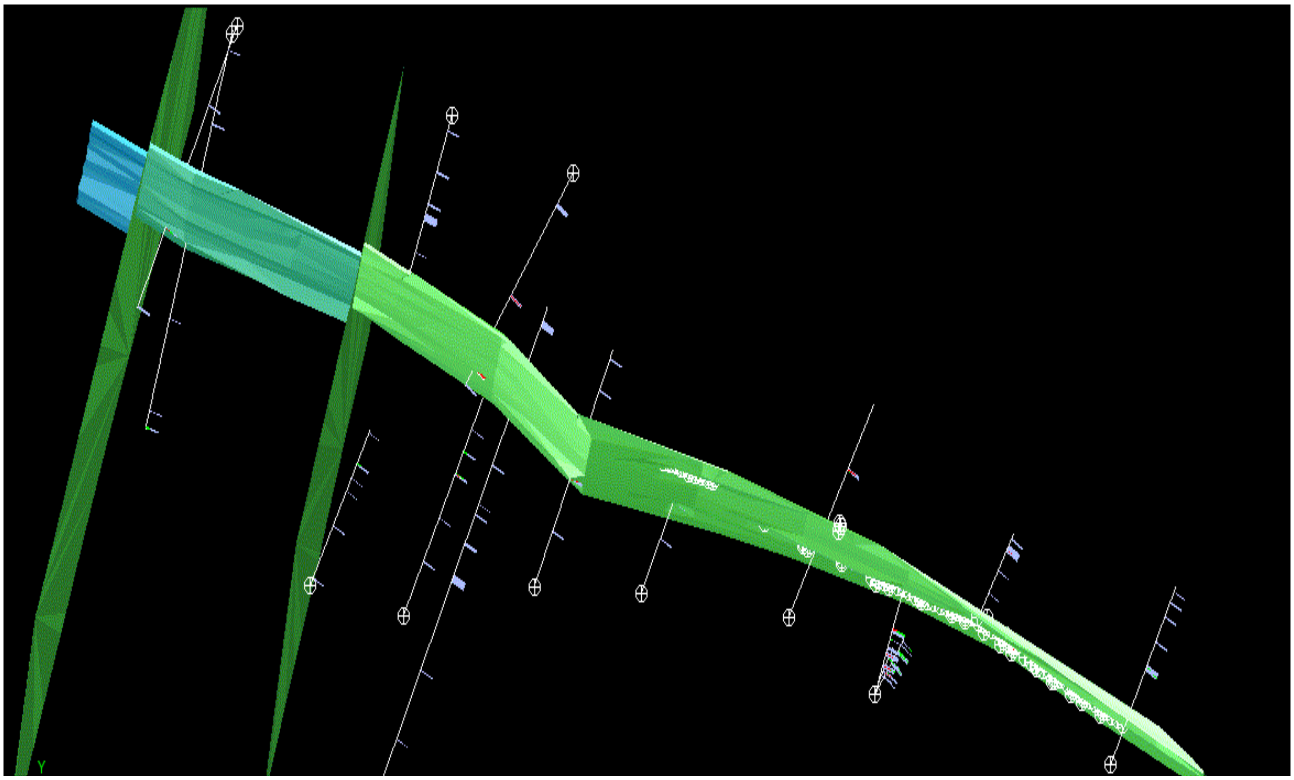

**Figure 15-5. Main Vein Solid Distribution from 2008 Drill Data**

## 15.6 Variography

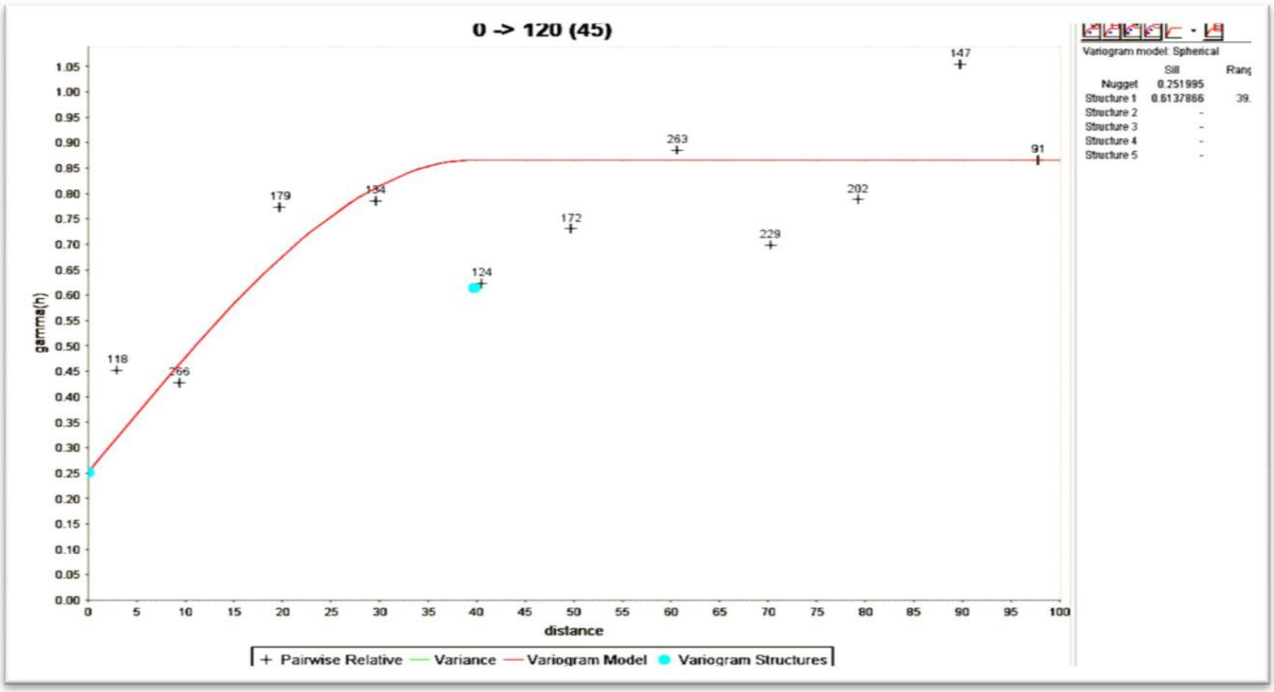


**Figure 15-6. Varigram Illustrating Nugget Effect of Limited Data**

## 15.7 Resource Block Model

**Table 15-3. Computer Block Model Runs and Resultant Resource Calculations**

| | Pass 1 | Pass 2 | Pass 3 |
|---|---|---|---|
| Constrained within Vein 1 | yes | yes | yes |
| Minimum search distance: | 0 meters | 40 meters | 80 meters |
| Maximum search distance: | 40 meters | 80 meters | 300 meters |
| Bearing major axis: | 300 | 300 | 300 |
| Plunge: | 0 | 0 | 0 |
| | | | |
| Dip: | -85 | -85 | -85 |
| Major/Semi Major ratio: | 1 | 1 | 1 |
| Major/Minor ratio: | 15 | 15 | 15 |
| Minimum samples: | 3 | 3 | 3 |
| Maximum samples: | 10 | 10 | 10 |
| | | | |

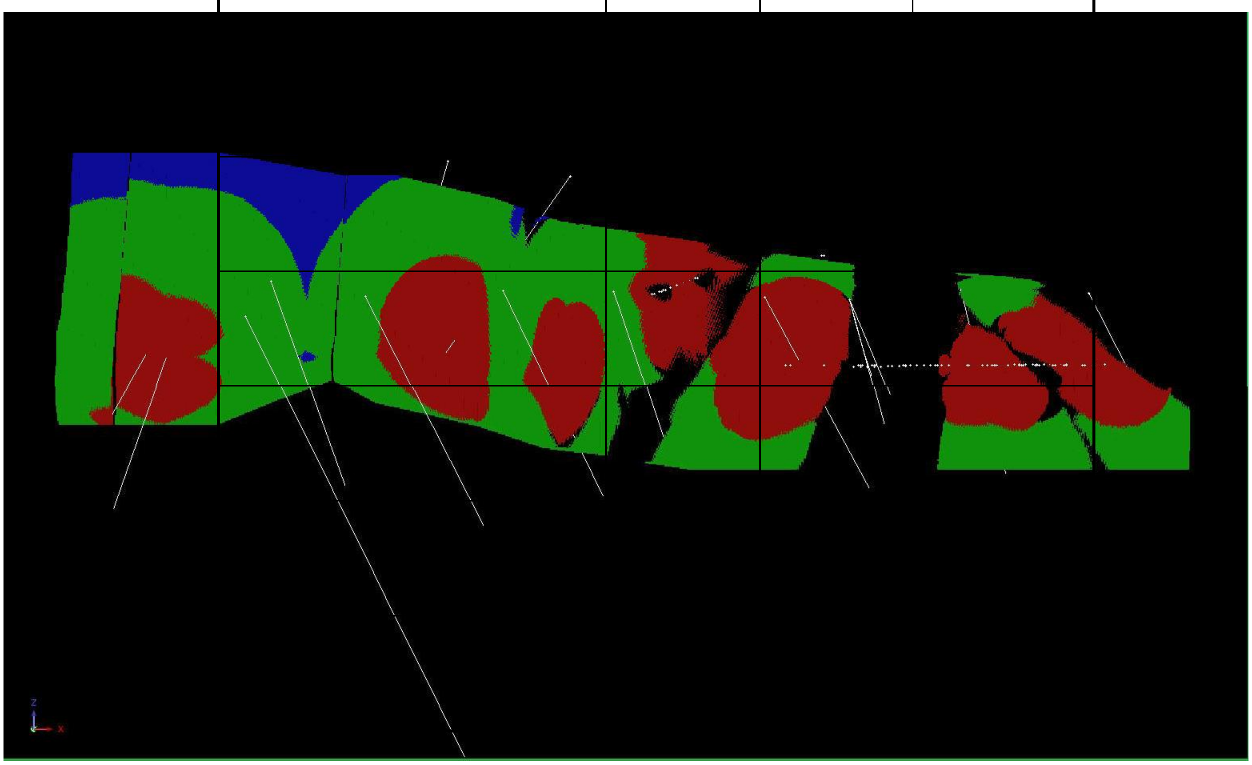

**Figure 15-7. Pass 1 in the Block Model from 0-40 meters (red is highest grade)**

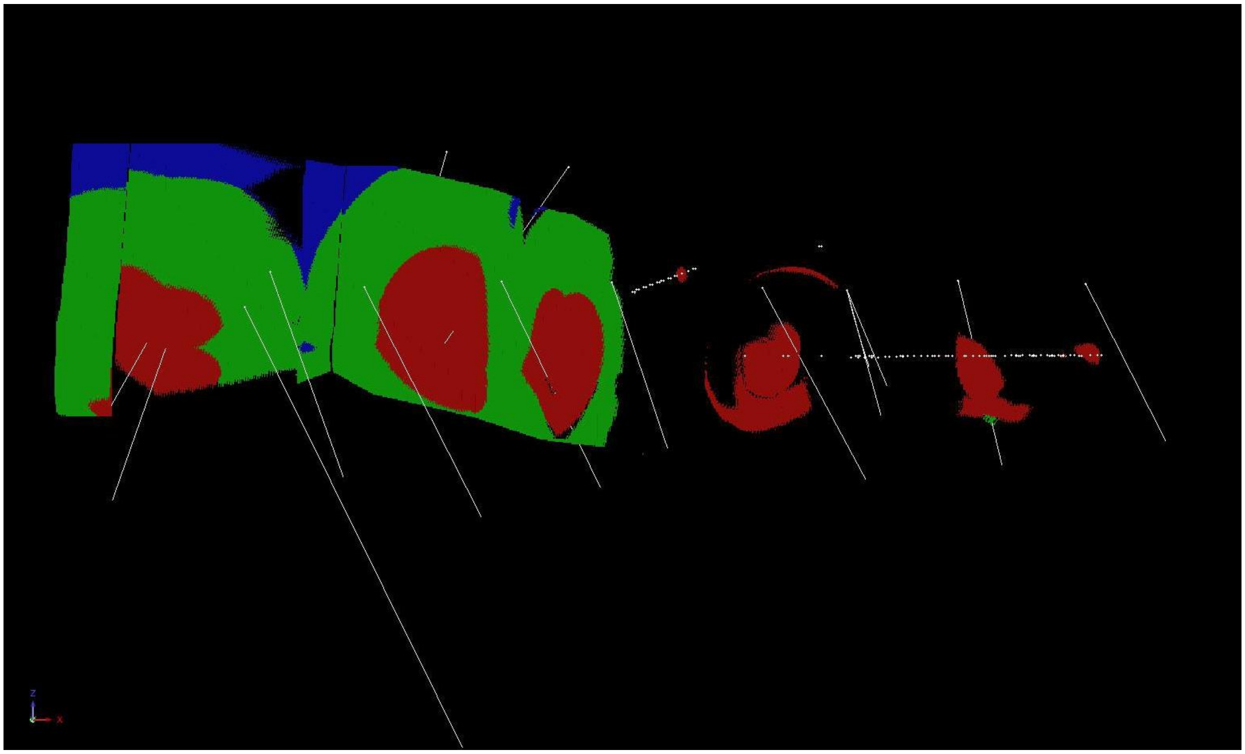

**Figure 15-8. Pass 2 in the Block Model from 40-80 meters (red is highest grade)**

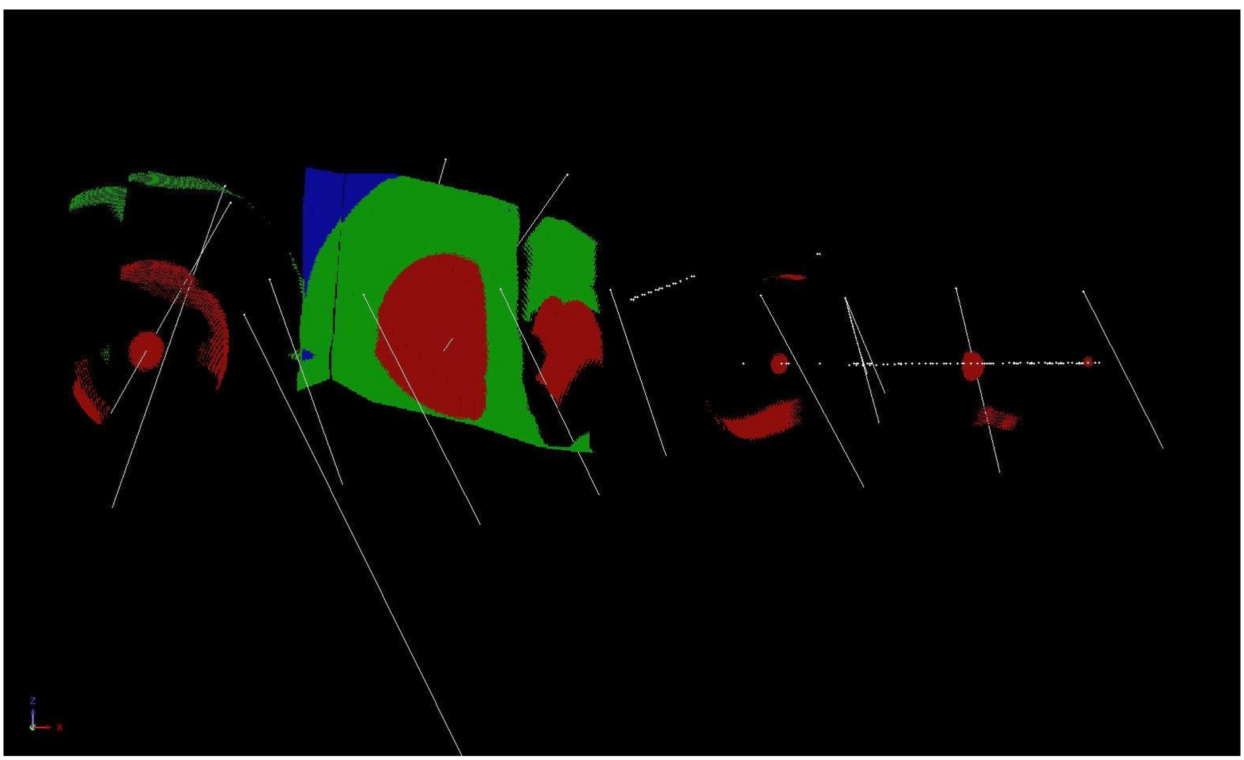

**Figure 15-9. Pass 3 in the Block Model from 80-300 meters (red is highest grade)**

## 15.8 Resource Statement

Based upon the variography search radii presented in Subsection 15.5 above, the following measured and indicated resource estimates have been made using SURPAC. These estimates are consistent with the illustrations presented above in Subsection 15.6. All of these estimates are unadjusted for depletion that must be determined from detailed underground mapping. The silver values by different cut-off grades (COG) are presented in Table 15-4 below.

| Ag_ppm >= 0 ppm | | | | |
|---|---|---|---|---|
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Ag Ppm** | **Ag tr oz** |
| Measured | 34,141 | 94,810 | 70 | 212,880 |
| Indicated | 37,044 | 105,820 | 98 | 332,431 |
| **Total >=0 ppm** | **75,948** | **213,959** | **84** | **545,312** |
| | | | | |
| **Ag_ppm >= 30 ppm** | | | | |
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Ag Ppm** | **Ag tr oz** |
| Measured | 23,539 | 66,512 | 94 | 201,739 |
| Indicated | 31,696 | 91,558 | 112 | 328,696 |
| **Total >=30 ppm** | **59,863** | **171,036** | **102** | **530,435** |
| | | | | |
| **Ag_ppm >= 60 ppm** | | | | |
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Ag Ppm** | **Ag tr oz** |
| Measured | 12,066 | 35,703 | 141 | 161,490 |
| Indicated | 22,931 | 67,941 | 136 | 296,843 |
| **Total >=60 ppm** | **38,205** | **112,751** | **134** | **458,333** |
| | | | | |
| **Ag_ppm >= 90 ppm** | | | | |
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Ag Ppm** | **Ag tr oz** |
| Measured | 5,732 | 18,360 | 214 | 126,224 |
| Indicated | 9,772 | 31,807 | 220 | 224,776 |
| **Total >=90 ppm** | **16,898** | **54,301** | **209** | **351,000** |

**Table 15-4. Estimated Measured and Indicated of Silver Resources by Cut-of-Grades**

The corresponding lead and zinc values have also been calculated based upon the silver COG using actual analytical results from the sampling program. Based upon this modeling, the lead runs 40 to 50 times the silver content after statistical capping as illustrated in Table 15-5.

**Table 15-5. Estimated Measured and Indicated of Lead-Zinc Resources by Cut-of-Grades**

| **Ag_ppm >= 0 ppm** | | | | |
|---|---|---|---|---|
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Pb Ppm** | **Zn Ppm** |
| Measured | 34,141 | 94,810 | 2,619 | 1,234 |
| Indicated | 37,044 | 105,820 | 4,261 | 1,578 |
| **Total >=0 ppm** | **75,948** | **213,959** | **3,447** | **1,404** |
| | | | | |
| **Ag_ppm >= 30 ppm** | | | | |
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Pb Ppm** | **Zn Ppm** |
| Measured | 23,539 | 66,512 | 3,621 | 1,614 |
| Indicated | 31,696 | 91,558 | 4,920 | 1,783 |
| **Total >=30 ppm** | **59,863** | **171,036** | 4,270 | 1,678 |
| | | | | |
| **Ag_ppm >= 60 ppm** | | | | |
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Pb Ppm** | **Zn Ppm** |
| Measured | 12,066 | 35,703 | 6,371 | 2,274 |
| Indicated | 22,931 | 67,941 | 6,452 | 2,177 |
| **Total >=60 ppm** | **38,205** | **112,751** | 6,210 | 2,148 |
| | | | | |
| **Ag_ppm >= 90 ppm** | | | | |
| **Estimated Resources** | **Volume m3** | **Tonnes** | **Pb Ppm** | **Zn Ppm** |
| Measured | 5,732 | 18,360 | 11,403 | 3,385 |
| Indicated | 9,772 | 31,807 | 12,476 | 3,634 |
| **Total >=90 ppm** | **16,898** | **54,301** | 11,617 | 3,421 |

## 15.9 Inferred Resources

Within the modeled solid of the main vein is under 10,000 ounces of silver resource that will fall into an inferred category but that is constrained further by the 80 meter search radius of the indicated resource. Vertical projection of the main vein at depth, is limited by data versus knowledge of the continuance of the trend. Assuming a cut-off grade of 60 ppm, it is anticipated that an additional 100,000 oz of silver are viable to 300 feet below ground surface.

There are yet three under-evaluated trends that are evident from drilling that may be significant if furthered evaluated. In Figure 15-8 below, the red cross-hatching represents a trend that may persist westward on the south side of the Main Vein. Informally this “South Trend” may represent a vein that is comparable to the Main Vein but over a shorter distance. Arbitrarily this inferred resource is estimated as 250,000 oz of silver above a 60-ppm cutoff and it will require focused drilling to delimit (Figure15- 10).

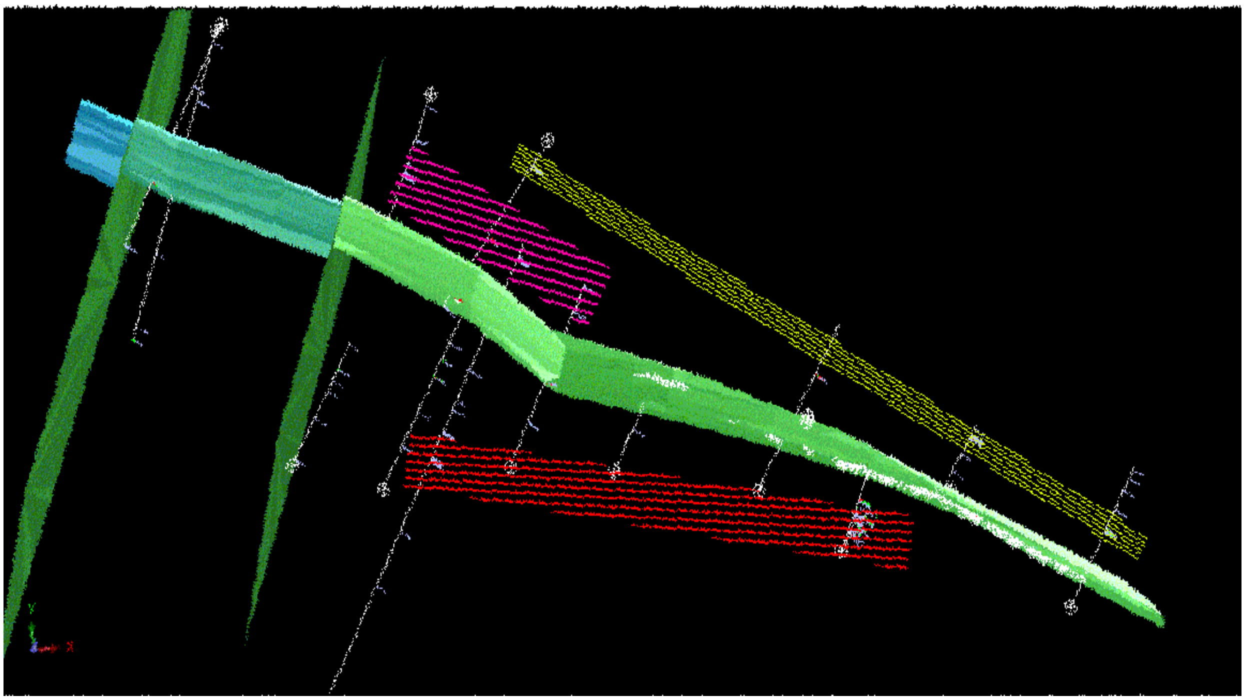

**Figure 15-10. Main Vein (solid) with Inferred Resources outside of Main Vein (cross-hatched)**

To the north yellow trend lies between several mineralized interceptions lying further to the north, informally named the "North Vein". As in the case of the South Trend there is insufficient data to enable constructing a defensible wireframe for solid block modeling but there may be continuity. There is also evidence of this vein-like feature cropping to the surface near the entry to the north access road.

While there is more evidence for linear continuity of this zone, the mineralization is not as strong and therefore the inferred resources are deemed less significant than the South vein at 150,000 silver oz of silver above a 60-ppm cut-of-grade.

There are undoubtedly other targets beneath the sill-like diabase that covers most of the hillside of the property but there is nothing substantive at this time that can be used to pinpoint resource targets. One of these zones, informally called Middle Trend may be a duplicate section due to faulting is outline in purple. This trend does not appear continuous but may contain 50,000 ounces of silver in an inferred resource category above 60 ppm. These estimates were based upon resource interceptions and relative geometry and grade versus volumetric/tonnage calculations since such data are currently insufficient for making such calculations.

In summary, the inferred resources of silver above 60 ppm on the Sill Lake property are as follows in Table 15-6:

| Trend or Vein | Location | Constraint | Tonnes @ >140 ppm Silver (approx.) | Approximate Inferred Silver oz |
|---|---|---|---|---|
| Main Vein | +80 m radius | Existing Solid | 2,200 | 10,000 |
| West Main | Extension | Surface Trench | 22,000 | 100,000 |
| South Trend | South of East Drift | 2 Drill Hole Intercepts | 55,500 | 250,000 |
| North Trend | Upslope of workings | Narrow Zone Close to Surface | 33,300 | 150,000 |
| Middle Trend | Between Main Vein & North Trend | Faulting (?) | 11,100 | 50,000 |
| **TOTAL** | | | | **660,000** |

**Table 15-6. Inferred Silver Resources for the Sill Lake Deposit**

# 16.0 OTHER RELEVANT DATA AND INFORMATION

## 16.1 Underground Workings

While not confirmed by the QP, the configuration of the underground workings after rehabilitation would look as outline in Figure 16-1.

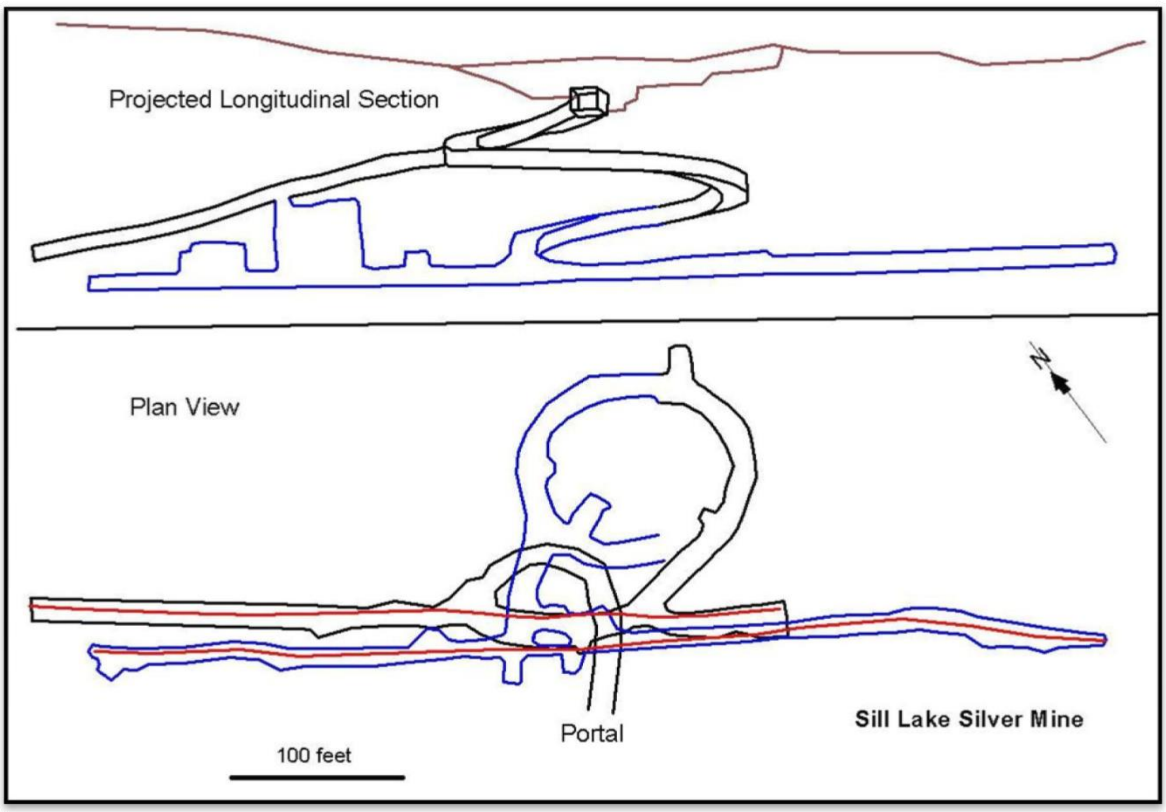


**Figure 16-1. Rendering of Sill Lake Workings by Gilead in 2008**

Further mine planning was initiated by Prace in 1987 as seen in Figure 16-2. It is likely that there have not been any other working levels developed based upon recent entry in 2008. It has not been determined by the QP in this investigation whether this plan would be justified with the existing data but Prace did have other drill data to support their mine planning. As can be seen from this rendering, the East Drift was developed subsequent to this 1986 plan.

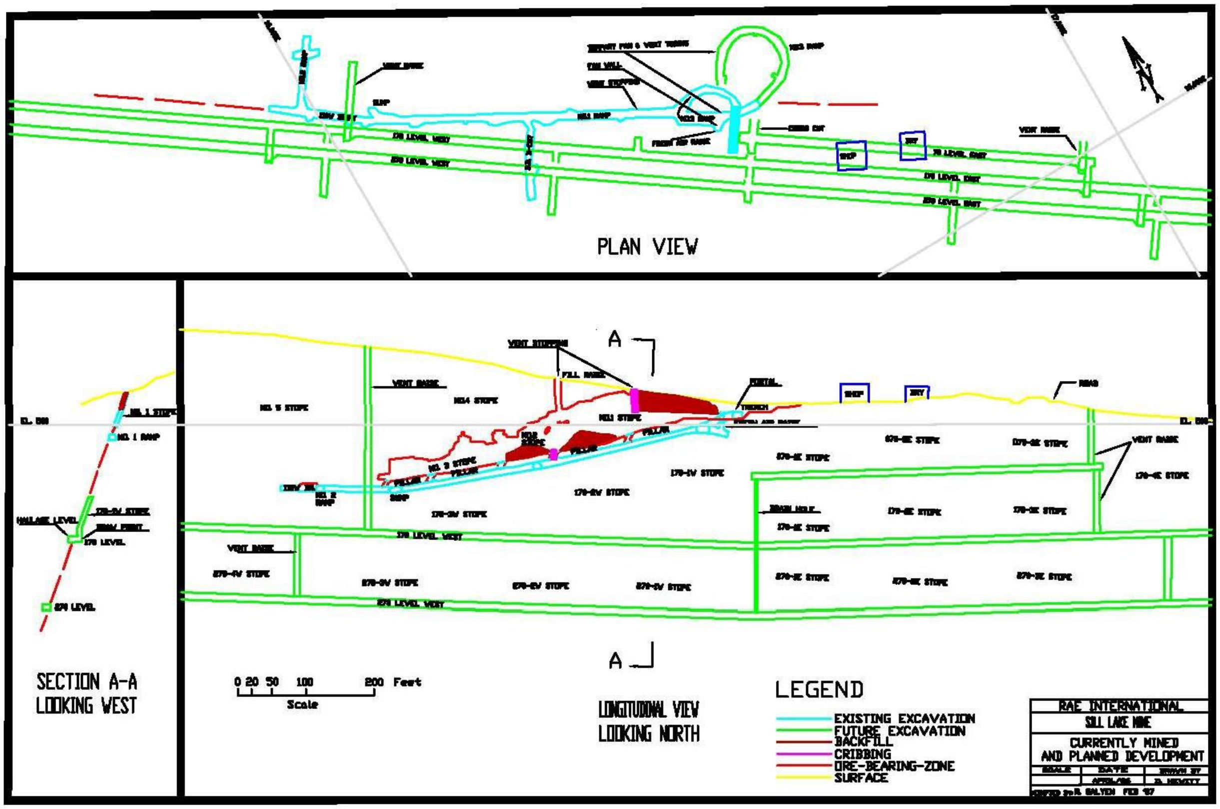


**Figure 16-2. Mine Plan Developed by Prace (1987) with Access and Stope Targets Identified at that Time**

## 16.2 Resource Depletion

The resource estimates in this report need to be adjusted for depletion or mined out ore in the East Main Vein. Table 16-1 illustrates the computations of Gilead and those of Chemrox for East Drift. The latter was based upon an 8 ft by 8 ft drift and the length of the working level sampled by Gilead and RX. The short tons computed by Gilead have been converted to tones to be consistent with the resource estimates in this report. The density factor was same as that used by Gilead and the average grade was an arbitrary selection for generating a “ballpark” depletion.

Assuming that there are 171,036 tonnes of +30 ppm silver averaging 100 ppm in the measured and indicated category, an estimated depletion of 11,724 tonnes would reduce this to 159,312 tonnes. This equates to roughly 512,260 troy ounces of silver remaining in the measured and indicated category of +30ppm average 100 ppm. Since this is a rough estimate, the depletion reduction should be rounded to 12,000 tonnes. No attempt was made to reconcile this depletion estimate (Table 16-2) from prior production since the actual grades removed were not evaluated in this investigation.

| Mined Areas | Area | Volume | Tonnes (converted from tons) |
|---|---|---|---|
| | ft2 | cu ft | density at 10 ft3/ton |
| Vent Stope* | 415 | 1,660 | 151 |
| Stopes 1, 2, 3* | 24,443 | 97,772 | 8,880 |
| Decline and West Back* | 6,657 | 26,628 | 2,416 |
| East Working Level** | 3,232 | 25,856 | 2,346 |
| | | | |
| **Material Depletion** | | | **13,793** |
| **Resource Depletion Estimate*** ** | | | **11,724** |

* Data estimated by Gilead (2008)

** Data estimated by Chemrox based upon Delio mapping (2008)

*** 85% of Material Depletion

**Table 16-1. Estimated Depletion as of 2010 based upon D.Tortoso Mapping using 1987 Plan of Underground Workings**

## 16.3 Data Availability

Due to the management practice of an interim QP, there are data gaps that affect the quality of this report. Specifically, the following items are either lost or misplaced by Gilead or prior JV partner RX:

1. The original geologic logs;
2. Picture records of the core;
3. Complete set of analytical certificates;
4. Sample tag books necessary to determine the QA/QC samples in the analytical sheets;
5. Locations of soil and outcrop sample locations;
6. Analytical data for any soils collected; outcrop samples and trench data.

It is known with reasonable certainty that items 1 through 5 exist somewhere (eg likely in the possession of the prior QP) and should be obtained if possible.

# 17.0 ADDITIONAL REQUIREMENTS FOR DATA DEVELOPMENT AND PRODUCTION PROPERTIES

## 17.1 Future Data Development Requirements for Exploration/Development

Several requirements data development is necessary in the future and these are:

- Significant data from exploration efforts such as soil sampling, trench sampling and outcrop sampling is incomplete and should be organized by the company. Where such data may be under the control of another contractor, the Company should consider the cost benefit of acquiring that information rather than having to redo the program;
- Additional dewatering to gain access to underground workings will be necessary if any underground drilling is anticipated during potential development activities;
- Detailed mapping and surveying of existing underground workings is necessary to augment depletion estimates;
- Usage of QA/QC samples for all future sampling initiatives…not just core samples;
- Oversight or audits by the QP is essential during all future sampling initiatives to ensure that proper QA/QC is being practiced; and,
- Any future outcrop and/or geophysical stations should minimally be surveyed at least by GPS.
- Refer to items detailed above in Subsection 16.3.

## 17.2 Future Data Development Requirements for Production

For future production properties, the following key development requirements will be necessary;

- Permitting and frequent testing for water holding treatment and disposal from the mine;
- Reconstruction of an alternative access way for the East drift;
- Targeting the second vein zone with drilling for resource estimation;
- Underground drilling to extend the known ore trend;
- Determining recoveries from bench scale testing;
- Detailed mine planning for reserve estimation;
- A grade control program should be developed for non-galena hosted silver ore. The potential need for an on-site, silver assay lab will depend on the variability and extent of the non-galena silver occurrences;
- Proper reconciliation records for depletion, dilution and process recovery needs to be developed.

# 18.0 INTERPRETATION AND CONCLUSIONS

The Sill Lake lead-silver mineral occurrence is a high-grade narrow shear zone that appears to persist both below and on strike of prior mine development. While geophysical anomalies identified several high induced polarization and low resistivity anomalies along the trend of the known deposit, none of these translated to favorable results from the limited drilling that was conducted in 2008. This is believed to be in part associated with the complex structures and lithologies that could cause false anomalies. While the quality of the geophysical data is good, it needs to be re-evaluated considering the drilling results.

The known mineralization trend is structurally controlled along a sheer zone at a contact between metasediments and a diabase sill. Such contact relationships can often be complex resulting in pockets of mineralization when hydrothermal fluids are optimal. Delio Tortoso (December 2010) made the following interpretation that the author feels is correct. "The mineralized vein is most closely associated with the Keweenawan age gabbro dike that crosscuts the Nipissing Diabase dike. Both the mineralized vein and dike have a similar strike and dip, but they are not coincident. In some sections the mineralized vein occurs along the contact of the gabbro dike, in other sections the mineralized vein is in the hanging wall rocks (argillites). The identified structural zone is based on increase fracturing and alteration in the drill core. The structural zone suggests that there has been repeated movement over time and suggests that this is a robust mineralizing system".

Resource potential along the deposit will require a comprehensive drilling effort that evaluates both known structural trends and projected extensions. Figure 18-1 depicts Gilead's interpretation of

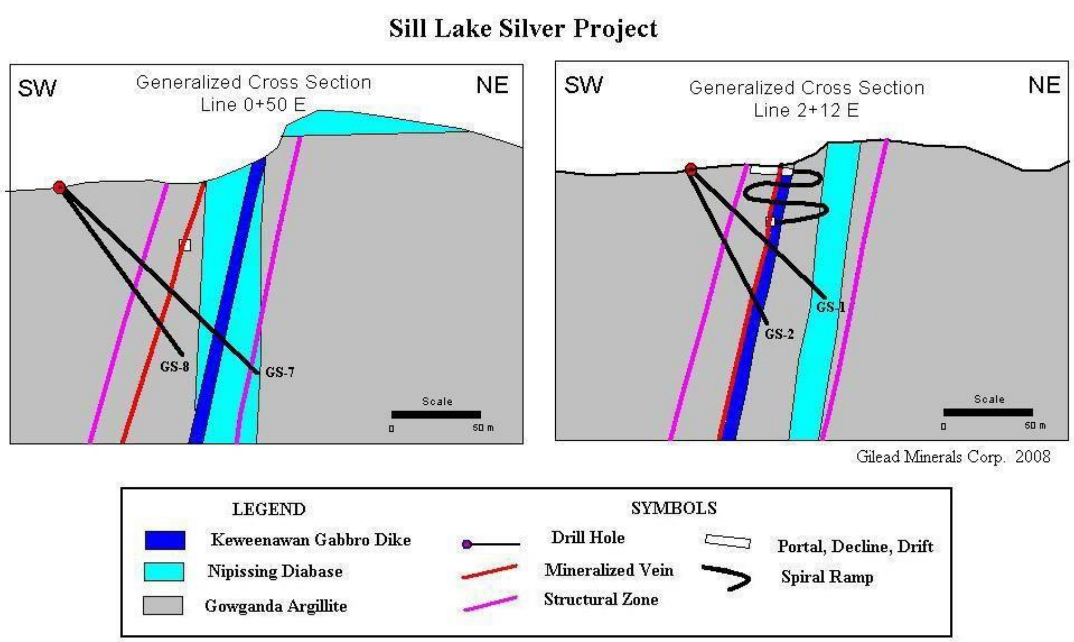


**Figure 18-1. Cross Section Illustrating Controls on Main Vein (Gilead, 2008)**

the mineralization in relation to the structural shear and host rocks using data from the 2008 drilling. While there is a close relationship between the vein occurrence and a gabbro dike, this association is not always an obvious contact relationship. However, the diabase intrusion into the argillaceous Gowganda Formation appears to follow the structural sheer excepting near surface where it becomes sill-like. The masking effect of the diabase throughout the property has been a detriment to delimiting other potential faults or sheers. However, the close association with diabase and the sheers does indicate that there is a relationship with the intrusive event and mineralization.

SMX also looked at the recent

Data interpretation has also led to the conclusion that the vein structure may pinch in and out with depth. While the drilling was successful in expanding the known resource, it did not achieve the goal of determining outlining deeper extension of the main vein nor lateral extension to the west. This in part is due to faulting but also due to the limited nature of the drilling program. Their reliance at the time of drilling on the geophysics using IP and resistivity. There are many ways to interpret geophysical results and perhaps the interpretation at the time could produce differing results with the subsequent knowledge of the drilling program. It is felt that there could be anomalies that were missed in the drilling were a result of the geophysical target being where projected versus surveyed.

Other geophysical work using a proton magnetometer by Chemrox netted no signatures across mineralized sheer zones and therefore deemed an ineffective exploration tool for Sill Lake type deposits. Prior to Gilead acquiring the property, airborne magnetic surveys were conducted but the maps were of too poor quality to interpret.

One of the more interesting discoveries of the 2008 program was the limited metallurgical work done on a high-grade galena sample using QEMSCAN™ BY SGS Lakefield. The 30% association of silver to non-galena may suggest multiple stages of mineralization and other non-galena type silver targets containing free silver and other sulfides such as tetrahedrite. These type of associations are less visible for mining purposes and could have been overlooked even in the existing development areas of the mine.

Statistical analysis of the predictability of silver grade in the main vein shows that beyond 80 meters in the trend of the vein; silver resources are very low. However, this relationship is not a function of the grade diminishing per se but more a function of the limited drilling. Extensions of the trend could exist at depth.

Channel sampling by different groups often did not correlate well with grade but did show a consistency with hotspots of higher-grade material. It is believed that this is a result of several factors including sampling methodology and access issues in the East Drift. The channel sample results were further challenging to incorporate in the resource model since the work was not observed by the QP's or adherence to the QA/QC protocol was not undertaken. Subjective decisions had to be made by the QP's as to which datasets to include and which to qualify as non-useful for indicated and measured resource calculations. The work, however, did have major value and was incorporated in the solids model.

A half of a million silver ounces currently in the measured and indicated category at Sill Lake is somewhat small by comparison of most operating mines although another 660 thousand inferred ounces would make the project more profitable if defined by additional drilling and classified as either indicated or measured. Likely, comparable deposits are in the area awaiting discovery.

# 19.0 RECOMMENDATIONS

Much has been learned from the 2008 geophysical and drilling program but much needs to be further evaluated to understand the full economic potential of the property. The trend that has been drilled thus far was the simplest to find as it was previously developed. However, to expand the indicated and measured resource, a more comprehensive exploration program will be necessary. It is recommended that this be done in two drilling Phases: (Phase I) Exploration and Development Drilling and (Phase II) Preliminary Mine Planning and Economic Analysis. The second Phase should be contingent upon favorable results of Phase I. Favorable results should be based upon a Company target goal such as adding another half million indicated and measured silver ounces.

## 19.1 Exploration Program

It would be advisable to minimize expenditures on additional geophysical surveys. Instead prior to designing a new drilling program, the existing geophysical data should be reinterpreted and possibly the sections should be remigrated. Calibration with the prior drilling results should be undertaken.

Assuming that the soil samples collected on a systematic grid are still available for analysis, this should be undertaken using at least a 32 element ICP scan. While we know that lead is a poor soil tool in that it is very immobile, free silver would be mobile and may be associated with more mobile metals such as zinc and copper. Having a large enough sample population to do correlation statistics would help to ascertain whether drilling targets can be identified in terrain masked by vegetation and diabase sill.

After the geophysical data has been reinterpreted and the soil data assessed, a drilling program can be designed in detail. The drilling should be done with three purposes namely: (1) test anomalies outside of the structural trend; (2) extend resources vertically and (3) in-fill drilling where gaps exist in the data. To undertake the next phase of exploration may cost $1.5 to $2.0 million CD and would entail drilling about 7500 meters. This would include the cost of geophysical reinterpretation, soil and core analyses, oversight and resource modeling.

While recent Spectrographic surveys conducted by Steele and Associates (2019) show several new anomalies, without validation on the surface with either soil and/or rock samples should be done prior to commencing any detailed subsurface testing.

And finally, the copper and graphite occurrences in the area might be worth further evaluation. Copper mineralization was seen in in an adit north of the lead deposit and Ministry core and associated older logs showed evidence of graphite.

## 19.2 Preliminary Mine Planning and Economic Analysis

Assuming that the minimum target resources are obtained in Phase I, the second Phase of evaluation could be undertaken. Generally, for a project of this scale, the cost would run about $750K. This includes costs associated with special studies such as water disposal; permitting analysis; and preliminary engineering design for determining realistic capital costs and revenue stream.

# 20.0 REFERENCES


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Ontario Geological Survey-Open File Report 5602 (by Peter Born, Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto)

Steele and Assoc. (December 2019) ASTER Satellite LWIR Imagery, Assessment for the Sill Lake Claims, Sault Ste. Marie Mining District, Ontario, Canada 44pp

Tortosa, Delio (2010), verbal communication with Sean Muller in August 2010; data compilation; map preparation review and comments on the draft 43-101

# 21.0 GLOSSARY

| Term | Definition |
| --- | --- |
| Assay: | The chemical analysis of mineral samples to determine the metal |
| Capital Expenditure: | content. All other expenditures not classified as operating costs. |
| Composite: | Combining more than one sample result to give an average result over a larger distance. |
| Concentrate: | A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the |
| Crushing: | ore. Initial process of reducing ore particle size to render it more amenable for further processing. |
| Cut-off Grade (CoG): | The grade of mineralized rock, which determines as to whether or not it is economic to recover its content by further concentration. |
| Dilution: | Waste, which is unavoidably mined with ore. |
| Dip: | Angle of inclination of a geological feature/rock from the horizontal. |
| Fault: | The surface of a fracture along which movement has occurred. |
| Footwall: | The underlying side of an orebody or stope. |
| Gangue: | Non-valuable components of the ore. |
| Grade: | The measure of concentration within mineralized |
| Hangingwall: | rock. The overlying side of an orebody or slope. |
| Haulage: | A horizontal underground excavation which is used to transport mined ore. |
| Hydrocyclone: | A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials. |
| ICP | Induced Coupled Plasma analysis of cations. |
| Igneous: | Primary crystalline rock formed by the solidification of magma. |
| Kriging: | An interpolation method of assigning values from samples to blocks that minimizes the estimation error. |
| Level: | Horizontal tunnel the primary purpose is the transportation of personnel and |
| Lithological: | materials. Geological description pertaining to different rock types. |
| LoM Plans: | Life-of-Mine plans. |
| LRP: | Long Range Plan. |
| Material | Mine properties. |
| Properties: Milling: | A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product. |
| Mineral/Mining Lease: | A lease area for which mineral rights are held. |
| Mining Assets: | The Material Properties and Significant Exploration Properties. |
| Ongoing Capital: | Capital estimates of a routine nature, which is necessary for sustaining operations. |
| Ore Reserve: | See Mineral Reserve. |
| Pillar: | Rock left behind to help support the excavations in an underground |
| RoM: | mine. Run-of-Mine. |
| Sedimentary: | Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks. |
| Shaft: | An opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste. |
| Sill: | A thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness. |
| Smelting: | A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or doré phase and separated from the gangue components that accumulate in a less dense molten slag phase. |
| Stope: | Underground void created by mining. |
| Stratigraphy: | The study of stratified rocks in terms of time and space. |
| Strike: | Direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction. |
| Sulfide: | A sulfur bearing mineral. |
| SURPAC | Computer modeling software used for resource and reserve computations distributed by GEMCOM. |
| Tailings: | Finely ground waste rock from which valuable minerals or metals have been extracted. |
| Thickening: | The process of concentrating solid particles in suspension. |
| Total Expenditure: | All expenditures including those of an operating and capital nature. |
| Variogram: | A statistical representation of the characteristics of sample data related to distance prediction of grade. |

# 22.0 CERTIFICATE OF AUTHORS

**Sean C. Muller, P.Geo and P.G**

**001-208-582-3218**

**smuller.smx@gmail.com**

**CERTIFICATE OF AUTHOR**

I, Sean C. Muller, P.Geo. do hereby

certify that: I am a Senior Resource Geologist

for:

SMX International Corporation

1077 Happy Jack Road

Cheyenne, Wyoming 82009

I graduated in a Master of Science degree in Geology from Idaho State University in 1978 and in a Bachelors degree in Earth Science from La Salle University in 1973. I am currently enrolled in a Ph.D. program in Mining Engineering at the Colorado School of Mines.

I am a Licensed Professional Geologist in Idaho by examination. Further, I am a Registered Member of the Society of Mining Engineers of AIME for preparing NI43-101 resource documents.

I have worked as a geologist for a total of 48 years since my graduation from the university spending at least 10 years working with precious and base metals projects. My underground mining experience with base metals in greenstones started in 1973 and I have worked in similar geologic terraines worldwide.

I have read the definition of "qualified person" set out in national Instrument 43-101 ("NI43-101") and certify that by reason of my education, affiliation with professional associations (as defined by NI43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for purposes of NI 43-101.

I am responsible for the preparation or overseeing of all sections of the technical report titled Sill Lake 43-101 Resource Report, Sault Saint Marie, Ontario.

My prior involvement with the property that is the subject of the Technical Report was the preparation of an environmental analysis and a qualifying report in 2008 and a NI43-101 compliant Resource Report in 2010.

I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical report.

I am independent of the issuer applying all of the tests in Section 1.5 of the National Instrument 43-101.

I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with the instrument and form.

I consent to the filing of the Technical Report with any exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this day of April 18, 2021

<u>Sean C Muller</u>

**John A. Rae, P.Geo**

**+1-647-505-5641**

**johnrae@magma.ca**

**CERTIFICATE OF AUTHOR**

I, John A. Rae, P.Geo. do hereby certify

that: I am a Consulting Geologist and Mining

Engineer for:

SMX International Corporation
1077 Happy Jack Road
Cheyenne, Wyoming 82009

I graduated with a Technical Diploma in Mining Engineering from Halleybury School of Mines in 1978 and I am a Licensed Professional Geoscientist in the Province of Ontario #0907.

I have worked as a mining engineer and geologist for a total of 38 years since my graduation from the Haileybury university spending all of my career working with precious and base metals projects. At least 5 years of my experience includes working on underground mining projects including the Sill Lake lead-silver deposit.

I have read the definition of "qualified person" set out in national Instrument 43-101 ("NI43-101") and certify that by reason of my education, affiliation with professional associations (as defined by NI43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for purposes of NI 43-101.

I am responsible for the preparation of all mining sections of the technical report titled Sill Lake 43-101 Resource Report, Sault Saint Marie, Ontario.

My prior involvement with the property that is the subject of the Technical Report was the started in 2005 with an evaluation of the property through 2010 in conjunction with the work of Chemrox Technologies.

I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical report.

I am independent of the issuer applying all of the tests in Section 1.5 of the National Instrument 43-101.

I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with the instrument and form.

I consent to the filing of the Technical Report with any exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this day of April 18, 2021.

John A. Rae

PROFESSIONAL GEOSCIENTIST
JOHN A. RAE
PRACTISING MEMBER
0907
ONTARIO

INSIGHT GEOPHYSICS INC.
95 WALBY DR., OAKVILLE, ONTARIO, CANADA, L6L-4C8
905 465 2996

# APPENDIX A

# Geophysics
# Interpretation Report

Tuned Gradient and Insight Section Induced Polarization and Resistivity Surveys

## BUTTERCUP (SILL LAKE) PROPERTY

Sault Ste. Marie, Ontario

Prepared for: Gilead Minerals Corp.

June, 2008

Craig Pawluk

# TABLE OF CONTENTS

## INTRODUCTION

In April of 2008, Insight Geophysics Inc. was contracted by Gilead Minerals Corp. to perform Tuned Gradient and Insight Section Time Domain Induced Polarization / Resistivity Surveys over the Buttercup Property near Sault Ste. Marie, Ontario, Canada.

The previous deposit on the property is understood to have consisted of one major vein with a few sub-parallel veins. The main argentiferous galena vein varied in width from 1-3 meters and had ore grades of 40 ounces of silver per ton and 10-30% lead. Sulphide minerals present were galena, tetrahedirite, pyrite, chalcopyrite sphalerite and pyrrhotite.

The IP survey has been designed with a small receiver dipole length (MN) of 12.5 meters in order to maintain maximum lateral resolution for detecting narrow vein like features. The expected preferred anomalous response from the survey will be a high chargeability measurement coincident or generally associated with low resistivity measurements. As the veins are only expected to be 1-3 meters wide, the anomalous response will likely be no more than 2 receiver dipoles wide unless multiple veins are causative source.

## General Information

- Project Name: Buttercup Property, Ontario, Canada
- Survey Type: Time Domain Induced Polarization / Resistivity
- Arrays Types Used: Tuned Gradient, Insight Section

  Client: Gilead Minerals Corp.<br>#705, 401 Queens Quay West<br>Toronto, Ontario<br>M5V 2Y2

- Client Representatives: **Mr. John Moses**,<br>Gilead Minerals Corp

# SURVEY GRID

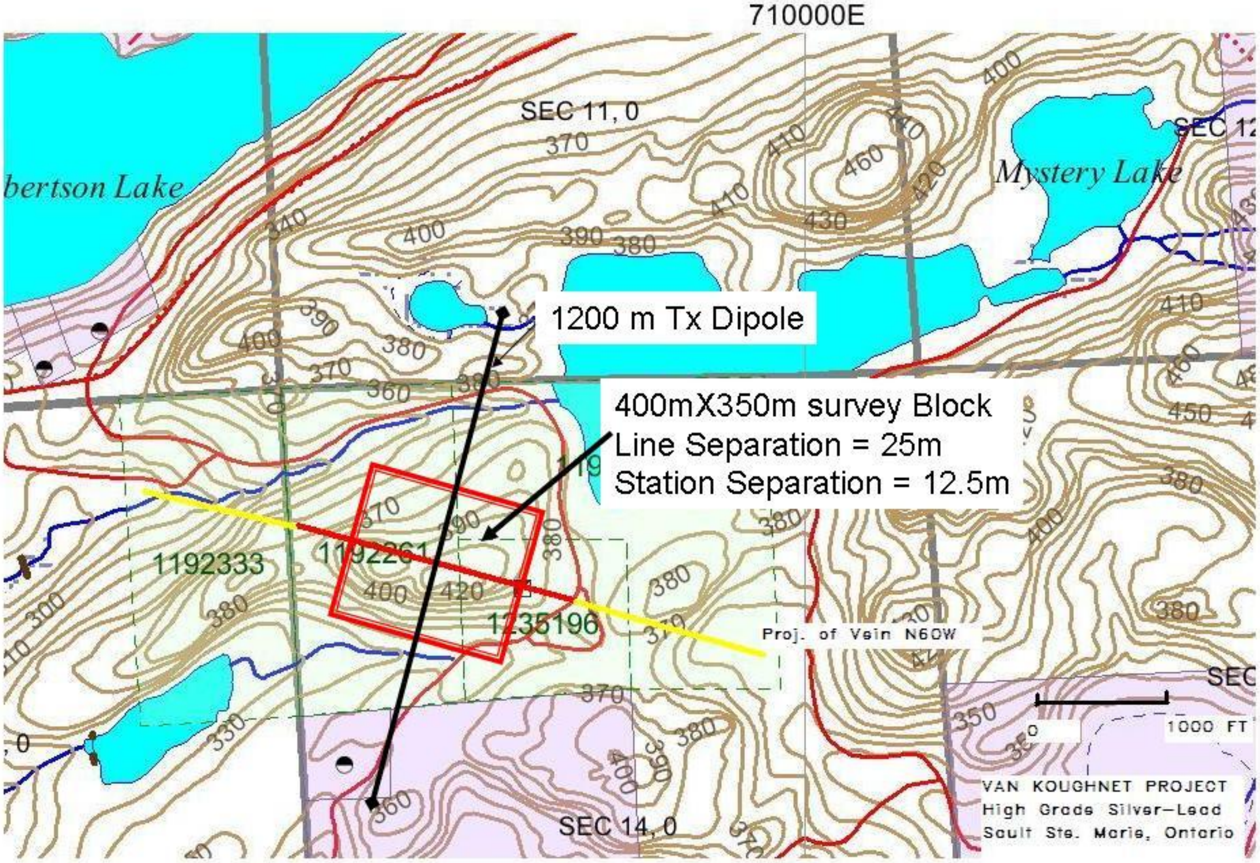
## Grid Location

- Country: Canada
- Province: Ontario
- General Location: Sault Ste. Marie

## Grid Specifics

### Cosby Property

- Established: Prior to survey
- Coordinate System: Metric
- Method: Surveyed
- Line Separation: 100m
- Station Interval: Picketed @ 25m




*Buttercup Project Survey Area*

## SURVEY PARAMETERS

### Specifications

Tuned Gradient Survey

- Array: Tuned Gradient
- AB (Tx dipole length): 1200m
- MN (Rx dipole spacing): 12.5m
- Sampling Interval: 12.5m with a 25 meter line separation

Insight Section Survey

- Array: Insight Array
- AB (Tx dipole spacing): Multiple AB dipoles ~100m to 1200m
- Levels per section: ~15
- MN (Rx dipole spacing): 12.5m
- Sampling Interval: 12.5m

## Instrumentation

- Receiver: Elrec Pro (refer to Appendix B ; Instrument Specifications)
- Transmitter: Huntec Mk IV 7500W

## Parameters

- Transmitted Waveform: Square wave @ 0.0625 Hz
  50% duty cycle
- Receiver Sampling: Semi-Logarithmic windows (20 windows)

| Window | Width (ms) | Window | Width (ms) |
|---|---|---|---|
| M Daly | 160 | | |
| 1 | 80 | 11 | 160 |
| 2 | 80 | 12 | 160 |
| 3 | 80 | 13 | 160 |
| 4 | 80 | 14 | 160 |
| 5 | 80 | 15 | 320 |
| 6 | 80 | 16 | 320 |
| 7 | 80 | 17 | 320 |
| 8 | 80 | 18 | 320 |
| 9 | 160 | 19 | 320 |
| 10 | 160 | 20 | 320 |
| | | **TOTAL** | 3680ms |

*Semi -Log windows*

## Measured Parameters

- IP measured Parameter: Chargeability in mV/V
- Resistivity measured Parameters: Primary Voltage in mV and Transmitted Current in mA.

# SURVEY EXECUTION

## Generalities

- Survey Dates: April 8-28, 2008
- Mob Days: 2 days
- Survey Days 18 days
- Weather/Standby Days 1 day

## Personnel

Martin Kratochvil, Operator, IGI

Perry Nielsen, Tx Operator, IGI

Gerry Beach, Field Assistant, IGI

Luke Foster, Field Assistant, IGI

Rob Comfort, Field Assistant, IGI

## Survey Coverage

Tuned Gradient

A tuned gradient survey was conducted on lines 200E to 200W. One transmitter dipoles was used to cover the grid area. Transmitted current was approximately 3.6 Amps.

Tx#1 Line 0E 600N-600S

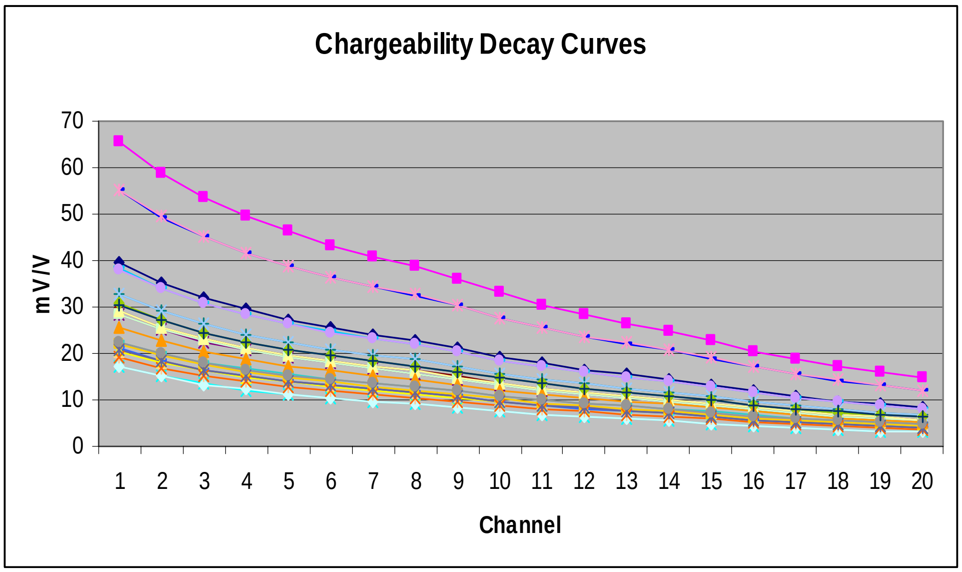
Approximately 10% of all survey readings were repeated for QA/QC assurances. The data collected was very clean. Chargeability typically repeated to less than 1 mV/V and apparent resistivity to less than 10%. Some noise was encountered in the area of the old workings and on the old tailings pond edges.

Insight Sections

Eight Insight Sections were surveyed on Lines 200W, 150W, 100W, 50W, 0E, 50E, 100E and 200E. The Insight Sections were designed to provide Apparent Resistivity and Total Chargeability information to a maximum estimated depth of approximately 200 meters.

As with the tuned gradient survey data, approximately 10% of all survey readings were repeated for QA/QC assurances. Chargeability typically repeated to less than 1 mV/V and apparent resistivity to less than 10%.

Some noise was encountered in the area of the old workings.




*Typical Chargeability Decay Curves – Buttercup Property*

# DATA PRESENTATION

## Data Processing

Processing of the IP data was handled with two software packages:

- Prosys software from Iris, was used to dump the instrument and edit out spurious readings. It produces a binary and an ASCI text export.

***.bin**
Raw binary dump files from Elrec Pro, one file per day. Can be viewed and exported using Prosys software available on Iris website at the following link:
http://www.iris-instruments.com/Support/Download/Download_geophy.html

- Oasis Montaj from Geosoft, was used to compile and QC the data in a Database format. It produces a database and a *.xyz format export as a final digital product. All map products were generated with the mapping portion of this package.

***.gdb**
Oasis database file.

## Digital Data

- Raw Data: Iris binary dump file
- Processed Data: CSV file of all parameters in binary dump file.

  Geosoft *.gdb database file.

# Maps

*Refer to attached map pocket for printed maps.*

**Insight Sections**

| Map Name | Scale |
|---|---|
| L200W Apparent Resistivity Insight Section | 1:1250 |
| L200W Total Chargeability Insight Section | 1:1250 |
| L150W Apparent Resistivity Insight Section | 1:1250 |
| L150W Total Chargeability Insight Section | 1:1250 |
| L100W Apparent Resistivity Insight Section | 1:1250 |
| L100W Total Chargeability Insight Section | 1:1250 |
| L50W Apparent Resistivity Insight Section | 1:1250 |
| L50W Total Chargeability Insight Section | 1:1250 |
| L0E Apparent Resistivity Insight Section | 1:1250 |
| L0E Total Chargeability Insight Section | 1:1250 |
| L50E Apparent Resistivity Insight Section | 1:1250 |
| L50E Total Chargeability Insight Section | 1:1250 |
| L100E Apparent Resistivity Insight Section | 1:1250 |
| L100E Total Chargeability Insight Section | 1:1250 |
| L200E Apparent Resistivity Insight Section | 1:1250 |
| L200E Total Chargeability Insight Section | 1:1250 |

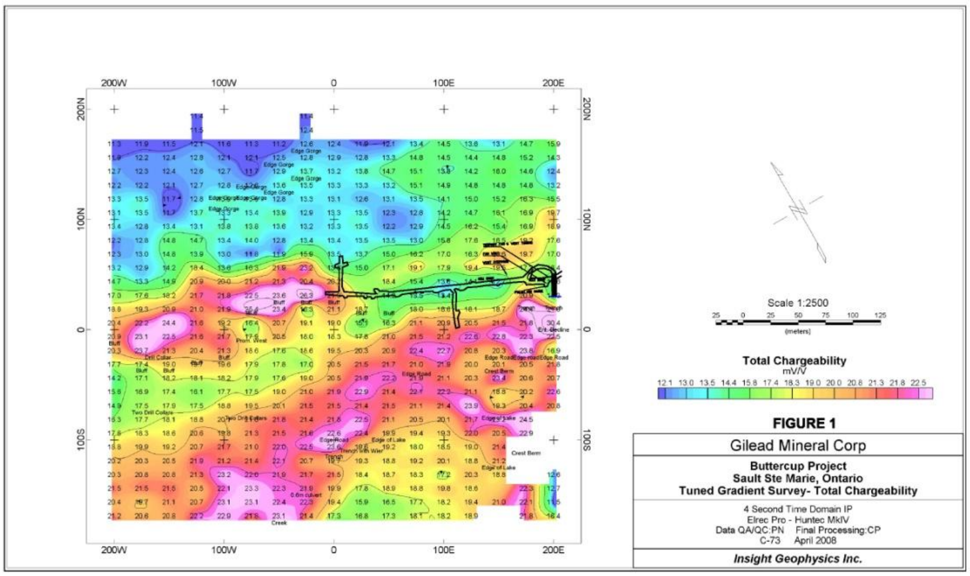
**Plan Maps**

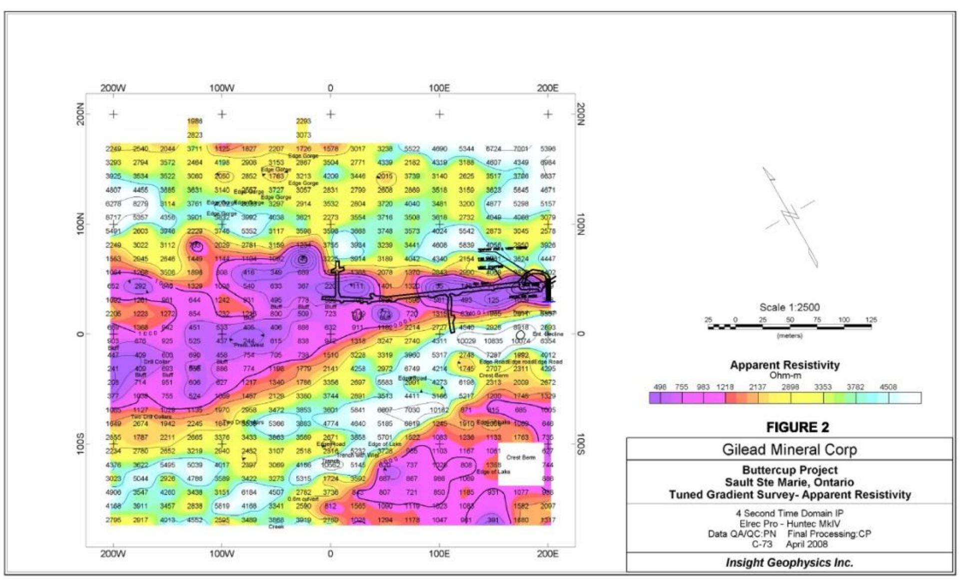
| Map Name | Scale |
|---|---|
| Tuned Gradient - Apparent Resistivity | 1:2500 |
| Tuned Gradient - Apparent Resistivity-With Interpretation Overlay | 1:2500 |
| Tuned Gradient – Total Chargeability | 1:2500 |
| Tuned Gradient – Total Chargeability-With Interpretation Overlay | 1:2500 |

## INTERPRETATION

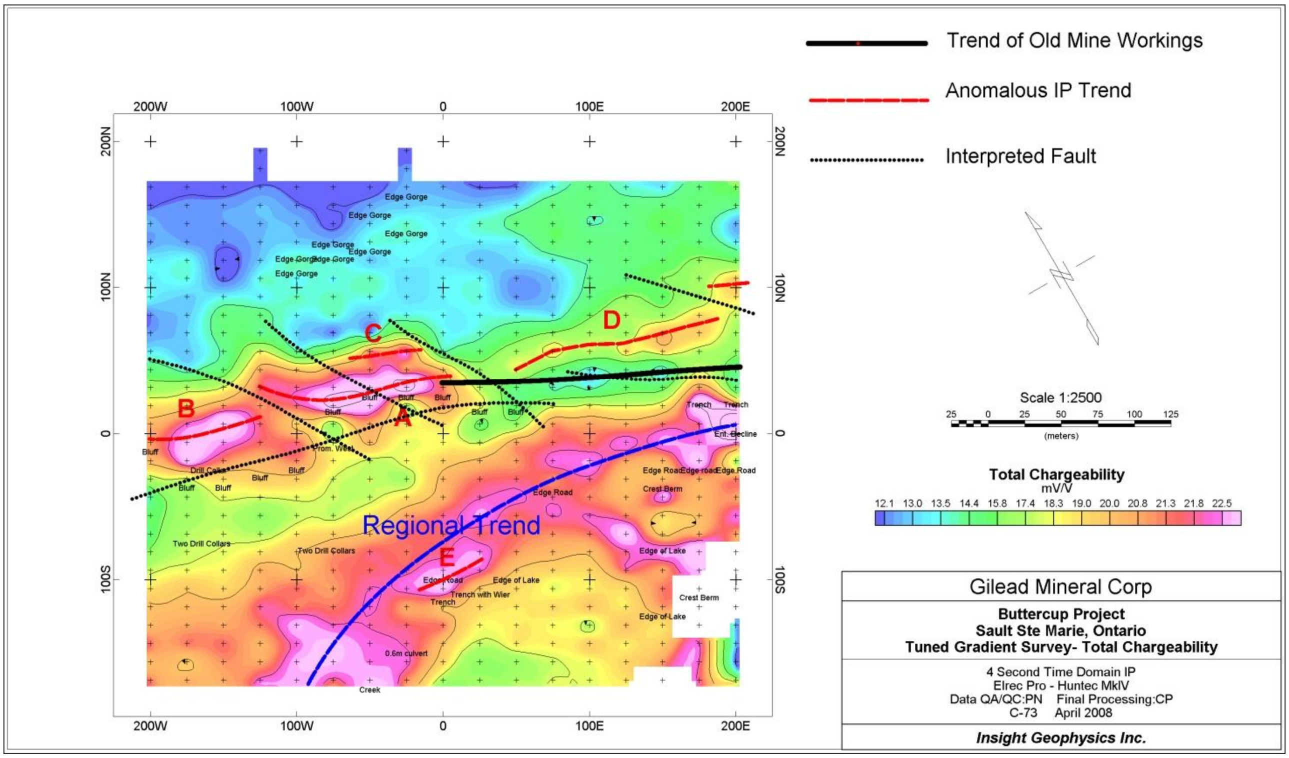
Below are diagrams prepared by Gilead Minerals Corp showing the position of the old mine workings on the Apparent Resistivity and Total Chargeability gradient maps. Note the coincidence of the low chargeability and low resistivity feature coinciding with the old flooded and mined out workings.

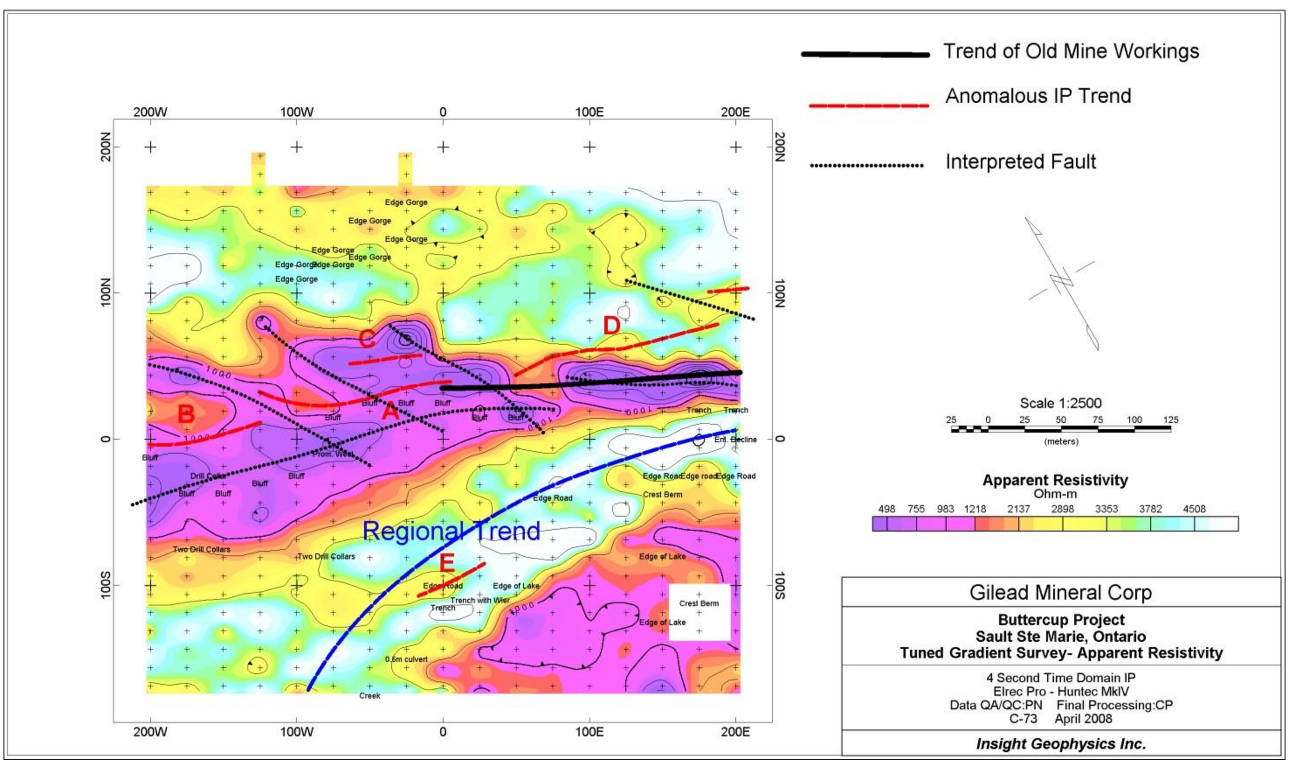
The low resistivities are attributed to faulting and/or the old flood mine workings. The low chargeability readings are attributed to the flooded mine workings and also to the lack of chargeable sulphides from the previous mining operations.



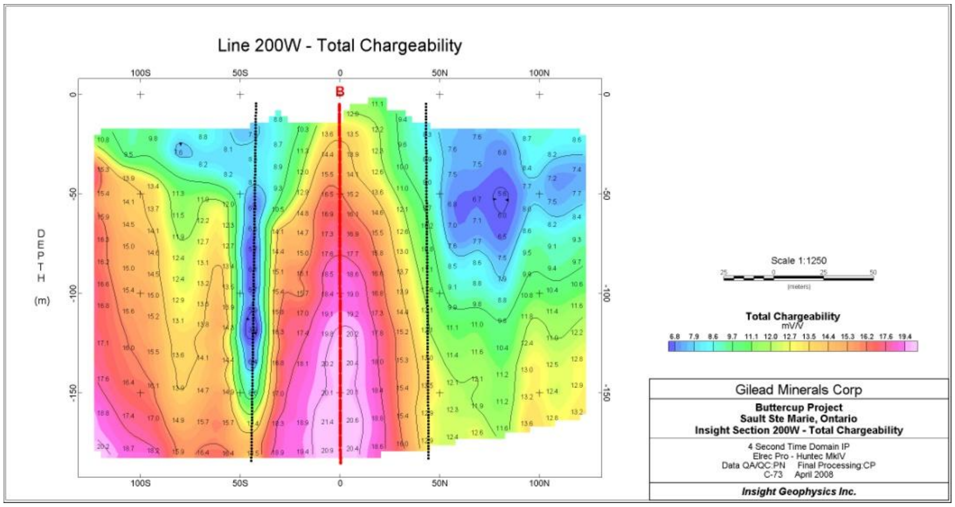



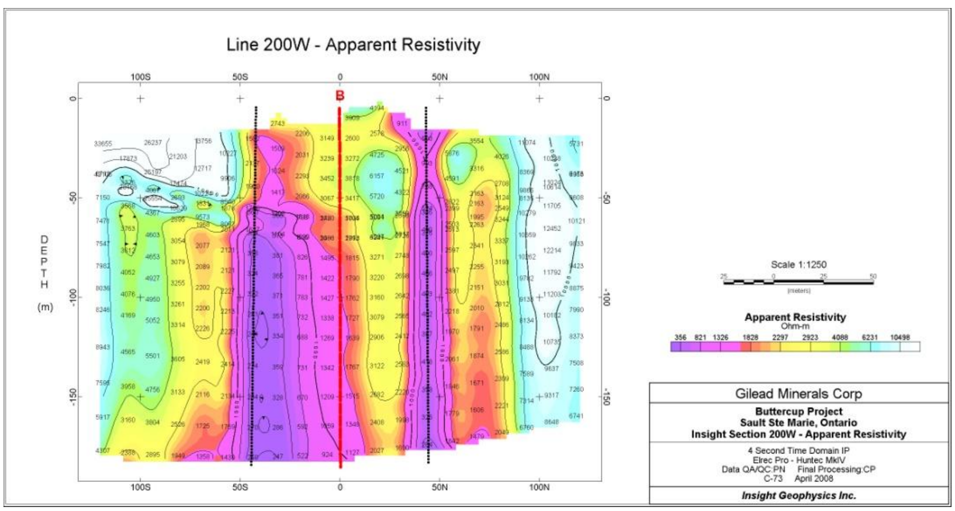
The following maps show the results of the gradient IP survey with the trend of the old mine workings (as supplied by Gilead) overlain. Anomalous trends from the IP/Resistivity survey (A through E) as well as geophysical interpreted faults have also been marked on the map. Each anomalous trend is interpreted from the results of both the gradient and Insight Section surveys. A more detailed description of the individual trends will follow.



## Insight Section 200W

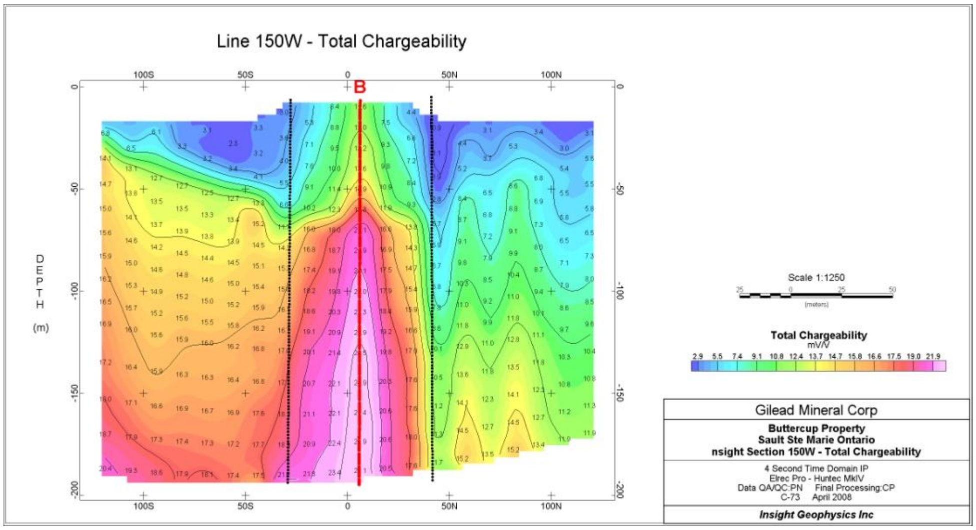


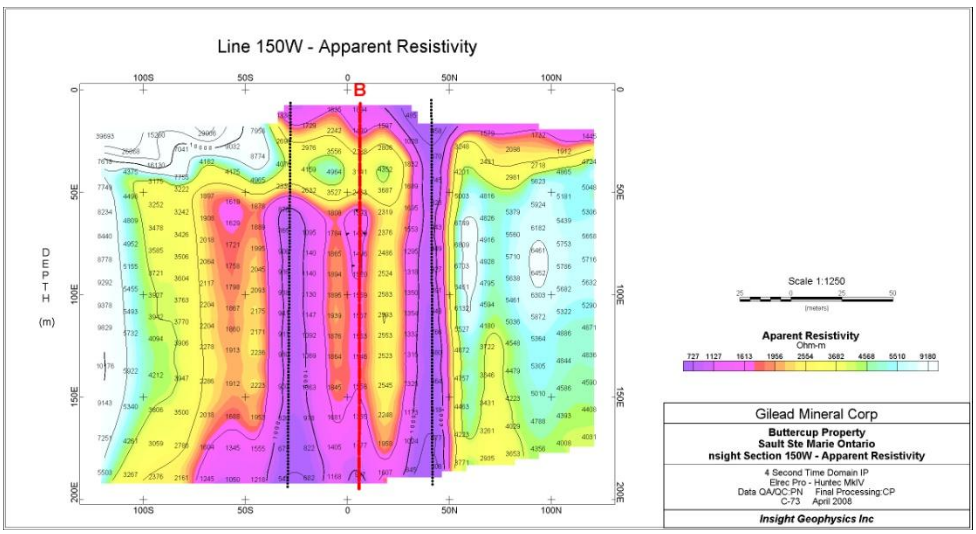




Anomaly B is present on line 200W at 0N. The anomaly displays chargeabilities in the 15-20 mV/V range and is associated with a zone of decreased resistivities. Depth to the top of the anomaly is estimated at less than 50 meters.

The anomaly lies within a broader zone of decreased resistivities extending from approximately 75S to 75N. Strong resistivity lows are present at 44S and 44N. These resistivity lows are interpreted as possible faults.

**Insight Section 150W**

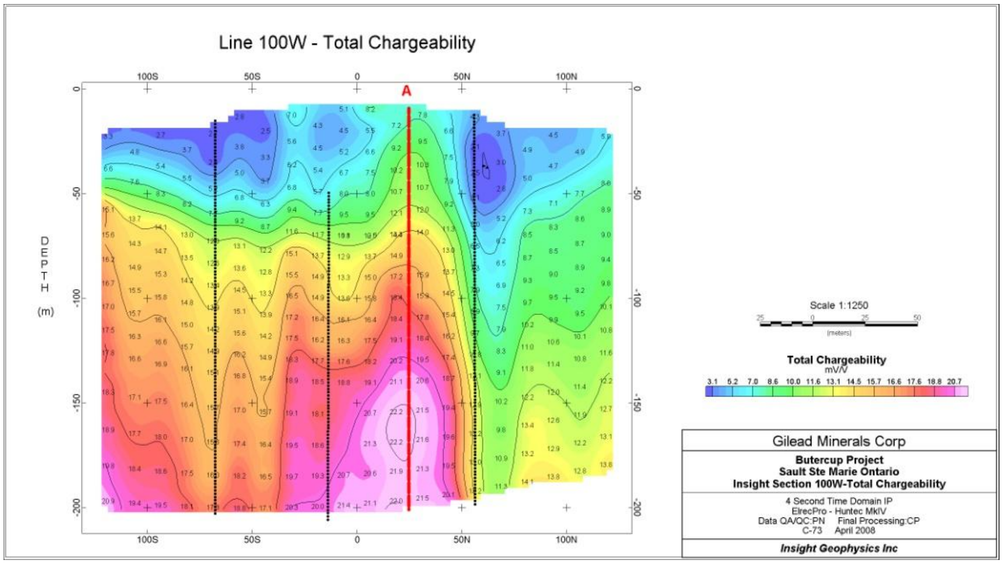


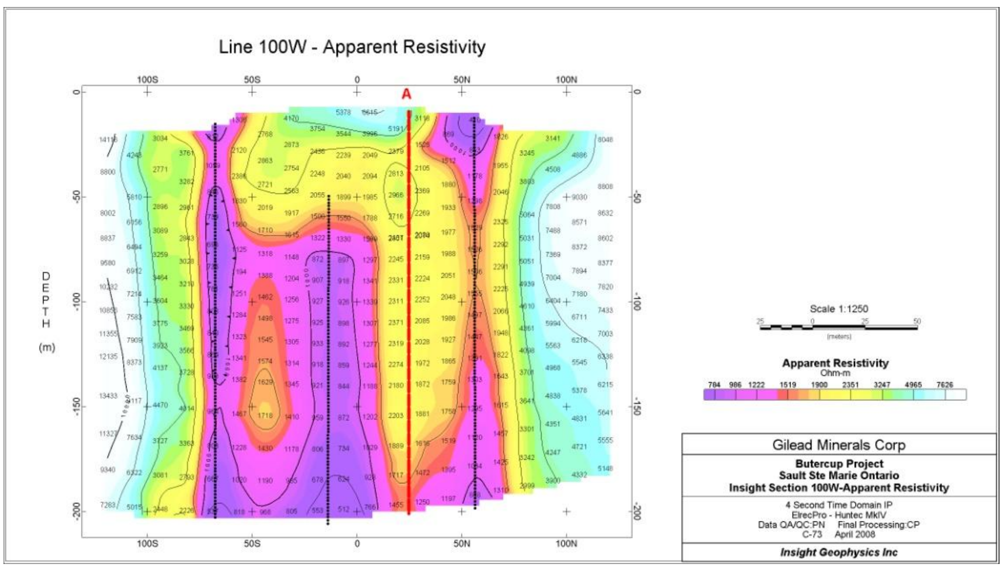




Anomaly B is present on line 150W at 6N. The anomaly displays chargeabilities in the 15-20 mV/V range and is associated with a zone of decreased resistivity. Depth to the top of the anomaly is estimated at less than 50 meters.

The anomaly lies within a broader zone of decreased resistivities extending from approximately 100S to 50N Strong resistivity lows are present at 25S and 38N. These resistivity lows are interpreted as possible faults.

## Insight Section 100W

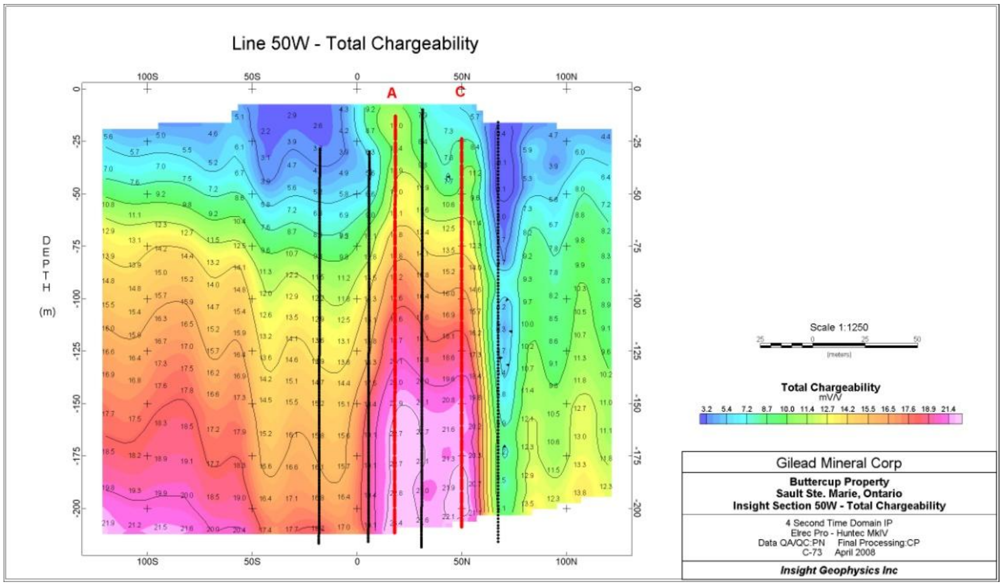


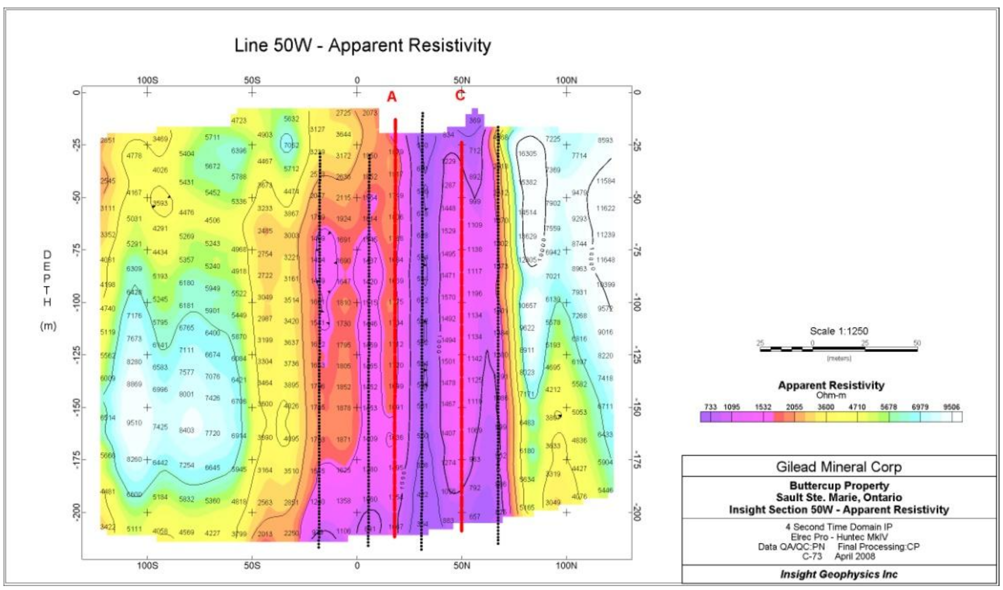




The western edge of anomaly A is seen on line 100W. There is a very well developed high chargeability signature centred at 25N. There is, however, no real signature associated with the high chargeability anomaly in the resistivity data.

The anomaly lies within a broader zone of decreased resistivities extending from approximately 100S to 75N. Three resistivity lows on line 100W have been interpreted as possible faults. They are centred at 68S, 12S and 56N.

**Insight Section 50W**

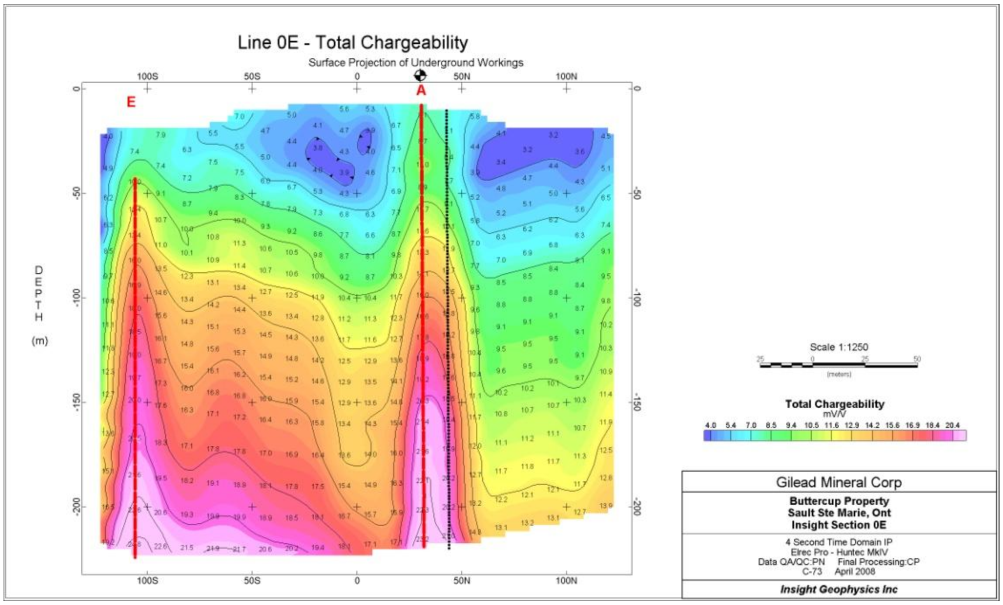


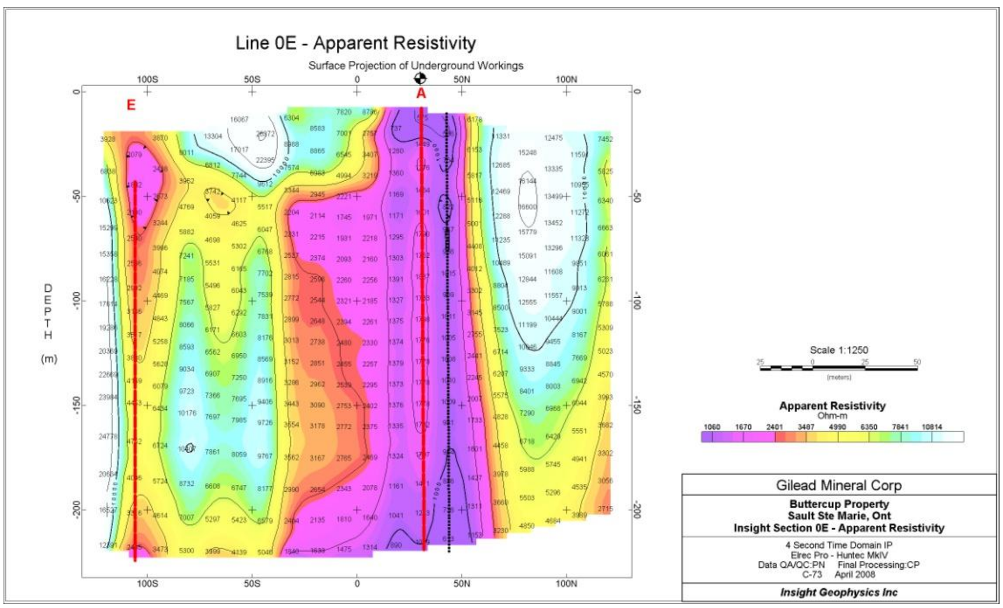




Both anomaly A and Anomaly C are present on line 50W. Anomaly A is centred at 18N and anomaly C at 50N. Both anomalies lie within a broad zone of decreased resistivities extending from approximately 50S to 75N and are within 25 meters of surface.

The zone of decreased resistivities appears to be quite complex on this line. The chargeability axis of anomalies A and C correlates with zones of subtle resistivity increases within the broad zone of lower resistivities.

**Insight Section 0E**



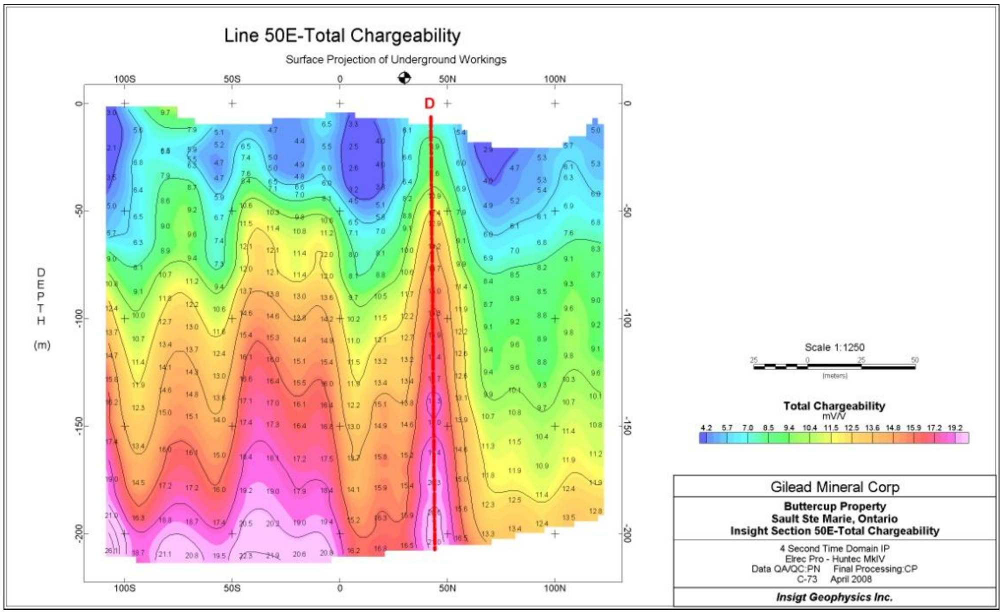

Both anomaly A and Anomaly E are present on line 0E. Anomaly A is centred at 31N and anomaly E at 106SN.

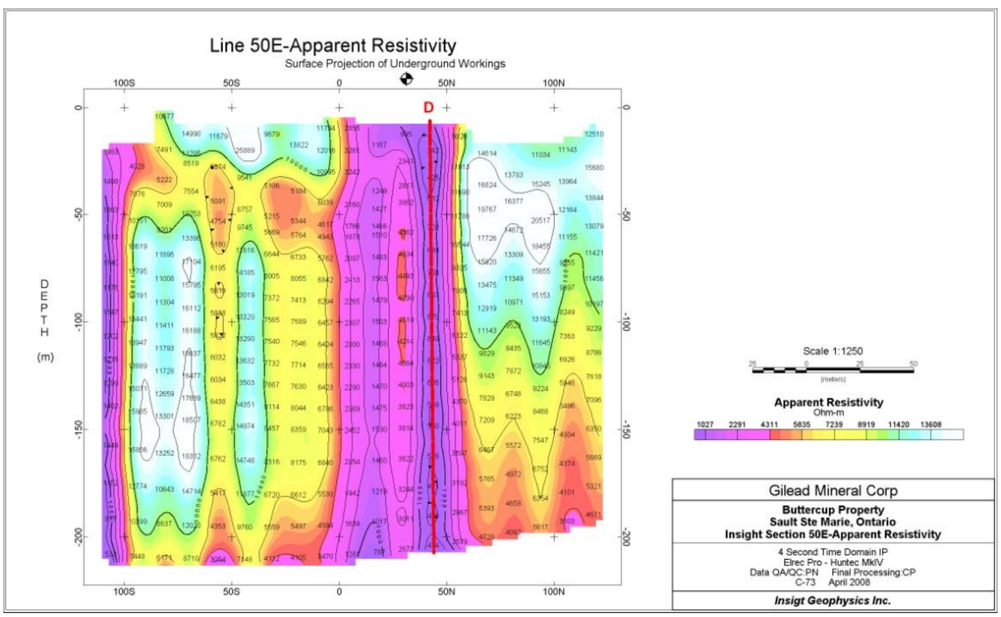
Anomaly A is a high chargeability feature associated with a very weak resistivity increase within a broader zone of low resistivities extending from approximately 38S to 50N. Depth to the anomaly is estimated at less than 25 meters. The anomaly is coincident with the surface projection of the western limit of the old underground workings (as supplied by Gilead)

Anomaly E is a high chargeability feature associated with a resistivity low. Depth to the anomaly is estimated to be approximately 50 meters.

A strong resistivity low at 44N is interpreted as a fault.

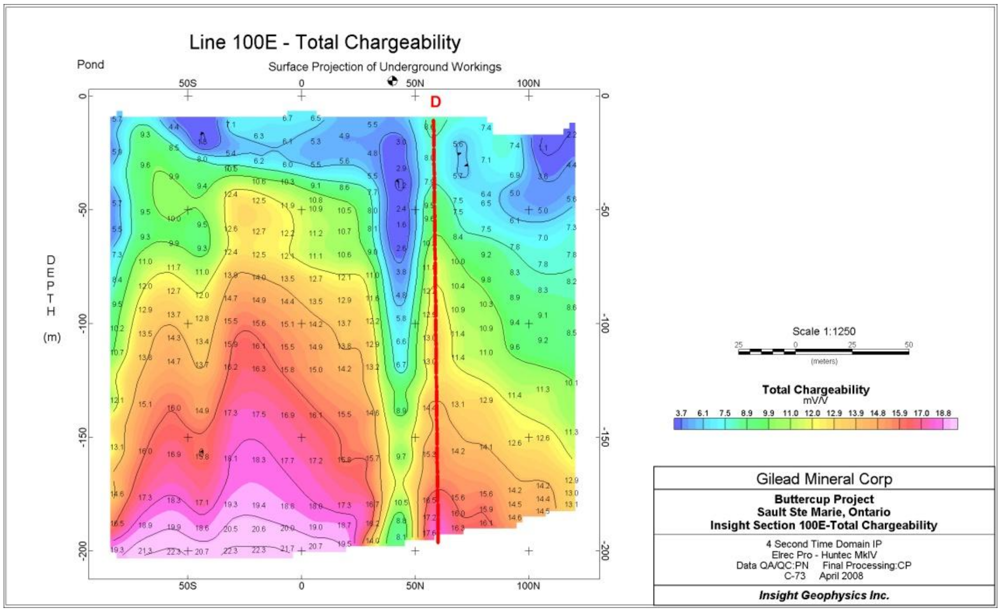
## **Insight Section 50E**

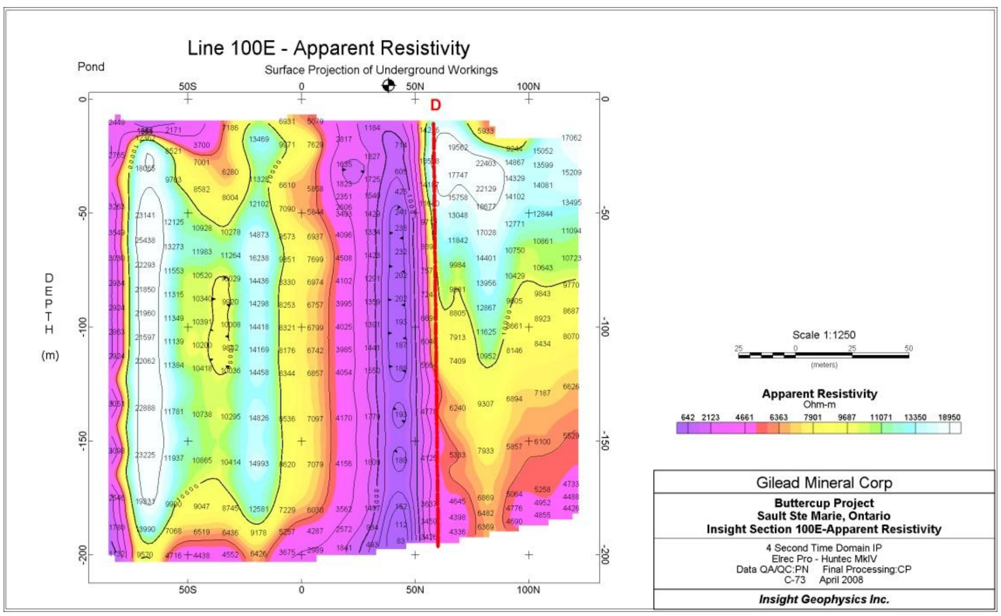



Anomaly D is present on Line 50E at 44N. The anomaly is an increased chargeability feature associated with a resistivity low. The anomaly lies on the eastern edge of a broader zone of resistivity lows extending from approximately 0N-50N. Depth to the top of the anomaly is estimated at less than 25 meters. The anomaly lies to the immediate north of the surface projection of the old underground workings.

**Insight Section 100E**

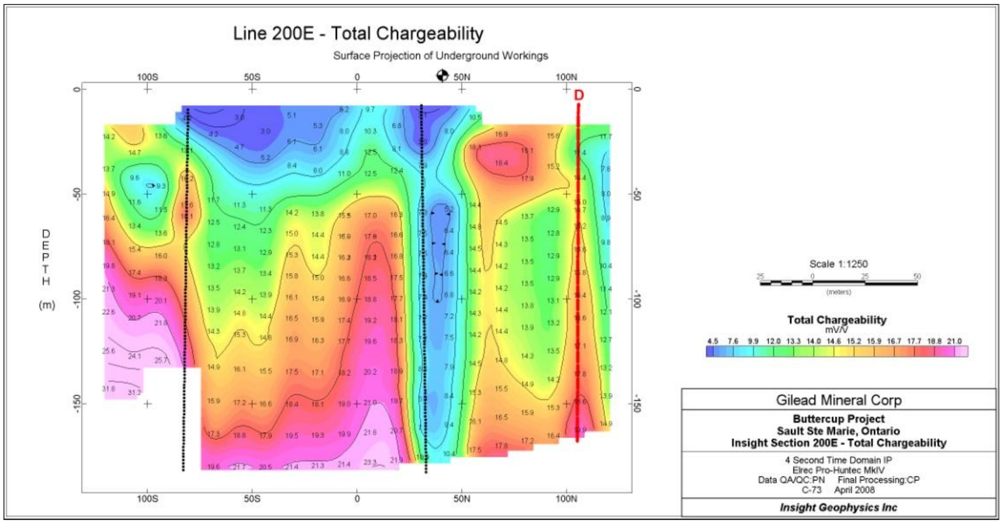


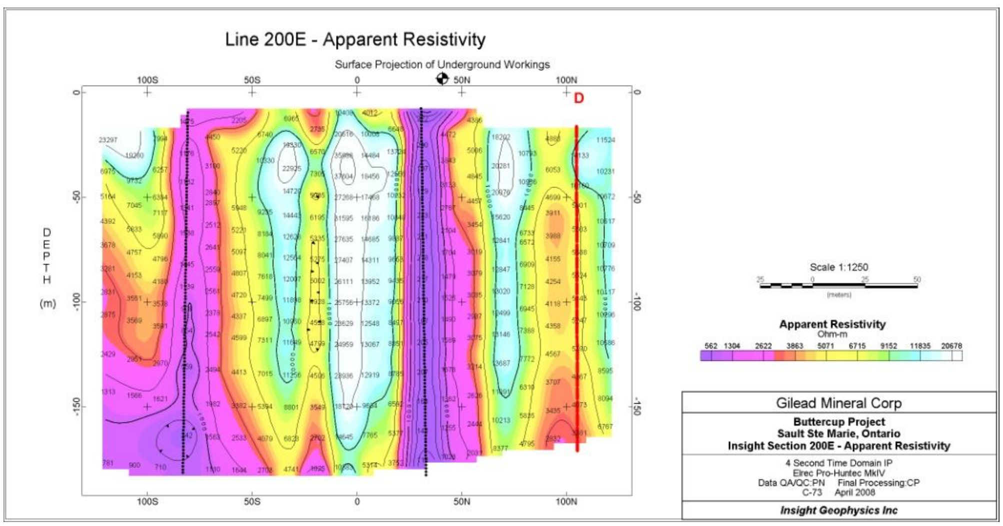




Anomaly D is present on Line 100E at 56N. The anomaly is a high chargeability feature that occurs at the resistivity northern contact of a broad resistivity low extending from approximately 12N to 62 N. The anomaly lies to the immediate north of the old mine workings.

The surface projection of the old mine workings correlates with a strong resistivity and chargeability low.

## Insight Section 200E




A high chargeability, low resistivity anomaly is present at 106N on line 200E. This anomaly is interpreted to possibly be the faulted off extension of anomaly D. Further lines to the east are required to confirm this.

A strong resistivity low at 32N is coincident with the surface projection of the old mine workings. The signature could be a result of the workings or could be a fault.

A second fault is interpreted at 82S on a strong resistivity low.

## Summary and Conclusions

The IP/resistivity survey has successfully delineated five anomalous IP/resistivity trends that fit the exploration model of narrow, near surface, sulphide enriched veins. The anomalous geophysical trends are prioritized A through E with A being the best target. All of the anomalous geophysical trends (with the exception of E) lie within a WNW-ESE striking trend of lower resistivity values that are interpreted to possibly be the extension of the fault and sheer zone associated with the original vein deposit.

A broader and more regional style of anomaly (marked on the map as “Regional Trend”) has also been interpreted. This anomaly is seen in both the gradient and the Insight Section data on Lines 100W-200E. The geometry of the anomaly is interpreted to indicate a larger and deeper (>100m) causative source of lower resistivity and higher chargeability material lying beneath resistive cap. This response would not fit with the near surface, narrow, vein model proposed as the exploration model, however, does not preclude further geological examination as an alternative target.

Anomaly A

Anomaly A occurs on lines 0E through 125W at approximately 25N. Insight Sections were run over the trend on lines 0E, 50W and 100W. Depth to the anomaly is estimated at less than 25 meters based on the results of the three Insight Sections.

The anomaly is interpreted to be structurally bound to both the east and the west by NNW trending faults and may have an additional similarly striking fault cutting through the middle of the anomaly. The eastern edge of the anomaly is essentially coincident with the western limits of the old underground workings.

Drilling of the anomaly is recommended on line 50W or 100W pending geological mapping of the area.

Anomaly B

Anomaly B is found on lines 200W through 125W at approximately 0N. Insight Sections were run over the trend on lines 200W and 150W. Depth to the anomaly is estimated at less than 50 meters based on the results of the two Insight Sections.

Anomaly B remains open to the west and could possibly be the faulted off western extension of Anomaly A.

Drilling of the anomaly is recommended on line 150W pending geological mapping of the area.

Anomaly C

Anomaly C is found on lines 50W and 25W at approximately 50N, directly to the north of Anomaly A. One Insight Section was run over the trend on line 50W. Depth to the anomaly is estimated at less than 25 meters based on the results of the Insight Section.

Anomaly C is interpreted to be structural bound to both the east and the west by approximately NNW striking faults

Drilling of the anomaly is recommended on line 50W pending geological mapping of the area.

Anomaly D

Anomaly D is found on lines 50W through 200E at approximately 50N, directly to the north of the old mine workings. The signature may reflect remnants of sulphides from the old workings. Three Insight Sections were run over the trend on lines 50E, 100E and 200E. Depth to the anomaly is estimated at less than 50 meters based on the results of the Insight Sections.

Anomaly D is interpreted to be structurally controlled to the west and faulted off between lines 175E and 200E. The anomaly remains open to the east.

Drilling of the anomaly is recommended on line 50E pending geological mapping of the area.

Anomaly E

Anomaly E is present on lines 50W through 50E at approximately 100S and lies within the large previously mentioned “Regional Trend”. The anomaly is of interest because the results from Insight Section 0E indicate a narrow, near surface (less than 50 meters depth) target of high chargeabilities and low resistivities.

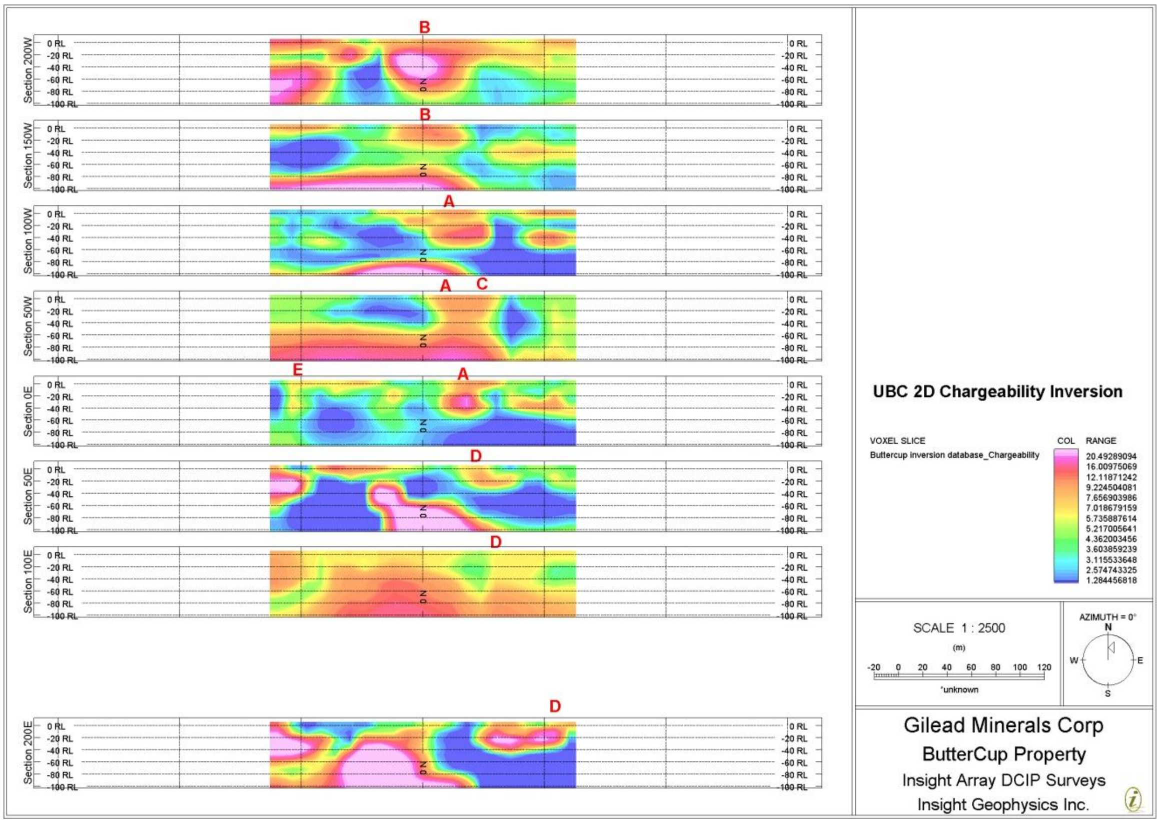
Some caution is warranted in drilling the anomaly as it is near the edge of a road and the edge of the old tailings pond (possible cultural contamination of the data).

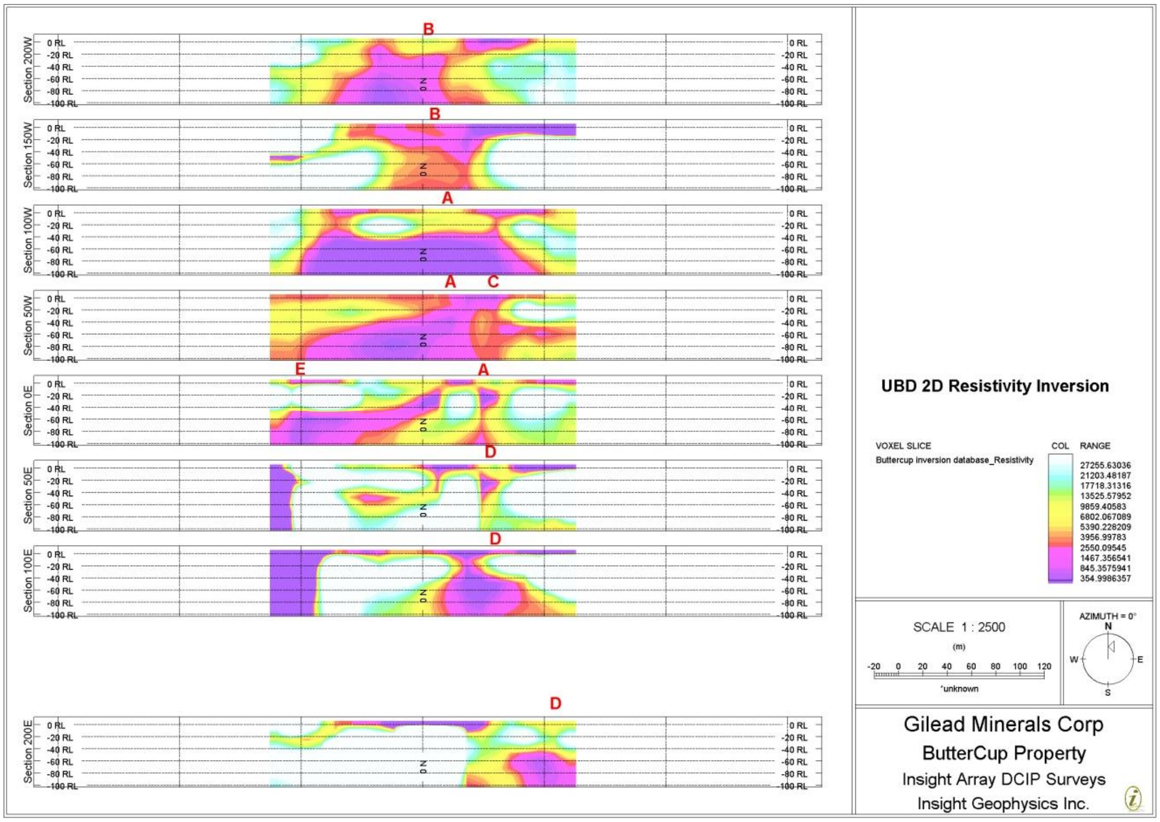
Drilling of the anomaly is recommended on line 0E pending geological mapping of the area.

## UBC 2D Inversions

All of the data has been inverted using the UBC 2D Smooth Model Inversion code. Results from the inversion confirm the shallow location of Anomalies A-E, however, due to the smooth model nature of the inversion, resolution of the anomalies has been reduced.

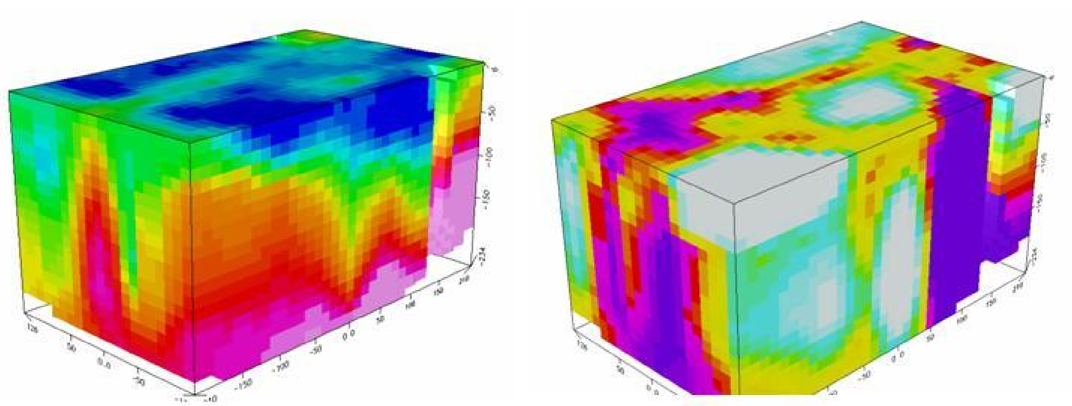
It is recommended that the inversion data be referred to as a secondary reference to the raw data. Actual positioning of drill holes is recommended to be done from the raw data with estimated depth to the top of the anomaly done using both the inverted and raw data.






## Geosoft 3D Voxels

3D data cubes of the raw and inverted data have also been created and are included on the data CD. The Geosoft viewer program (free download at the Geosoft web site) is required to view the data. The 3D data is also saved in ASCII format (file.XYZ), which may be importable into other 3D viewers.



*3D Geosoft Voxels of Total Chargeability and Apparent Resistivity – Raw Data*

## Comments

Insight would like to thank Gilead Minerals Corp. for their appreciated assistance and input during these surveys.

Respectfully Submitted

Craig Pawluk

Geophysicist

Insight Geophysics Inc.

# APPENDIX A: INSTRUMENT SPECIFICATIONS

## ELREC PRO Ten channel IP receiver

Terraplus is pleased to announce the ELREC PRO, its new ten channel IP receiver, featuring 20 chargeability windows and a graphic LCD display.

The following improvements have been introduced in this new receiver with respect to the previous ELREC 10 unit :

HARDWARE FEATURES:

The size has been reduced by 4 cm in height: 31x 21x 21 cm

The power consumption has been reduced by a ratio of three, which means that with less battery it is possible to have a longer autonomy.

As a result, the new system is 2.5 kg lighter than the ELREC 10, with a weight of 5.5 kg only.

The data (21 000 readings max.) are stored in flash memories not requiring any lithium battery for safeguard.

The new system is compatible with the existing SWITCH Plus boxes for automatic switching of electrodes according to preset sequences. In such a case, the receiver is used as a single channel unit ; with SWITCH Pro boxes (to be developed next), the full ten-channel capability of the ELREC PRO will be usable for a higher acquisition speed.

SOFTWARE FEATURES:

Each new reading is stored as a specific unit file, making easier the grouping of readings corresponding to a given profile, specially for the last (edge) points of a line obtained with a smaller number of dipoles than the main part of the profile.

The data format is compatible with the PROSYS software, which means that the operator can easily visualize the numerical values of the data, automatically sort them according to the standard deviation of the chargeability measurement, merge two files stored under different names, introduce the elevation of each electrode, etc.

The ELECTRE II software can be used to define and upload preset sequences of measurements according to any type of electrode array.

## Huntec Mk IV Transmitter

| | |
|---|---|
| Power: | 96-144V line to neutral, 3 phase, 400 Hz (from Huntec generator set), 7500W |
| Output: Voltage: | 100-3200 V dc |
| Current: | 16A maximum on low voltage ranges |
| Current regulator: | < 0.1% current change for 10% change in load resistance |
| Output frequency: | 1/16 Hz to 1 Hz (time domain and complex resistivity);<br>1/16 Hz to 4 Hz (frequency do-main) |
| Frequency accuracy: | 50 ppm, -300C to 600C |
| Output duty cycle: | (Defined as tON/(tON + tOFF)) ½ to 15/16 in increments of 1/16 (time domain);<br>15/16 (complex resistivity); ¾ (frequency domain) |
| Output current meter: | Two ranges; 0-10A, 0-20A |
| Input voltage meter: | 0-150V |
| Temperature range: | -34.0C to 40.0C |
| Size: | 53 X 43 X 43 cm |
| Weight: | 50 kg |

## APPENDIX B : MAP POCKET

# APPENDIX B

*Mineralogical Analysis of Select Rock Samples in the Sill Lake Area*

Prepared by:

John Lukfin, Ph.D

for:

Giliad Minerals

June 2008

## 1.0 Petrographic Descriptions

**SLOGCF-6:** Red and green, quartz deficient schist, with sericitized feldspars, amphibole (tremolite), and disseminated and veinlet carbonate. Source rock: most likely basaltic or diabasic.

**SL-CLF-4:** Recrystallized sandstone, or quartzite, with disseminated grains of feldspar, carbonate, clay, biotite (altered to actinolite), and minor opaques. Quartz grains have irregular, sutured contacts.

**SL-668-1:** Mostly pyrite with intergrown silicates and trace chalcopyrite and FeOx. Bright specs of yellow—probably chalcopyrite.

**SL-668-2:** Biotite-quartz schist; mainly composed of sutured grains of quartz, with interleaved biotite, and lesser amounts of muscovite, garnet, altered volcanic lithic fragments, and zircon? Source rock was probably a sandstone. In reflected light, the section contains less than 1% of disseminated pyrite, each grain rimmed and replaced by goethite.

**SLF-8:** Metasediment (quartzite), with mostly quartz, feldspar , chloritized mafic grains, and 2-3% opaques.

**GR-668-2:** Biotite-quartz schist, with dominantly sutured grains of quartz, interleaved biotite, muscovite, garnet, altered volcanic lithics, and zircon? Source rock was probably a sandstone. In reflected light, contains veinlet and disseminated pyrite; some pyrite veined by chalcopyrite. Any gold assays on this rock?? Less than 5% total sulfides.

**GR-668-3:** Schist, with foliated layers of feldspar, quartz, amphibole, chlorite, quartz veining, and 5-10% opaques. Source rock: similar to that above.

**GL-668-1:** Relatively fresh, coarse-grained intrusive rock, with phenocrysts of non-twinned plagioclase and pyroxene, altered and recrystallized to mixtures of tremolite and chlorite. Texture is ophitic or sieve-like. Opaques are probable magnetite, <5%, that are altered to leucoxene.

**12819:** Mostly galena, with lesser amounts of pyrite, and trace chalcopyrite. Total sulfides <10%.

**12825:** Greenish, coarse-grained, equigranular gabbroic rock, with plagioclase, pyroxene, and amphibole, with very local "myrmekitic intergrowths of quartz and feldspar. C.I. is > 50. Plagioclase and mafic grains are altered to chlorite, clay, and opaques.

**12827:** Amphibole schist, with quartz, pyroxene, and minor myrmekite. Amphiboles are commonly altered to epidote and chlorite. Source rock was probably a mafic intrusive or extrusive? In reflected light, the rock contains small amounts of very fine-grained sulfides, including pyrite, tetrahedrite?, hematite, and minor chalcopyrite.

**12835:** Coarse-grained, non-foliated gabbroic rock. Contains coarse pyroxene (augite) and feldspar (albite?), altered to carbonate, amphibole, and serpentine (possibly antigorite). Has 5-10% magnetite altered and replaced by leucoxene and rutile.

**12836:** Schist, with quartz, feldspar, chlorite, carbonate, and green amphibole (actinolite?), and 5-10% opaques. Source: probable mafic meta-volcanic rock.

**12837:** Veinlet with early sphalerite, followed by galena and chalcopyrite.

**51981:** Large grains of galena and some sphalerite, with olive-green tetrahedrite?, and trace of chalcopyrite. Galena features an unusual number of cleavage pits.

**52081:** Finely disseminated pyrite, <1%, and lesser amount of chalcopyrite.

**52082:** This rock is composed of coarse, strained quartz grains with a thin veinlet of carbonate (calcite?). No opaque minerals are present.

**OL-5:** Very fine-grained chalcopyrite and pyrite in thin veinlets and disseminations, <0.5%. Magnetite-hematite intergrowths also are noted.

**OC-8:** Schist, with non-twinned plagioclase, chlorite, quartz, carbonate, and fine mica. Plagioclase is kaolinized. Source rock: "meta-mafic" rock.

**Glory Hole:** Veinlet of galena with local patches of intergrown hematite, and a few grains of covellite.

**Property Shaft:** Coarse patches of pyrite, veinlet pyrite, and lesser chalcopyrite . Pyrite comprises 5-10% of section.

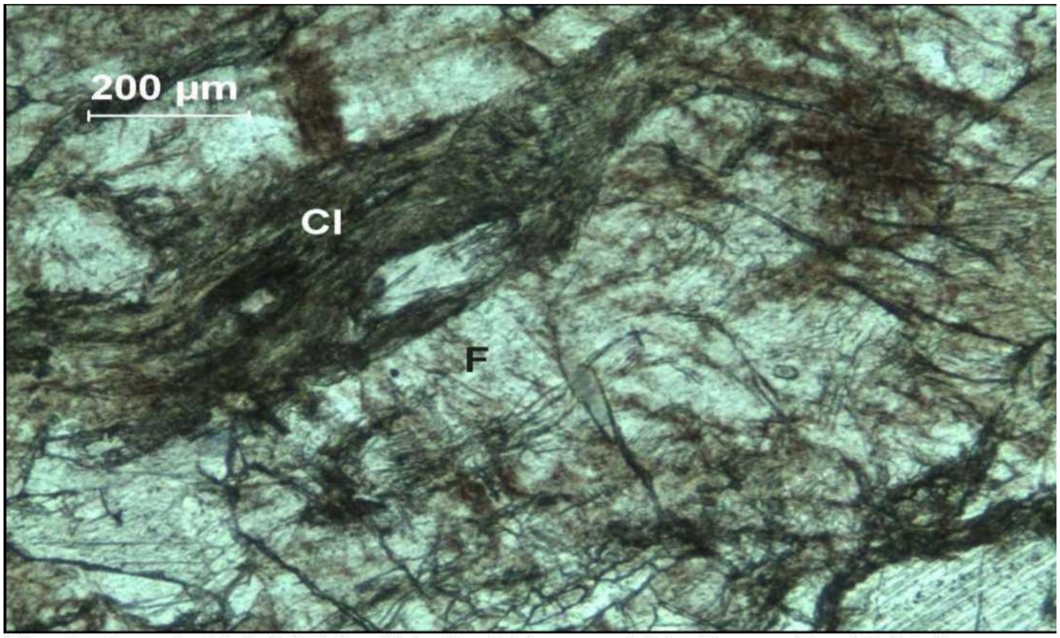



**Fig. 1** Sample SLOGCF-6. Chlorite-feldspar schist. Transmitted light, 5x.

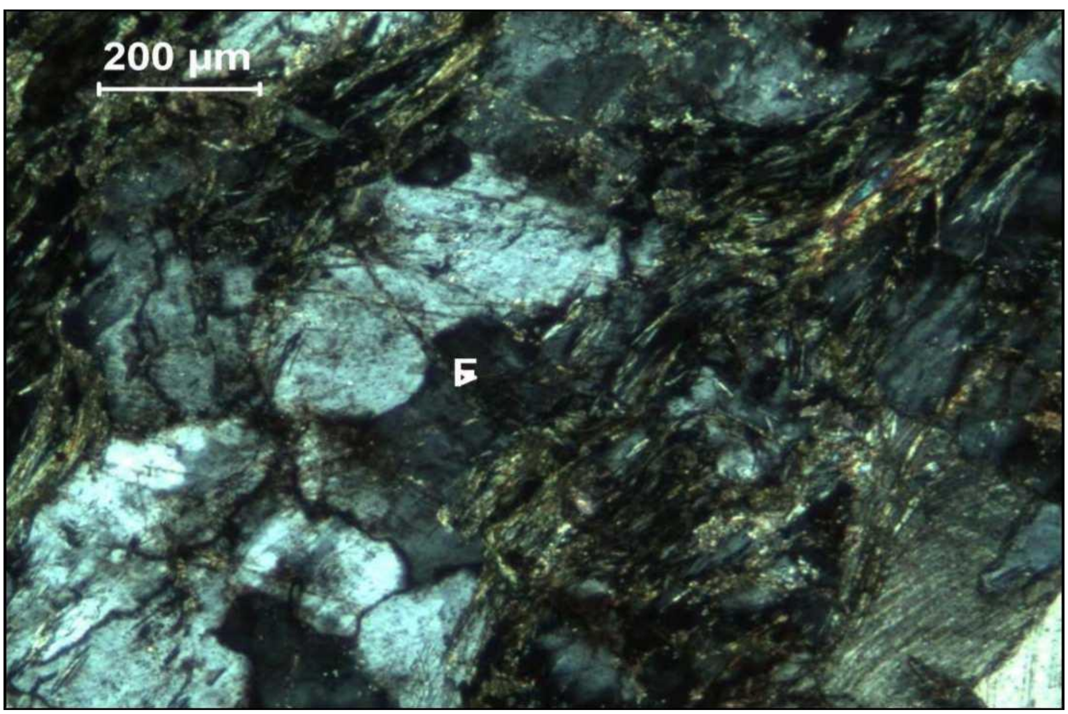



**Fig. 2** Sample SLOGCF-6. Another view showing argillized feldspars and chlorite. Crossed polars, 5x.

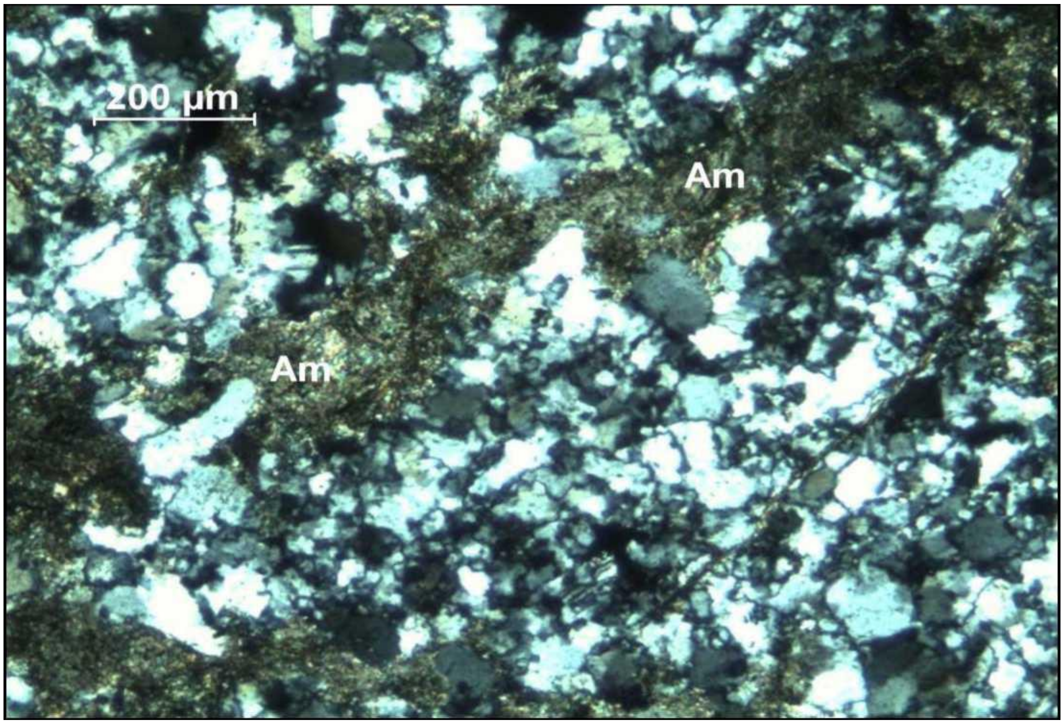



**Fig. 3** Sample SLCLF-4. Quartz-amphibole schist. Transmitted light, crossed polars, 5x.

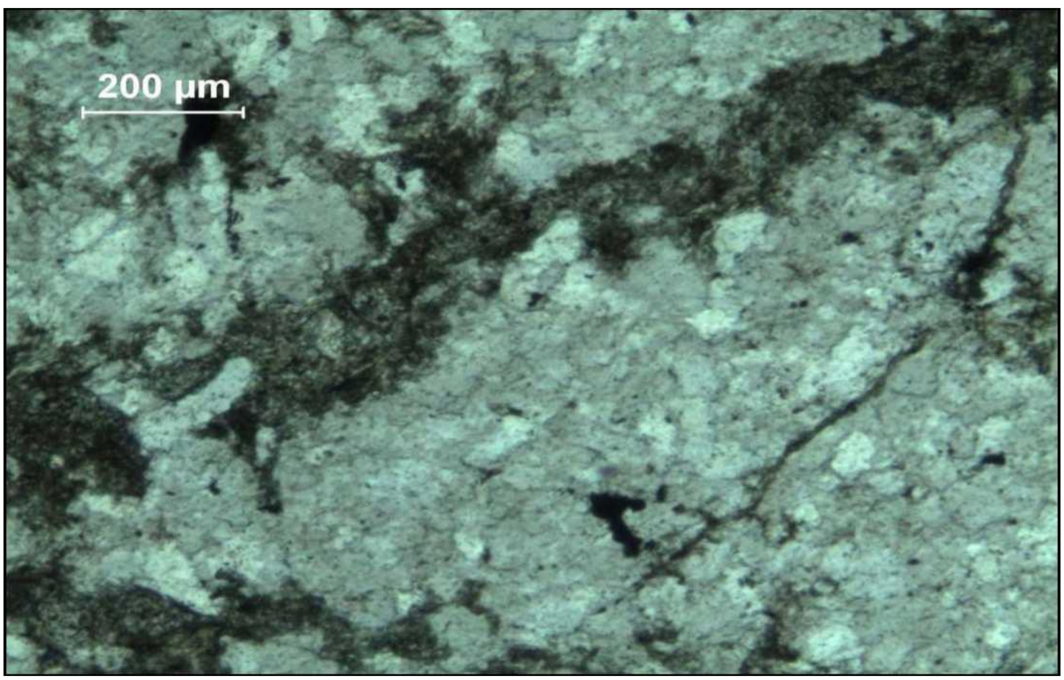



**Fig. 4** Same field of view, transmitted light.

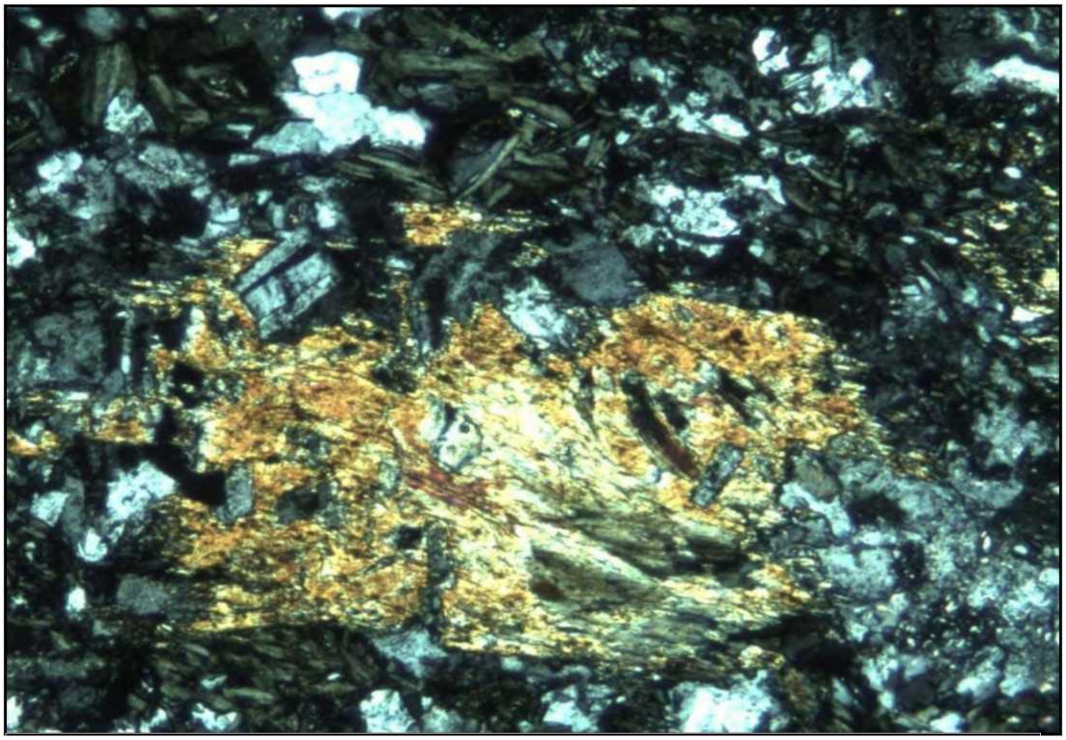


**Fig. 5** Sample GL-668-1. Section containing amphibole (yellowish) in matrix of plagioclase and chlorite (greenish brown). Transmitted light, crossed polars, 5x.

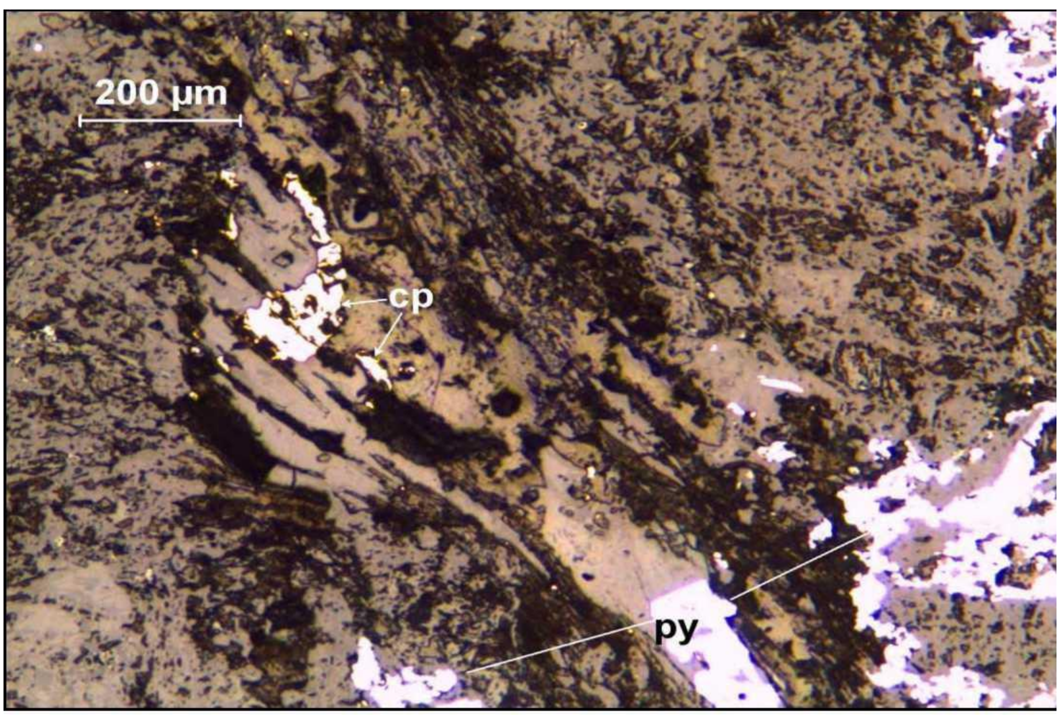



**Fig. 6** Sample SL-668-1. Disseminated pyrite and lesser chalcopyrite (not "true" color). Reflected light, 5x.

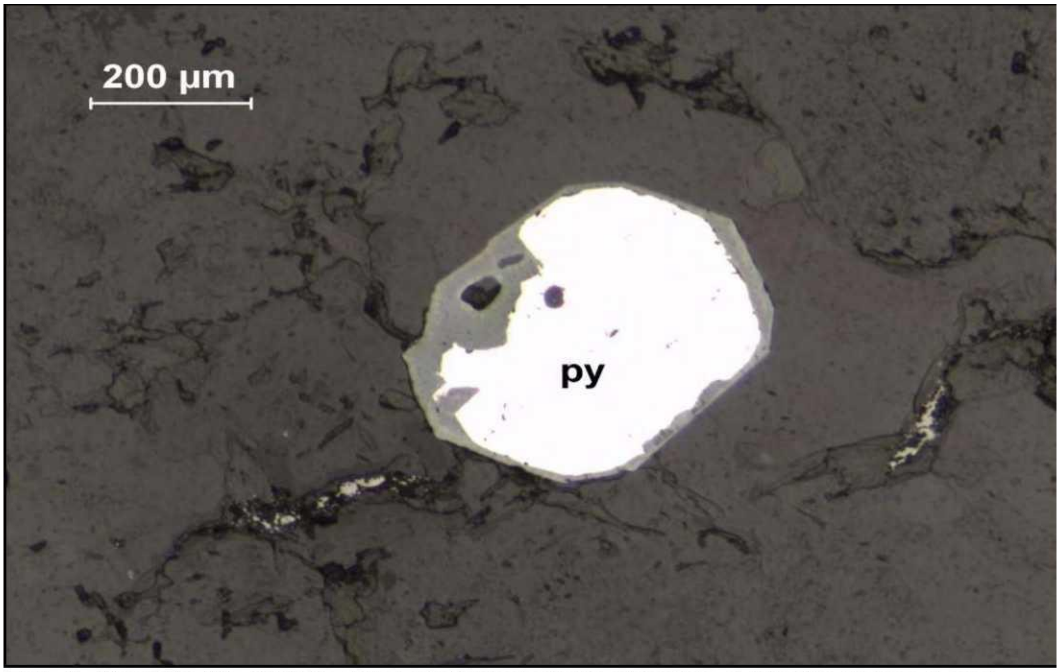


**Fig. 7** Sample SL-668-2. Disseminated grain of pyrite, typically rimmed and replaced by goethite. Reflected light, 10x.

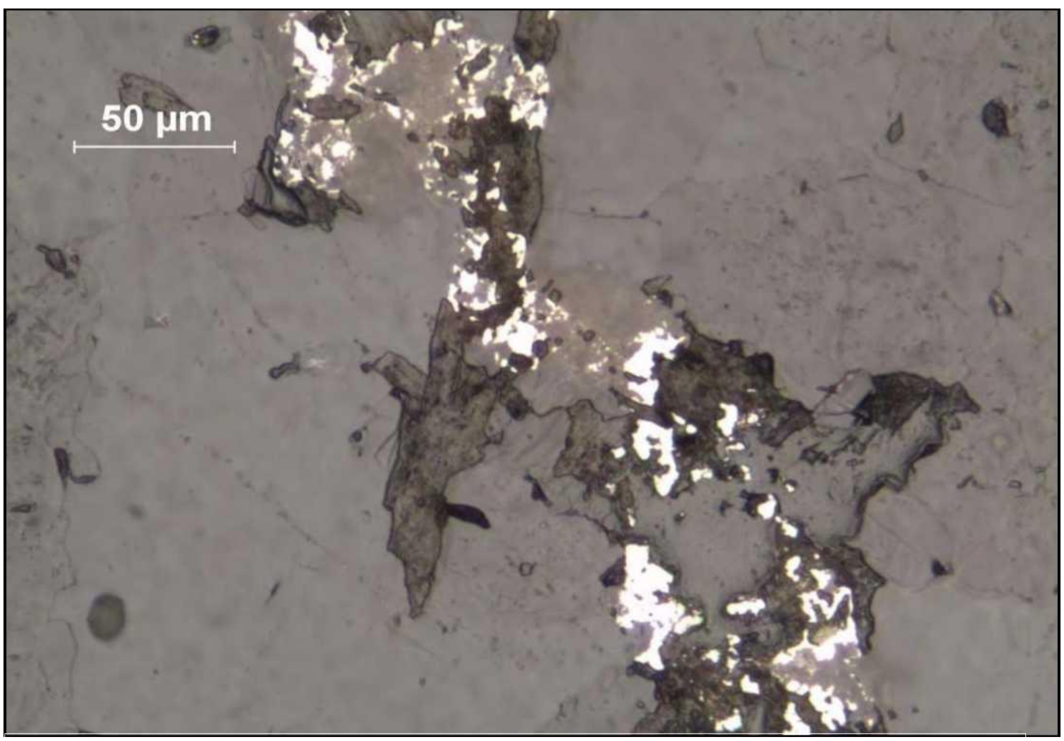


**Fig. 8** Sample SLF-8. Quartzite with disseminated pyrite, apparently replacing mafic grains. Reflected light, 5x.

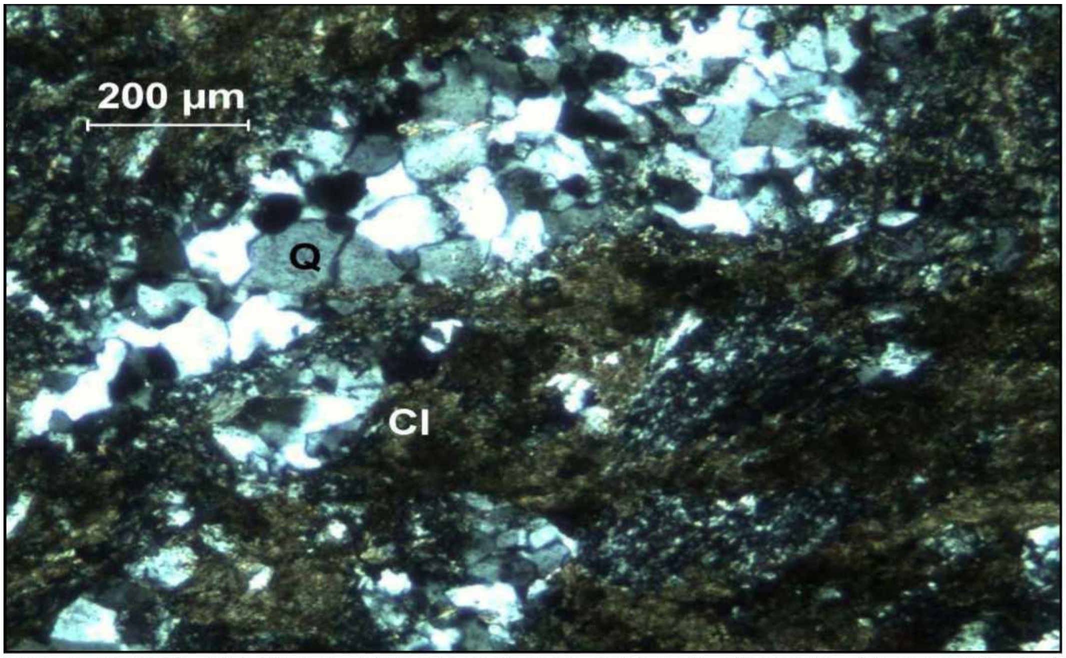



**Fig. 9** Sample GR-668-3. Chlorite-rich rock, with vein of quartz. Transmitted light crossed polars, 5x.

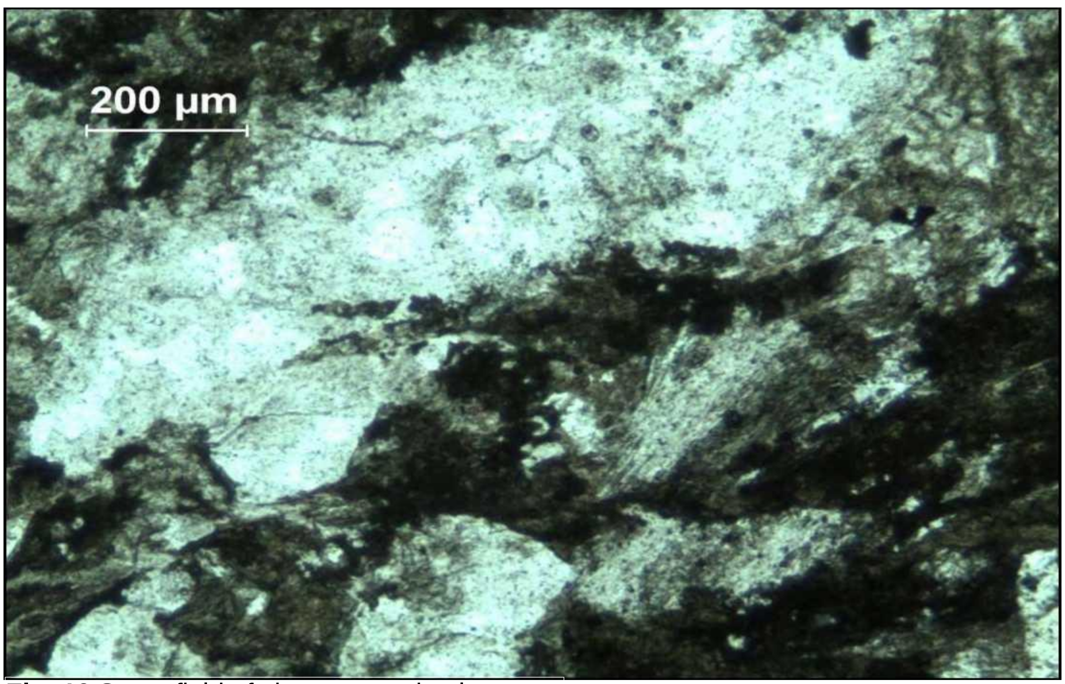



**Fig. 10** Same field of view, crossed polars.

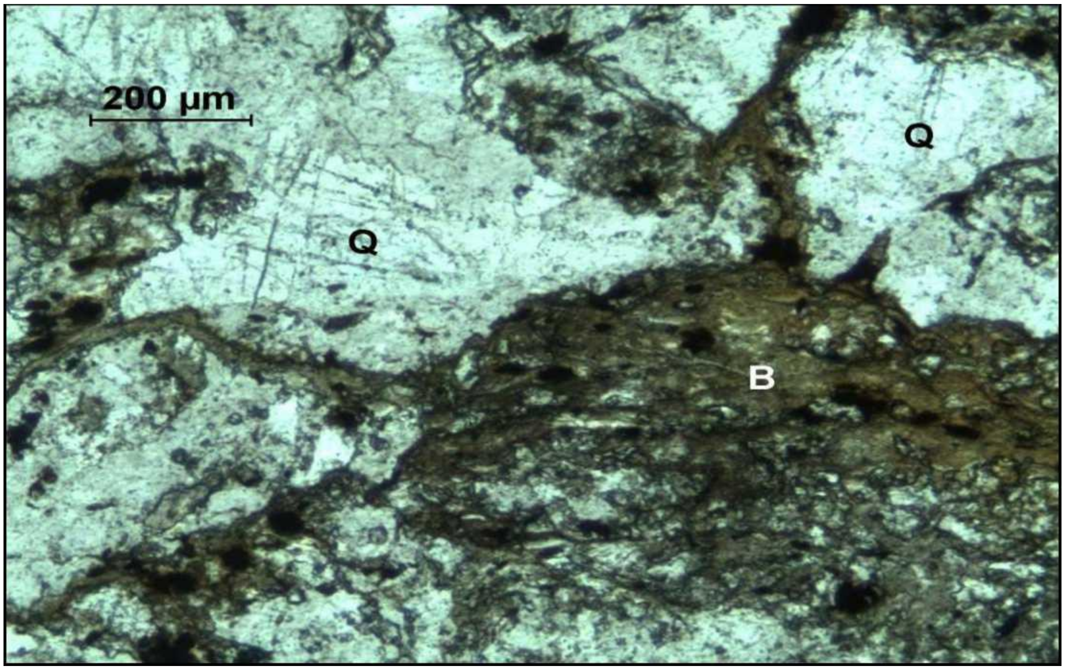


**Fig. 11** Sample GR-668-2. Quartz-biotite schist, with trace of amphibole. Transmitted light, 5x.

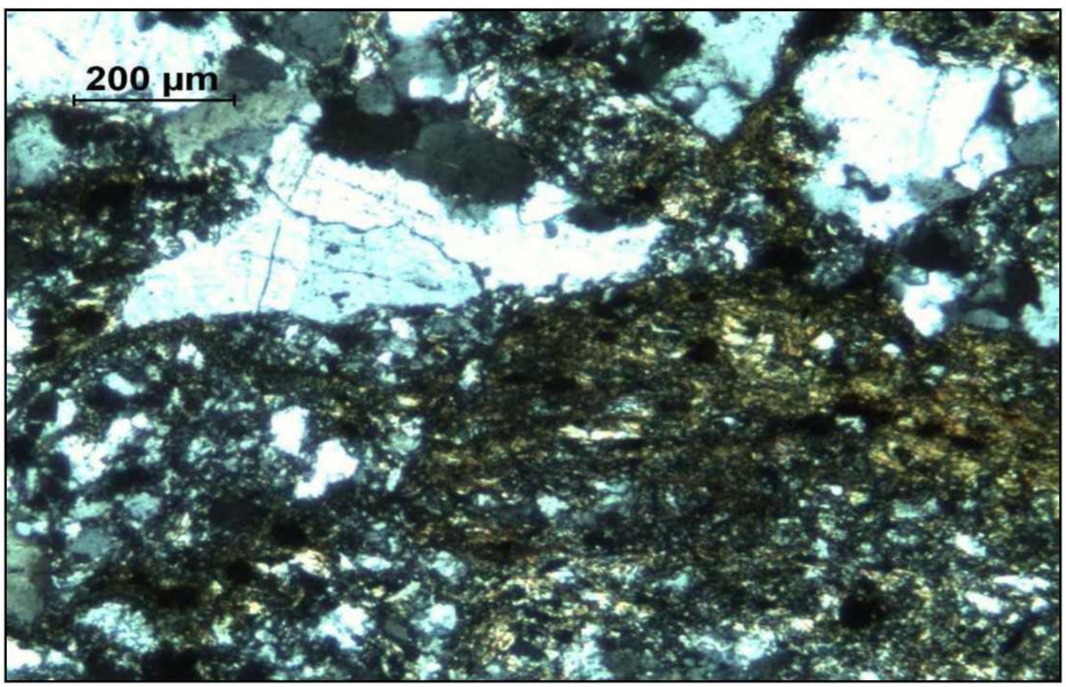


**Fig. 12** Same field of view, crossed polars, 5x.

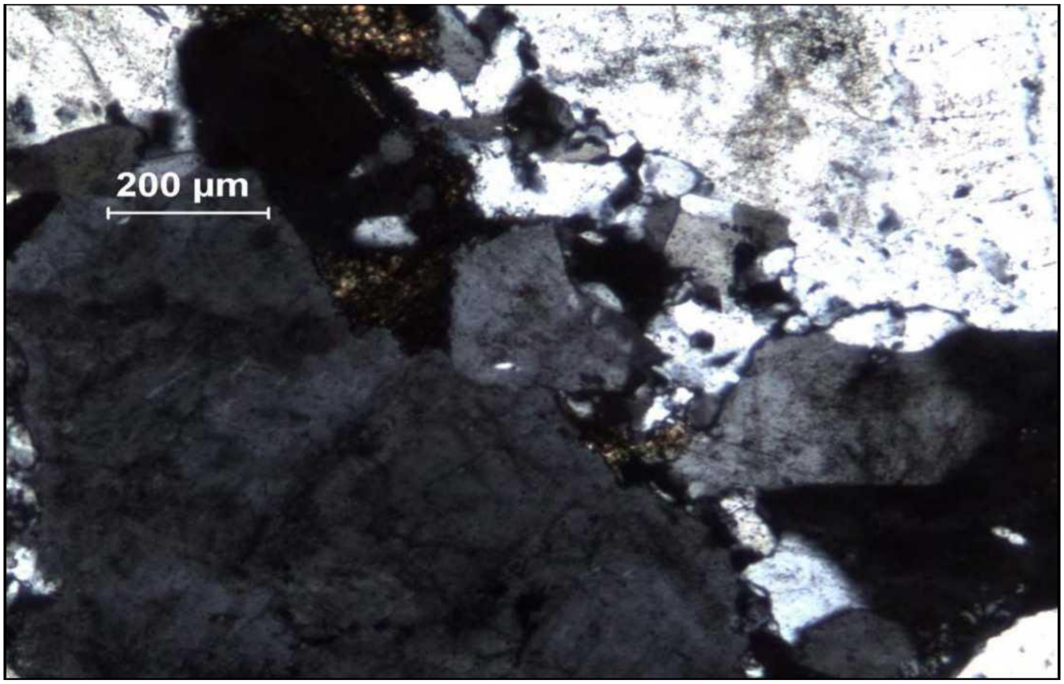



**Fig. 13** Sample GR-668-2. View of quartz and fine-grained biotite, crossed polars, 5x.

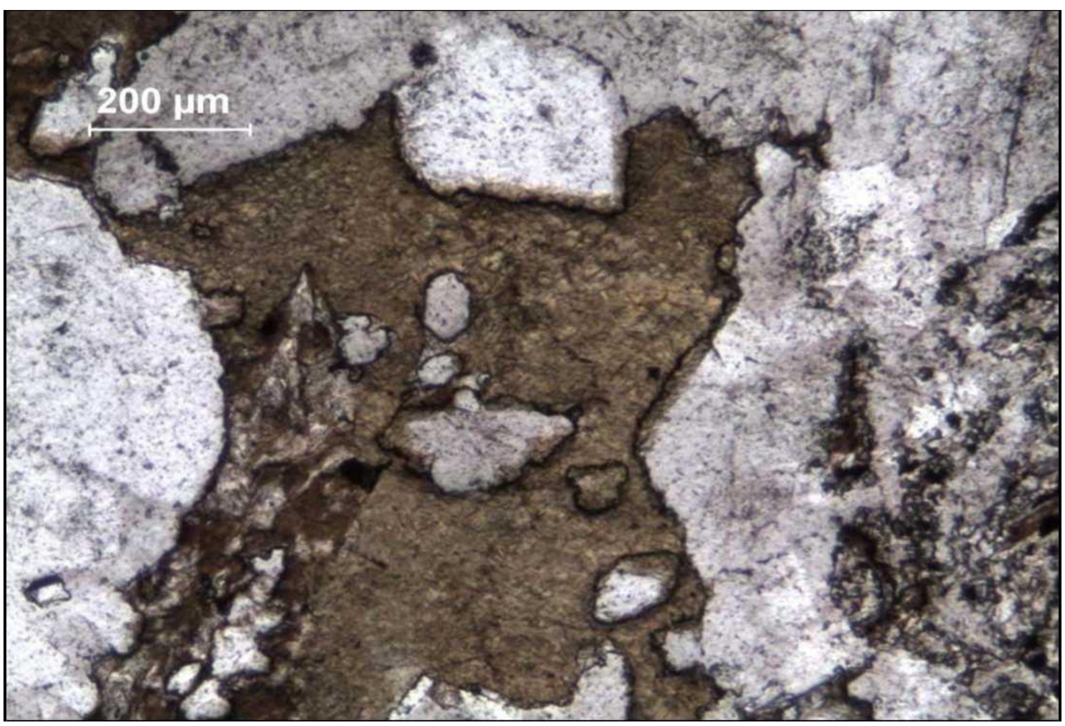



**Fig. 14** Sample GR-668-2. View of a patch of biotite (brown) and quartz. Biotite Is composed of a felted aggregate (recrystallized from clay?), transmitted light, 5x.

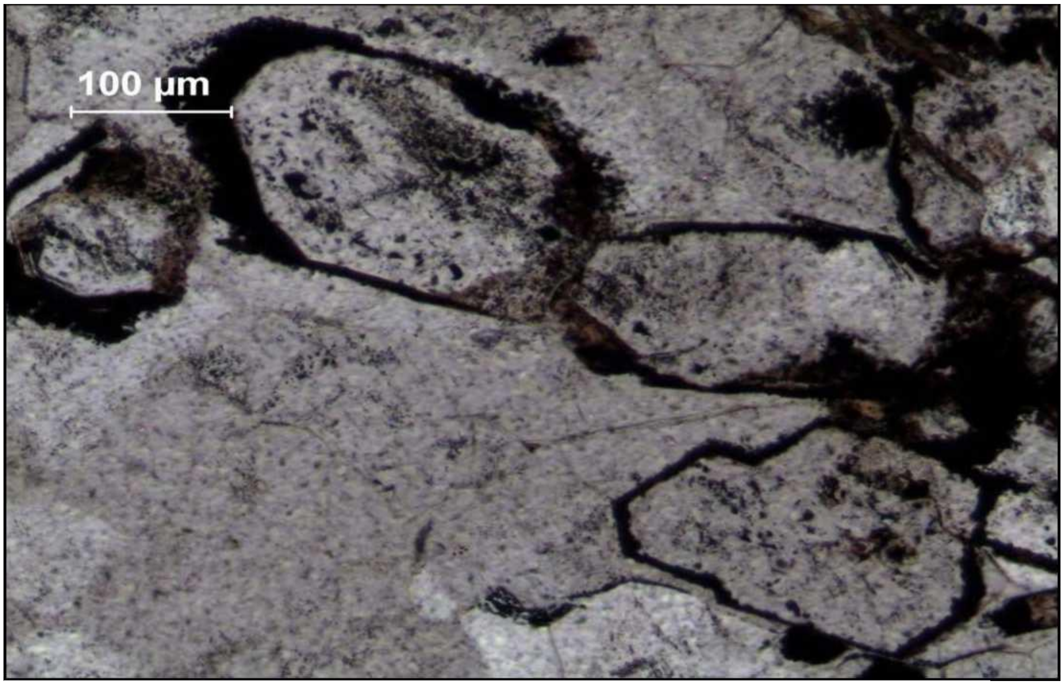



**Fig. 15** Sample GR-668-2. Unknown mineral (high-relief, outlined in black), transmitted light, 10x.

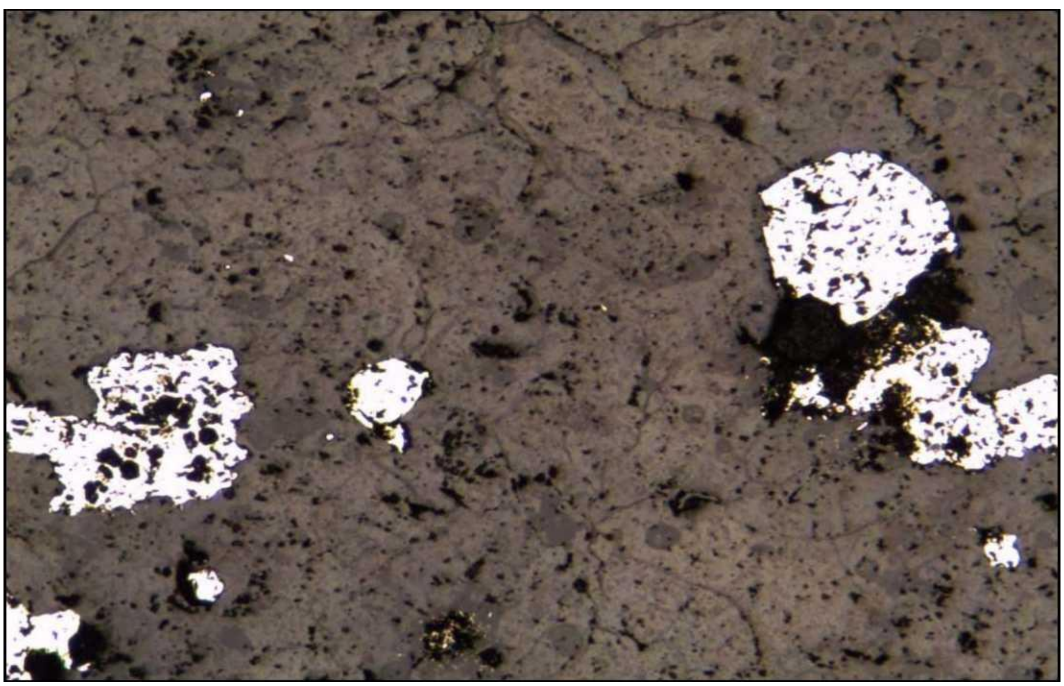


**Fig. 16** Sample 12819. Quartz vein with pyrite. Reflected light, 5x.

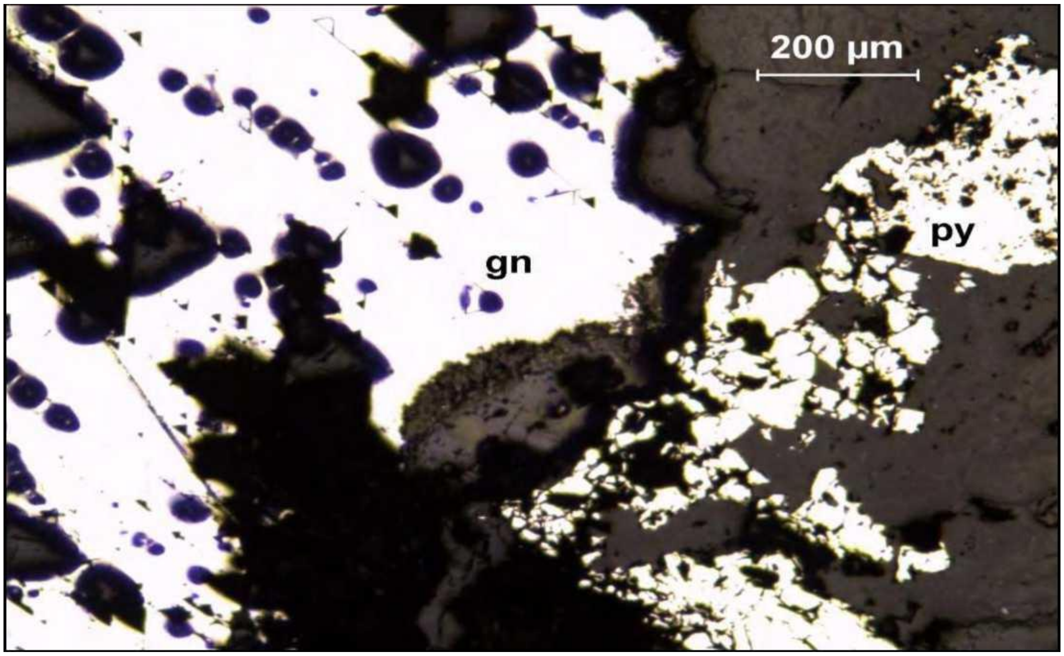



**Fig. 17** Same section, showing grains of galena and pyrite.

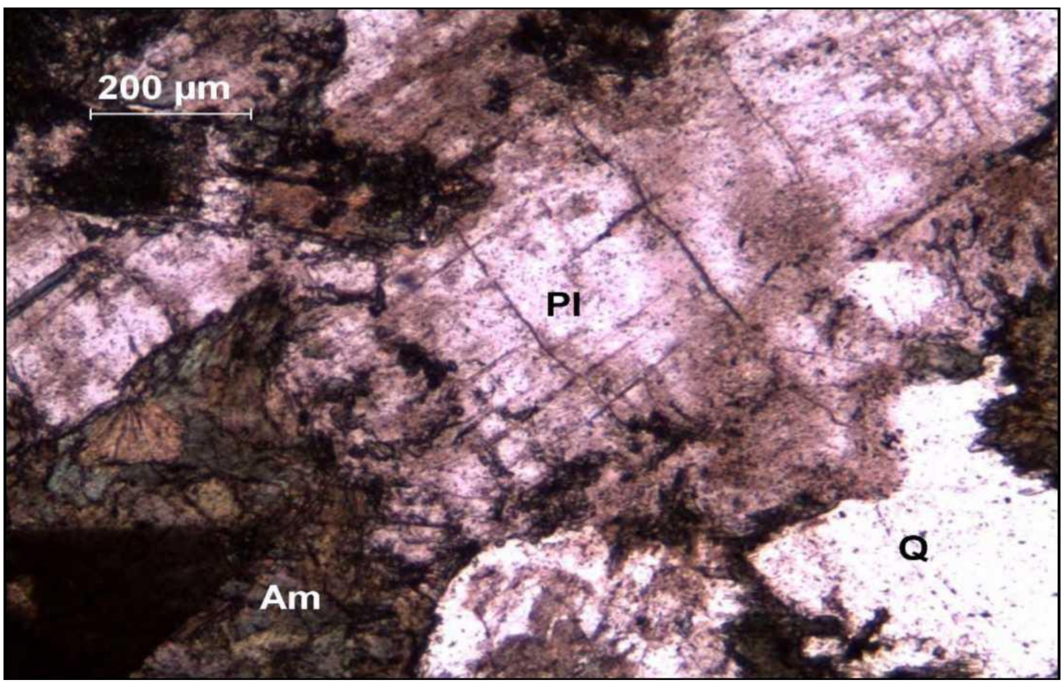



**Fig. 18** Sample 12825. Section showing intergrown plagioclase (Pl), amphibole (Am), and quartz (Q). Transmitted light, 5x.

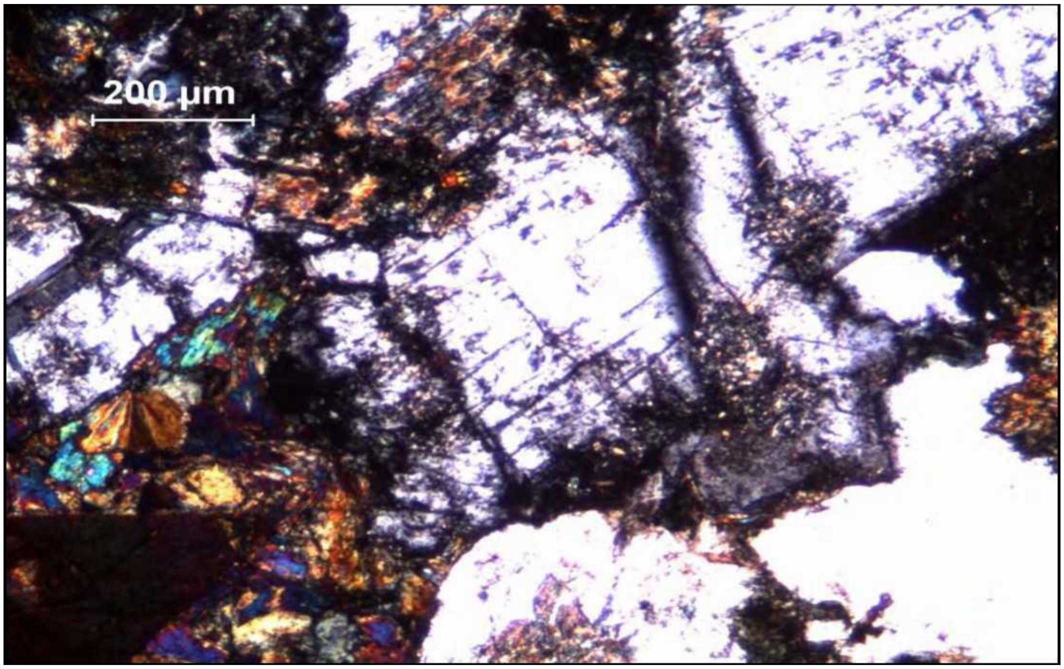



**Fig. 19** Same field of view, crossed polars.

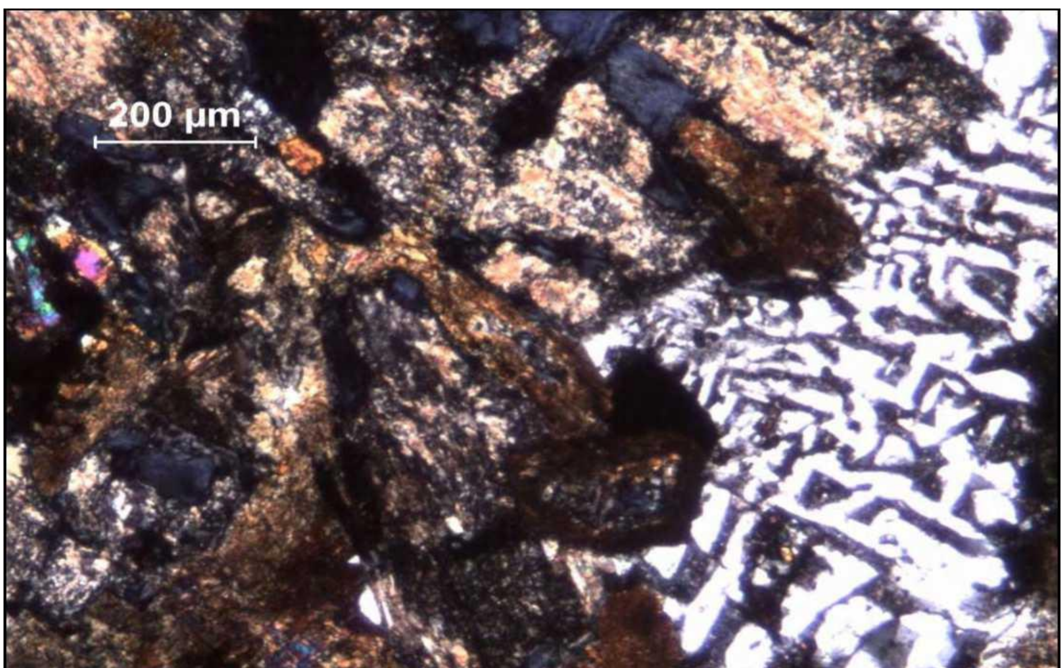



**Fig. 20** Sample 12827. Section of intergrown sericitized feldspar, pyroxene, and myrmekite (right field). Transmitted light, crossed polars, 5x.

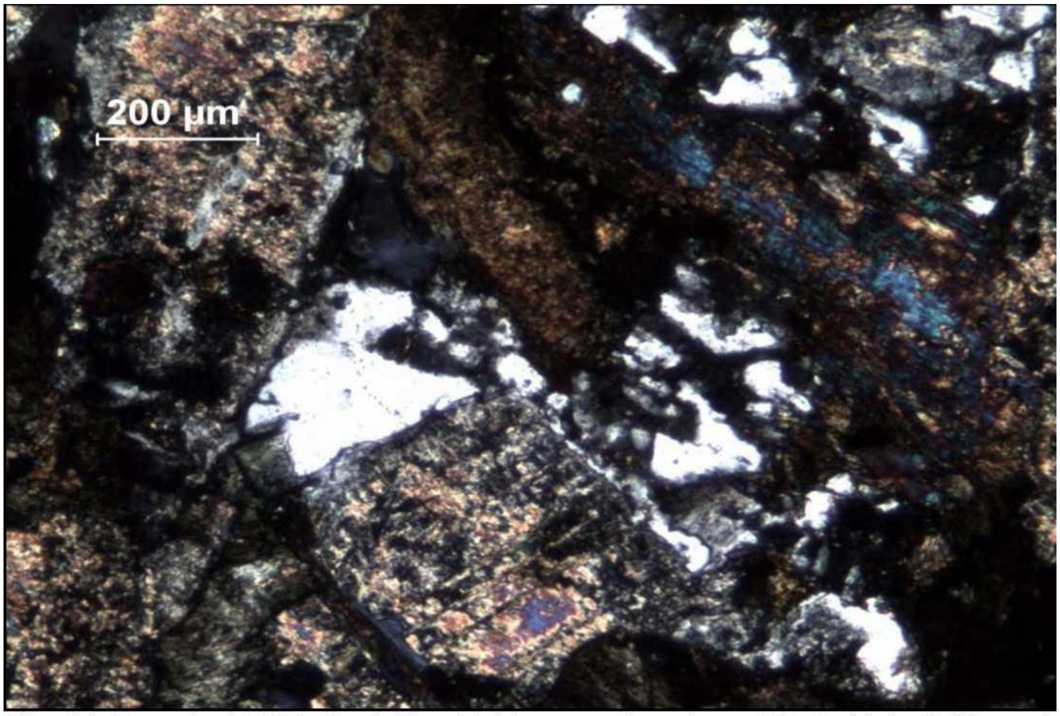


**Fig. 21** Sample 12827. Sericitized feldspars, altered amphibole (right field), and myrmekite (black and white intergrowth), crossed polars, 5x.

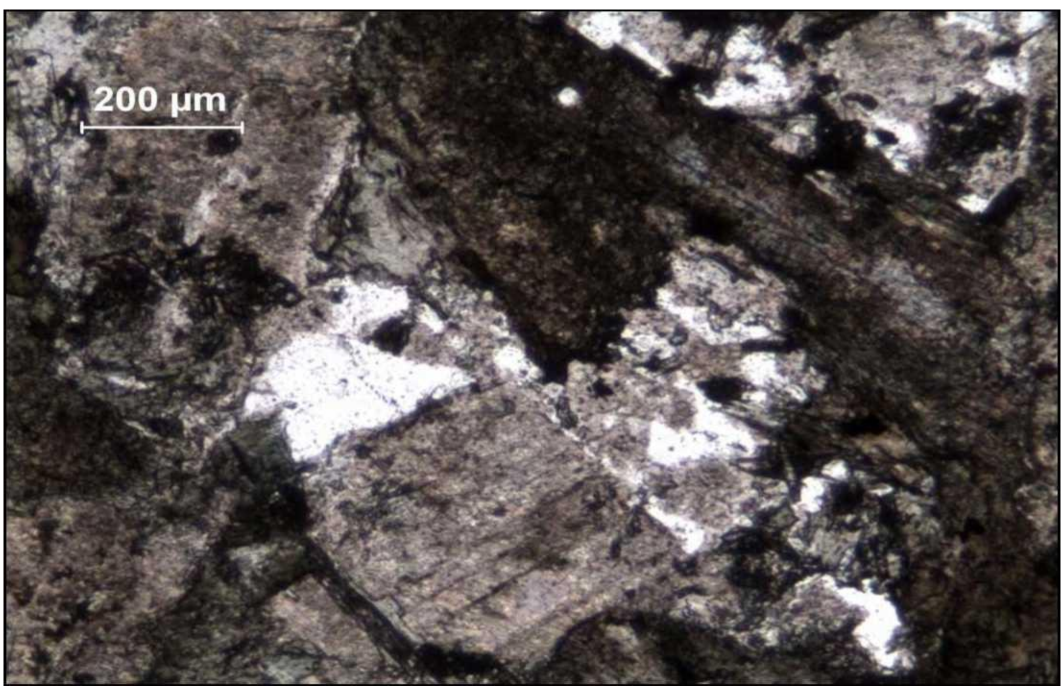


**Fig. 22** Sample 12827. Same field of view, transmitted light.

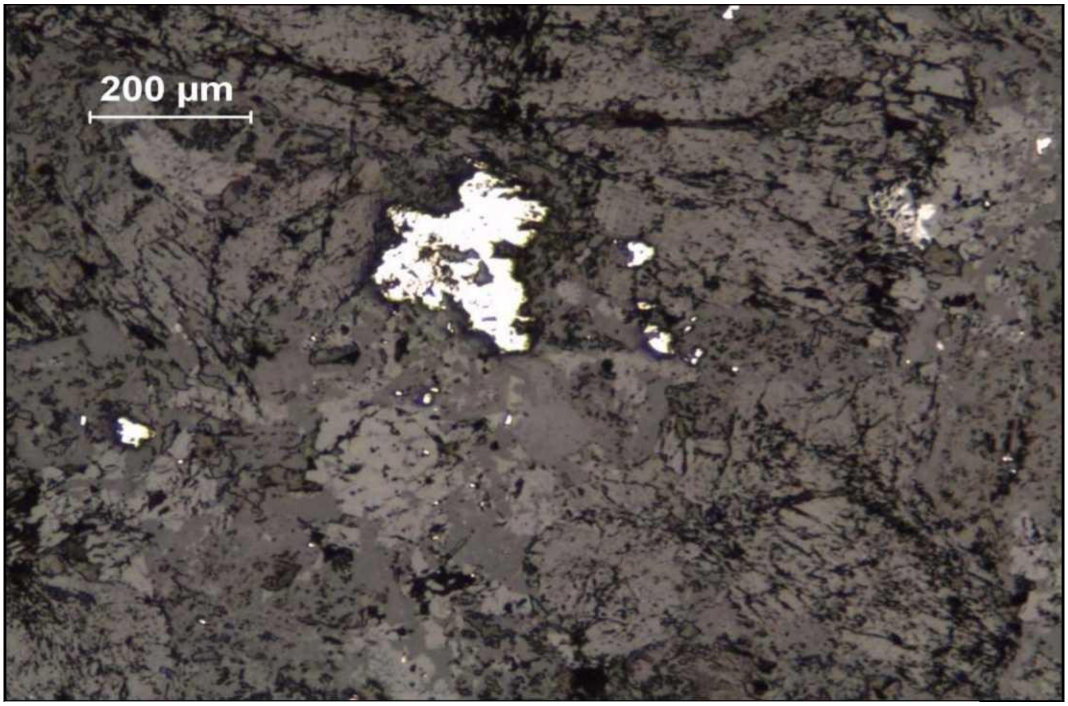



**Fig. 23** Sample 12827. Section with disseminated pyrite and trace of chal-copyrite (not shown). Reflected plane light, 5x.

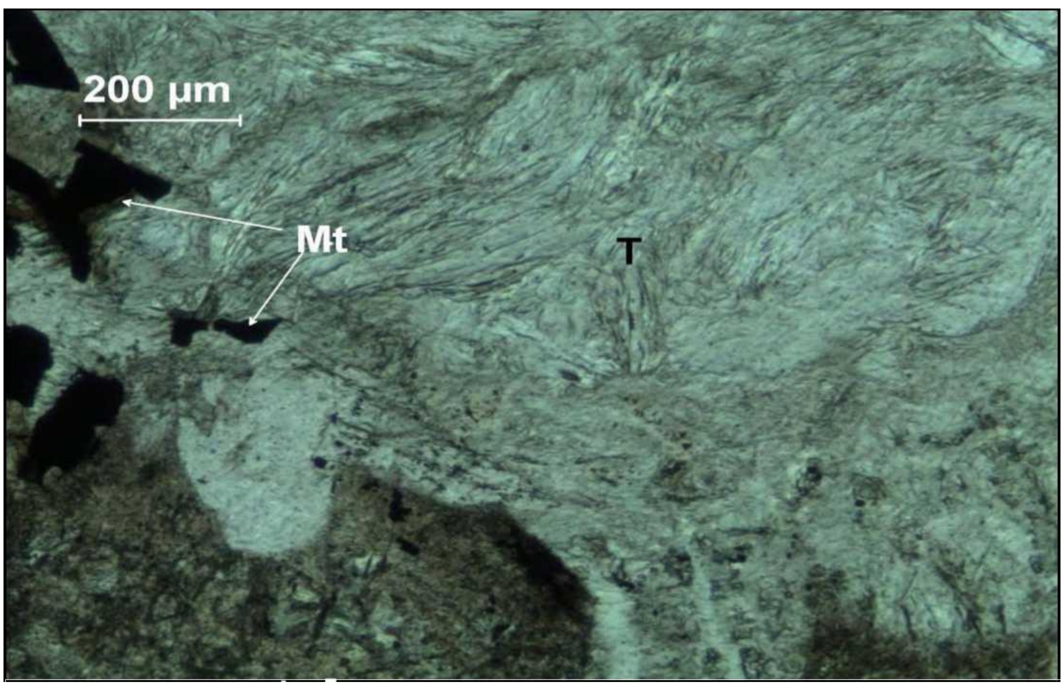



**Fig. 24** Sample 12836. Intergrown amphibole (tremolite, T), altered feldspar, and magnetite. Transmitted light, 5x.

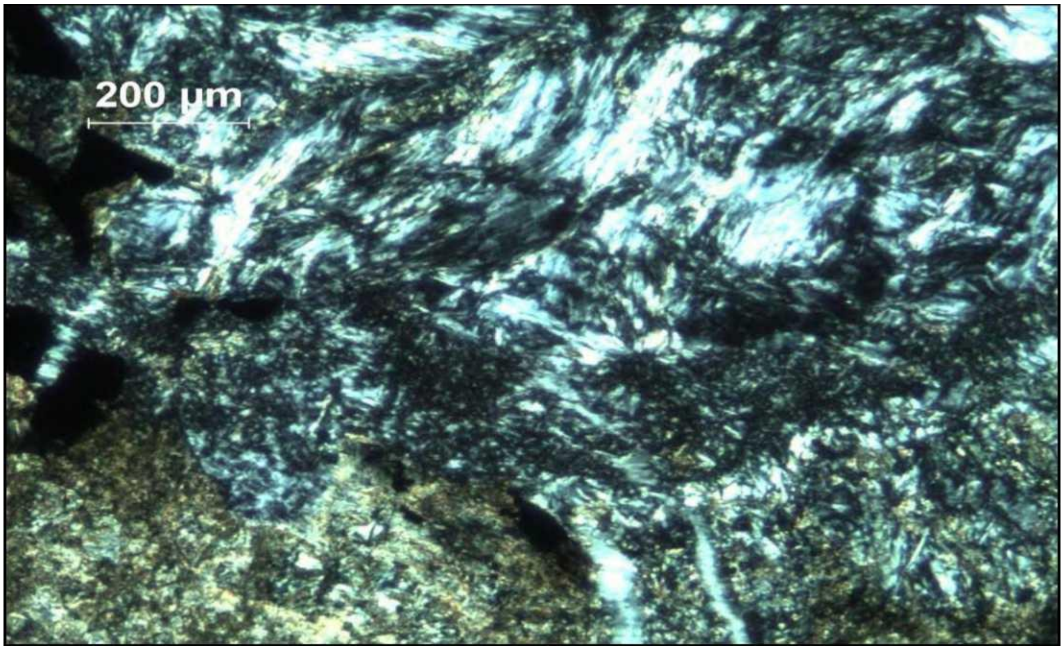



**Fig. 25** Same view, crossed polars.

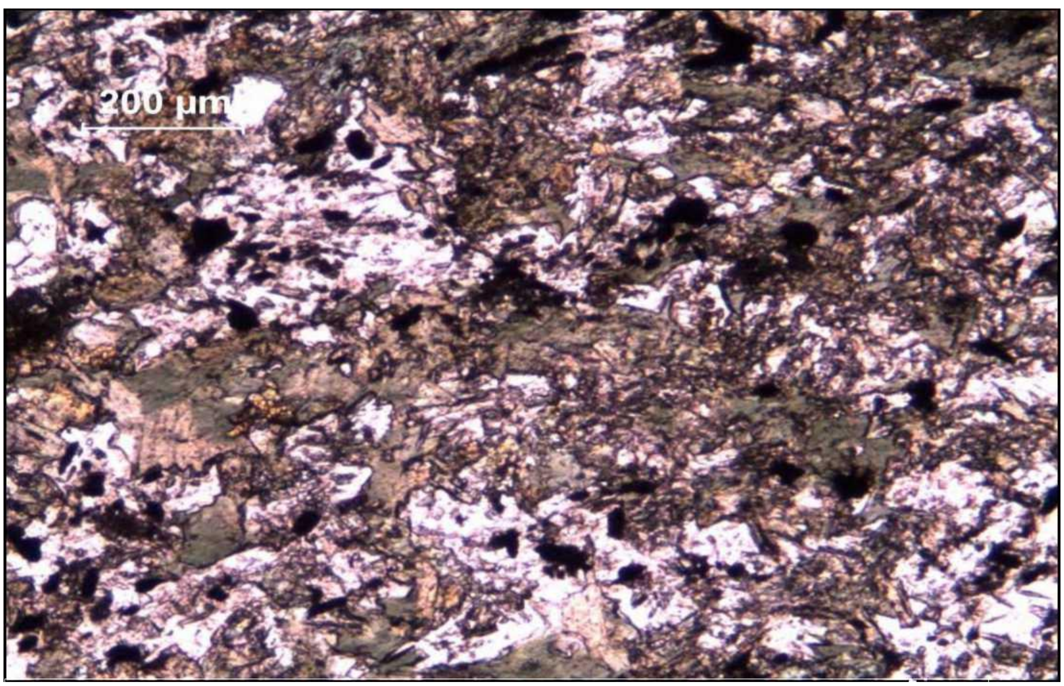



**Fig. 26** Sample 12836. Intergrown actinolite (green), quartz, feldspar?, and opaques (probably pyrite). Transmitted light, 5x.

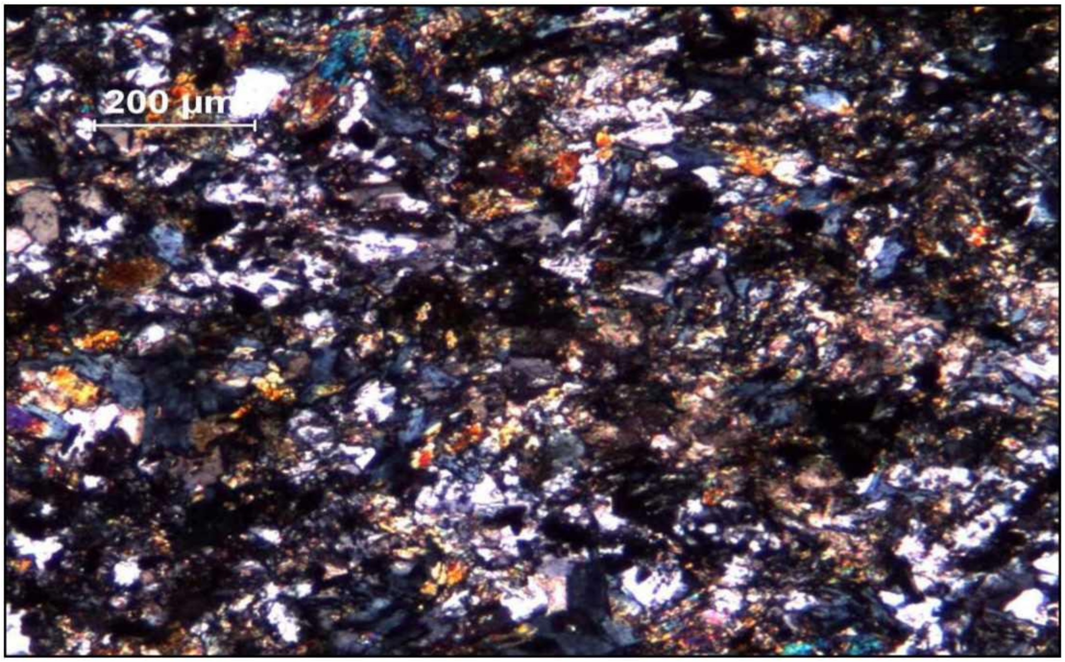



**Fig. 27** Same field of view, crossed polars.

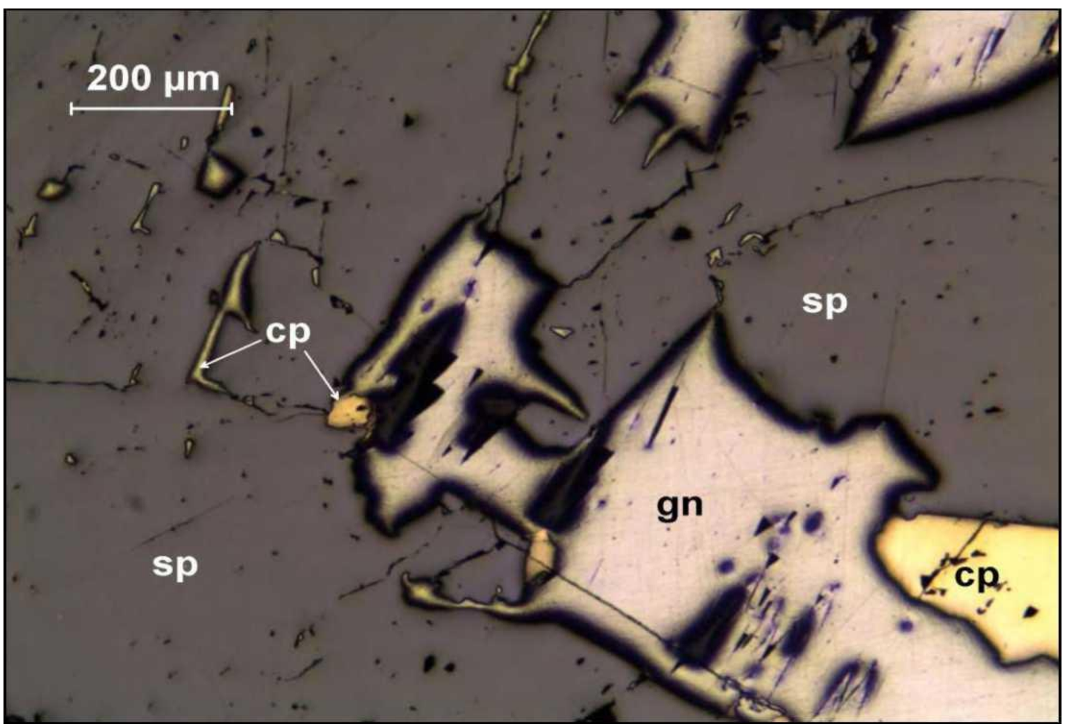



**Fig. 28** Sample 12837. Vein of sphalerite (sp), galena (gn), and chalcopyrite (cp). Reflected light, 5x.

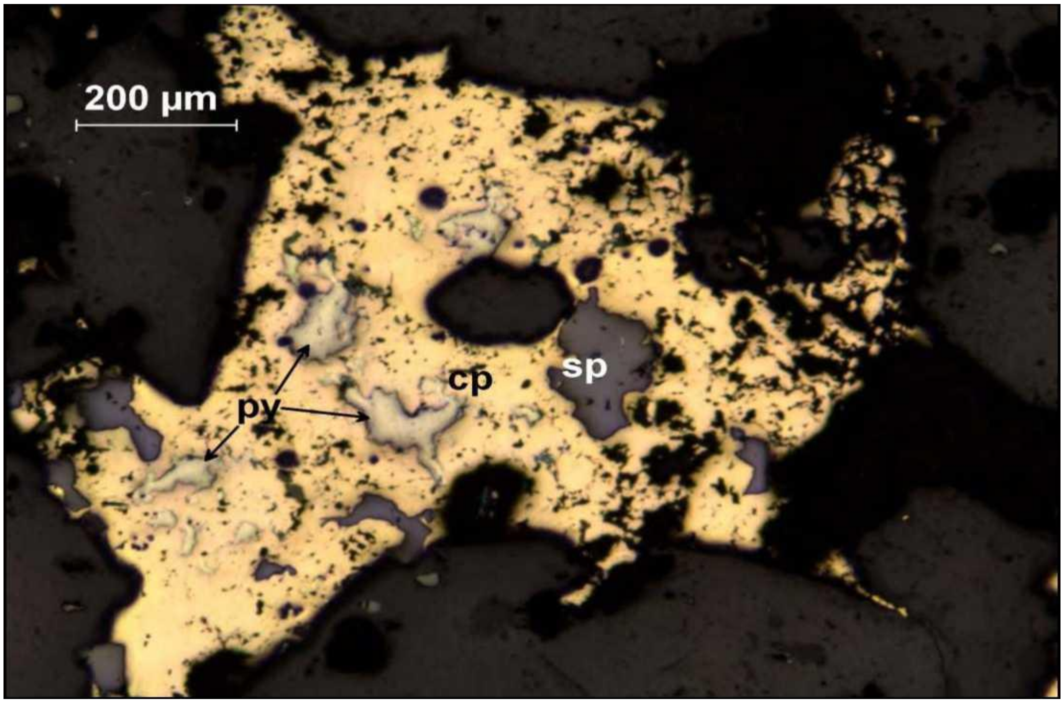



**Fig. 29** Same section, featuring chalcopyrite with inclusions of sphalerite and pyrite.

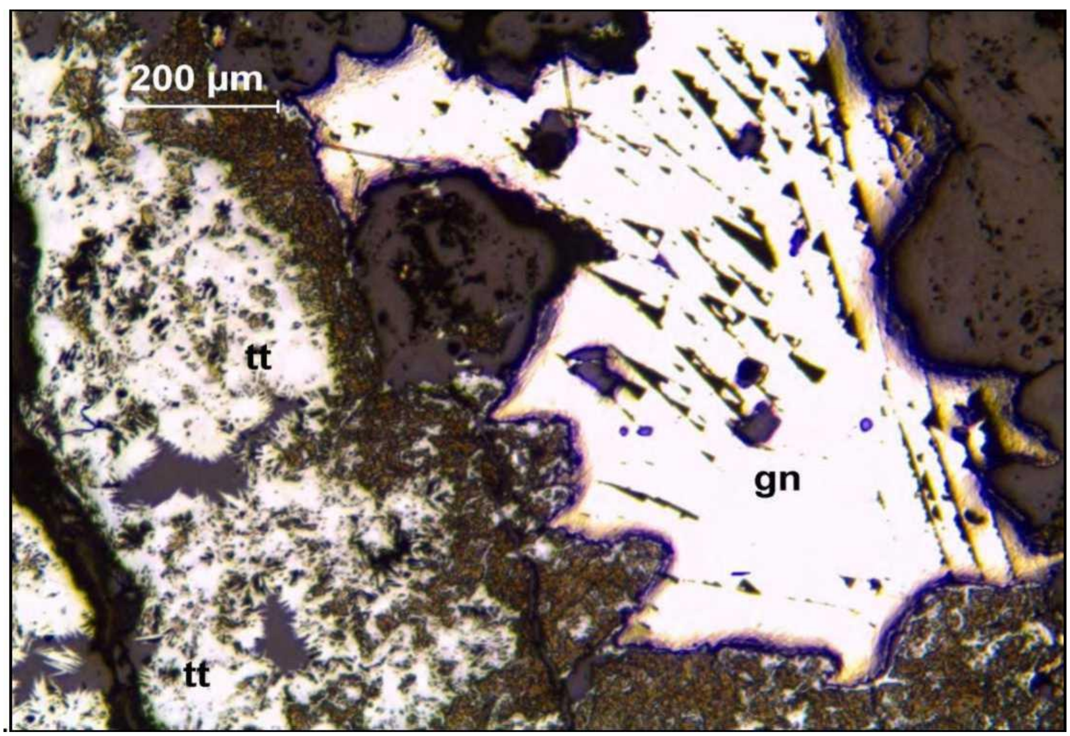



**Fig. 30** Sample 51981. Section of galena intergrown with tetrahedite? (tt). Reflected light, 5x.

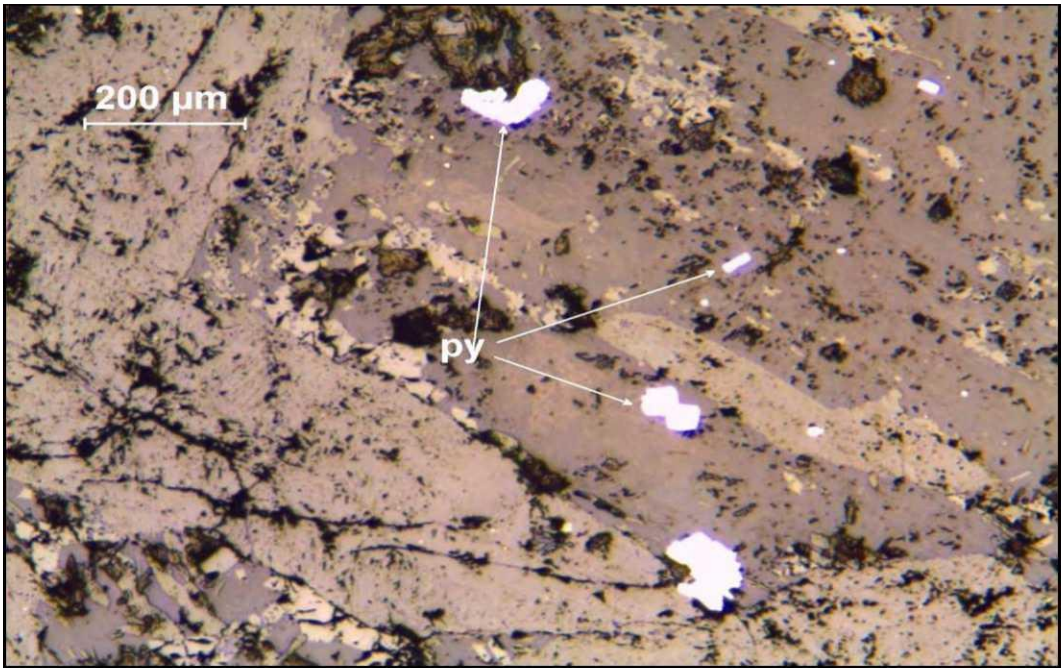



**Fig. 31** Sample 52081, with disseminated pyrite. Reflected light, 5x.

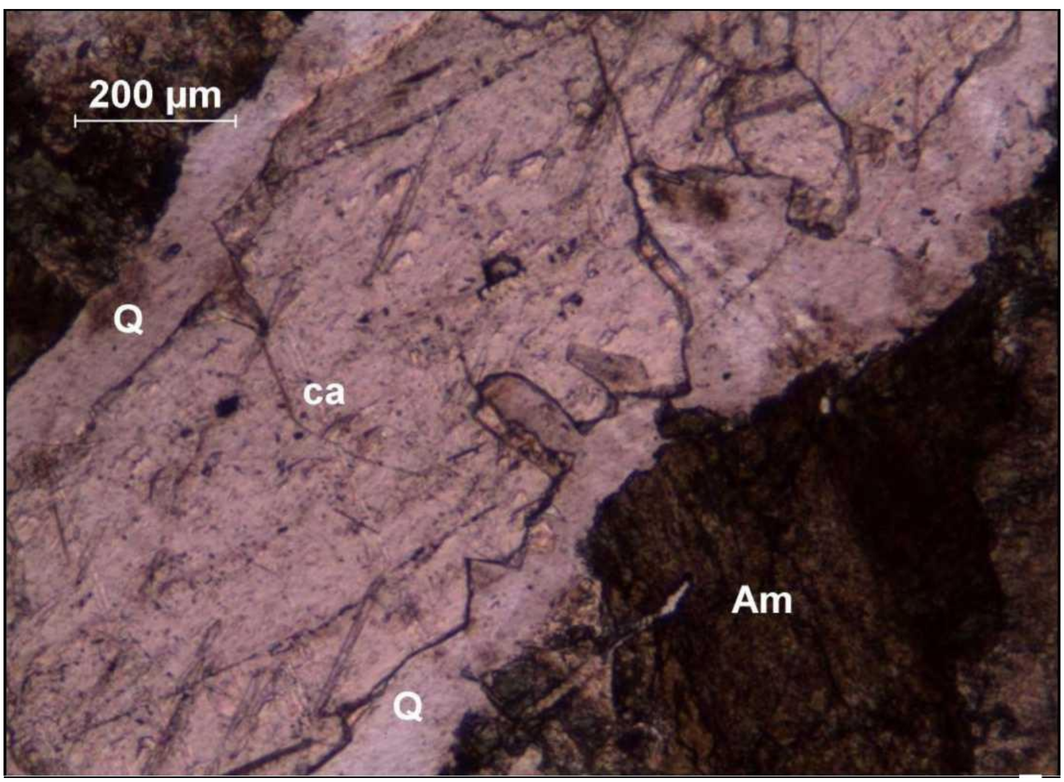



**Fig. 32** Same section, showing carbonate (ca)-quartz vein cutting amphibole (Am)-feldspar rock. Transmitted light, 5x.

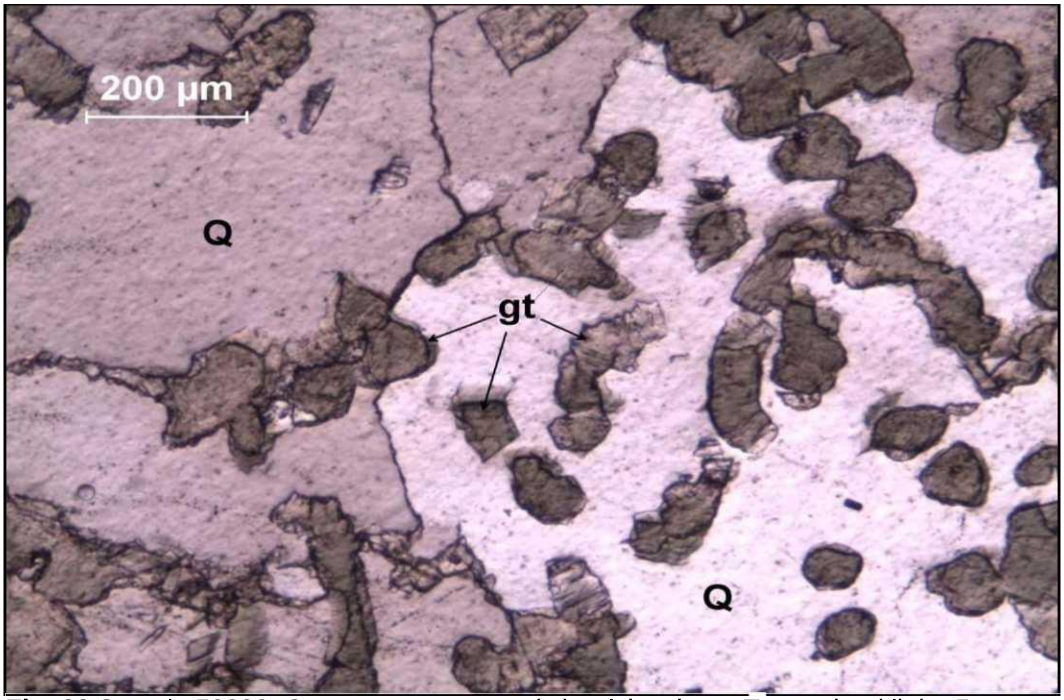


**Fig. 33** Sample 52082. Quartz-green garnet (gt)-calcite skarn. Transmitted light, 5x.

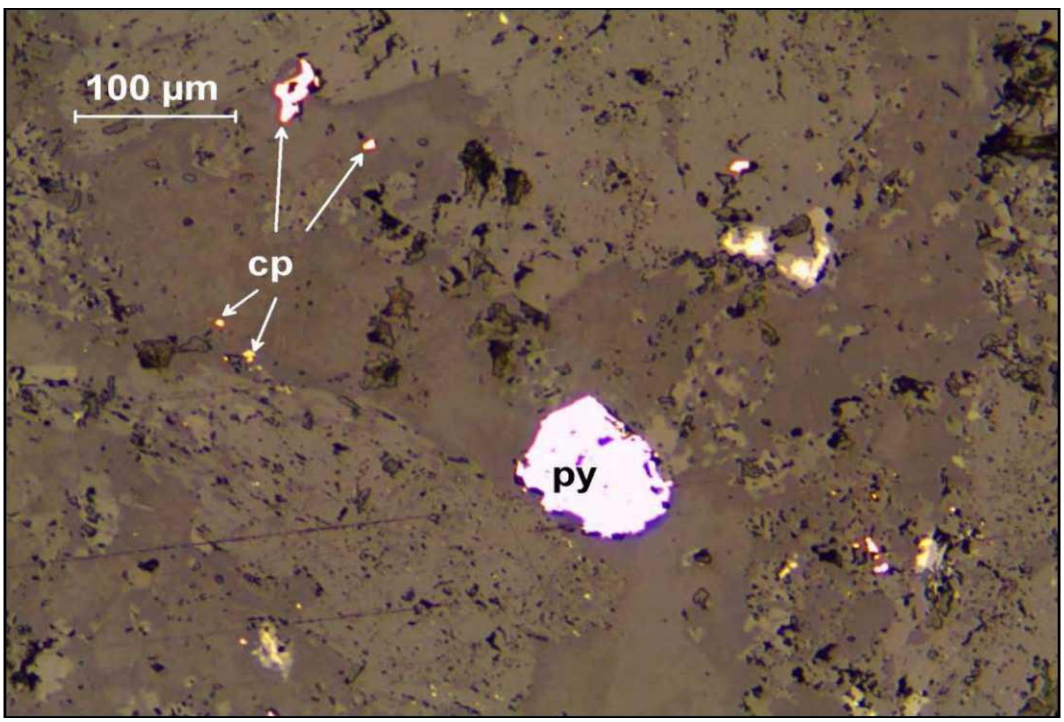


**Fig. 34** Sample OL-5. View of disseminated and veinlet pyrite and chalcopyrite. Reflected light, 10x.

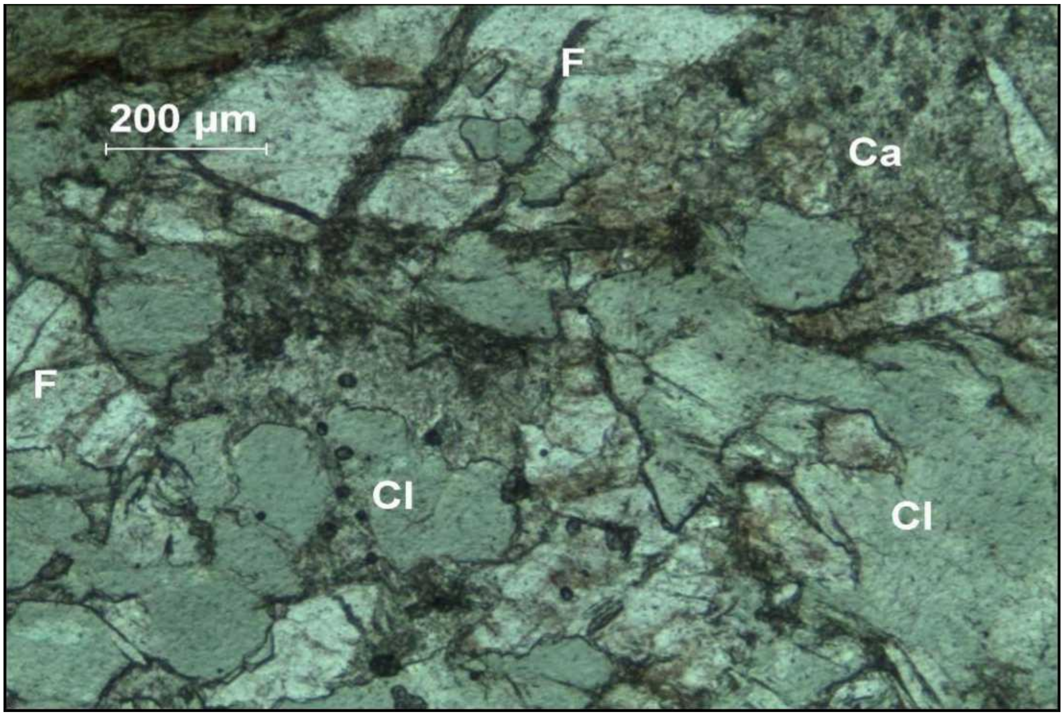



**Fig. 35** Intergrown feldspar (F), chlorite (Cl), and carbonate rock. Sample OC-8, transmitted light, 5x.

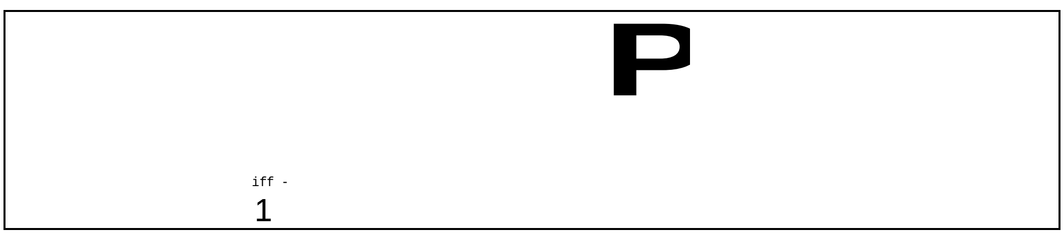


**Fig. 36** Same section, showing sericitized feldspars, chlorite, and magnetite (Mt). Transmitted light, crossed polars, 5x.

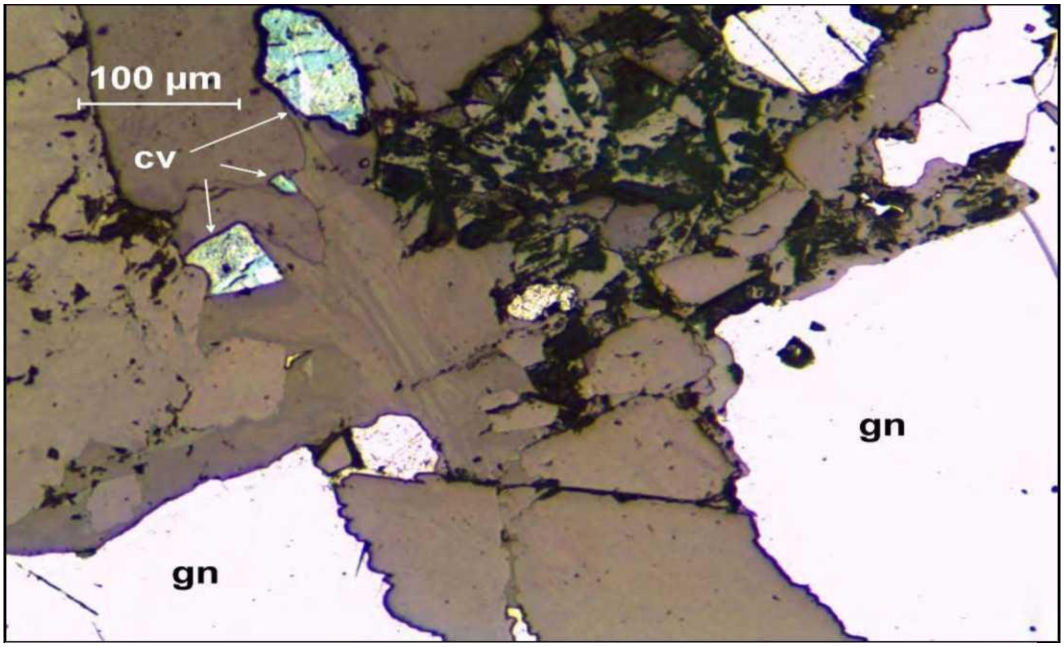



**Fig. 37** Sample from Glory Hole. Thin vein containing gangue, galena (gn) and minor covellite (cv). Reflected light, 5x.

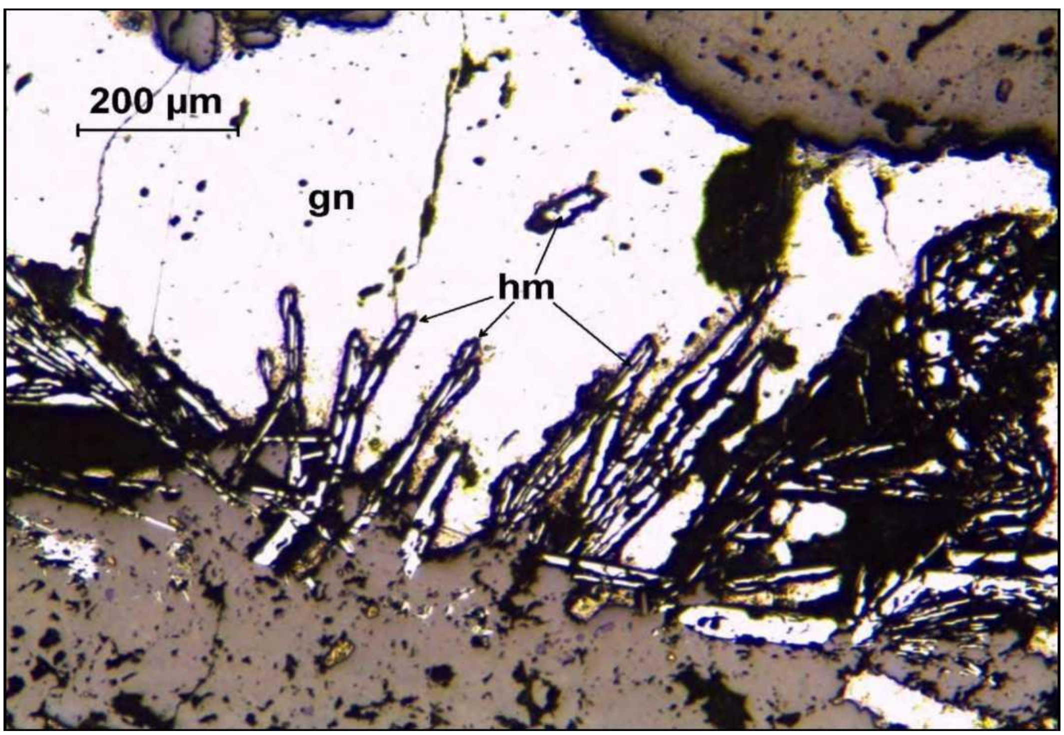



**Fig. 38** Veinlet of galena with secondary hematite (hm) blades. Same sample from Glory Hole, reflected light, 5x.

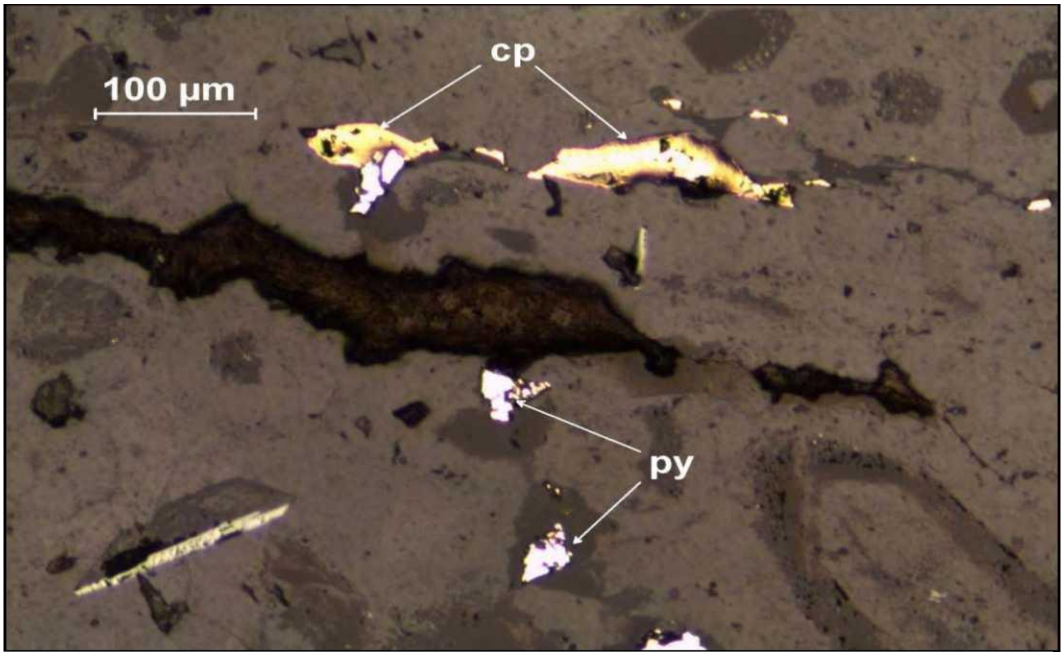


**Fig. 39** Same section, showing disseminated and veinlet pyrite and chalcopyrite. Reflected light, 10x.

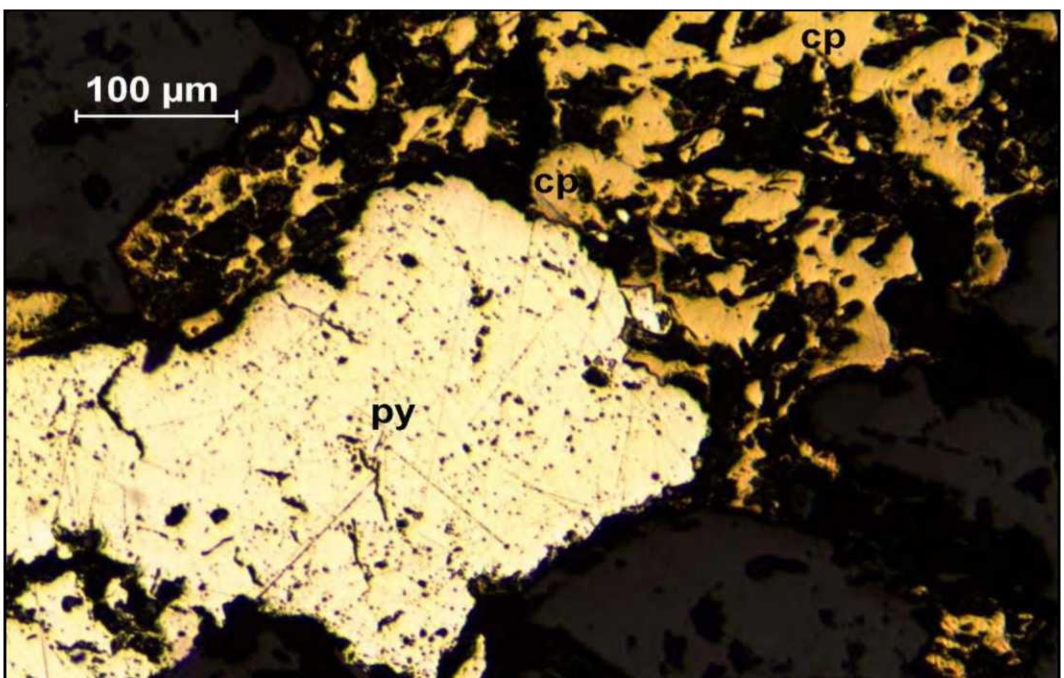


**Fig. 40** Sample from property shaft. Pyrite, chalcopyrite, and trace sphalerite in veinlet. Reflected light, 10x.

# APPENDIX C

**An Investigation into**

**QEMSCAN$^{TM}$ MINERALOGY OF A COMPOSITE (12844) SILVER BEARING SAMPLE**

prepared for

**GILEAD MINERALS CORPORATION**

CALR 11007-001
August 25, 2008

NOTE:
This report refers to the samples as received.

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# *Executive Summary*

One sample, referred to as “12844” was submitted by **Gilead Mineral Corporation** for mineralogical investigation. The objectives of the investigation were to determine the overall mineralogy, the type of Ag minerals and their liberation and association.

The sample was wet screened and four size fractions were generated based on the wt% distribution of the material, including +106 um, -106/+53 um, -53/+25 um and -25 um. The mineralogical analysis was carried out using the QEMSCAN$^{TM}$ by applying the PMA and TMS methods of analysis.

## Modal Mineralogy

The sample consist mainly of galena (91.5%) followed by quartz (6.8%). Other silicate minerals include trace amounts of mafic minerals (biotite, amphibole and chlorite), sericite/muscovite, K-feldspar, plagioclase. Other sulphides include trace amounts of Ag-minerals, sphalerite, chalcopyrite, pyrite, other Cu-Minerals, molybdenite and other-sulphides (mainly enargite). Trace amounts of Fe-Mn-oxides are also present.

The galena content increases from the coarse to the fine fraction by ca. 20% (13.2% to 33.9%). Most of quartz occurs in the coarse fraction (4.5%) and significantly less in the finer fractions (0.9%, 1.1% to 0.4%). Ag minerals, although in trace amounts, occur mainly in the -25/+3 um fraction. Ag minerals include stephanite and freibergite.

The grain size of galena ranges from, the coarse to the fine fraction, 90 um, 64 um, 29 um to 6 um; quartz ranges from 96 um, 50 um, 23 um to 8 um. The grain size of Ag minerals ranges, in the same order, from 15 um, 12 um, 9 um to 6 um.

## Liberation and Association of Ag-minerals

The overall liberation (Free and Liberated combined) of Ag minerals is 27.2%. Free and liberated Ag minerals increase by ca. 30% from the coarse to the fine fraction. The main association of Ag minerals is the form of middling particles with galena (77.4%) followed by complex (4.0%) and other Cu minerals (2.0%). Middlings with galena decrease by 22% from the coarse to the fine fraction.

## Liberation and Association of Galena

The overall liberation (Free and Liberated combined) of galena in the sample is 98.4% and is high through all fractions. The main association of galena is the form of ternary middling particles with sphalerite-pyrite (1.9%), other sulphides (1.5%), and complex particles (0.7%). Middling particles show minor variations across the size fractions.

## Ag Distribution

Electron microprobe analyses were carried to determine the chemical composition of the Ag minerals. The analyses yielded two distinct Ag phases, stephanite $Ag_5SbS_4$and freibergite $(Ag,Cu,Fe)_{12}(Sb,As)_4S_{13}$. The average Ag content of stephanite is 70.31wt% and that of freibergite 18.31 wt%. Electron microprobe analyses of galena are below or near the detection limit of the analyses (0.0095%).

Therefore, based on the electron microprobe analyses and the minerals mass of the Ag minerals, it is estimated that stephanite accounts for 98% and freibergite for 2% of the total Ag in the sample. Galena was not included in the calculation because the Ag analyses for the mineral were below the detection limit.

# *Introduction*

This report describes a mineralogical test program using QEMSCAN$^{TM}$ technology (Quantitative Evaluation of Materials by Scanning Electron Microscopy) on one sample, referred to as "12844", submitted by Gilead Minerals Corporation. The objectives of the investigation were to determine the overall mineralogy, the type of Ag minerals, and their liberation and association.

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Senior Process Mineralogist

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Senior Mineralogist

| | |
|---|---|
| *Experimental work by:* | *Anita Coppaway, Sample Logging*<br>*Dimitrii BoykoVekin, Section Preparation*<br>*Nicole Morton, QEMSCAN$^{TM}$ Operation*<br>*Tassos Grammatikopoulos, QEMSCAN$^{TM}$ Data Processing* |
| *Report preparation by:* | *Tassos Grammatikopoulos* |

# *Testwork Summary*

## 1. Sample Receipt and Description

One samples referred to as “12844” was submitted by **Gilead Mineral Corporation** for mineralogical investigation. The sample was wet-screened and four size fractions: +106 um, -106/+53 um, -53/+25 um and -25 um were prepared for mineralogical examination.

A portion of the head sample was submitted for WRA and ICP analysis. Each fraction was submitted for whole rock analysis (WRA) by XRF for data validation purposes. These results are presented in the assay reconciliation portion of this report and the Certificate of Analysis for the assays is presented in Appendix 4. A total of five graphite impregnated polished epoxy grain mounts were prepared for each sample including: duplicate polished sections of the +106 µm fraction and single polished sections for each of the finer fractions. All polished sections were submitted for analyses using QEMSCAN™ technology by the Particle Map Analysis (PMA) mode. The mineral assemblage and modal abundance of each fraction were determined using the QEMSCAN™. QEMSCAN™ is an acronym for Quantitative Evaluation of Materials by Scanning Electron Microscopy) - An automated, quantitative mineralogy system based on a EVO 430 SEM equipped with an EDS X-ray facility. Specific applications include accurate mineral modal analysis, size- and liberation-analysis. Provided minerals or constituent phases are chemically distinct, QEMSCAN™ is capable of reliably discriminating and quantifying phases, and is capable of providing volume and mass data, as well as liberation, grain-size and association characteristics. All fractions were also analyzed using the Trace Mineral Search (TMS). TMS is a mapping routine, where a phase reports as a trace constituent and can be located by thresholding of the back-scattered electron intensity. The objective of this routine is to reject barren fields and increase analysis efficiency.

Full QEMSCAN™ data are presented in Appendix 1 along with particle maps (Appendix 2); electron microprobe analyses are presented in Appendix 3; the Certificate of Analysis for the assays is presented in Appendix 4; and representative back scattered electron images and corresponding spectra from a Scanning Electron Microscope equipped with Energy Dispersive Spectrometer (SEM-EDS) are given in Appendix 5.

# *Appendix 1:* QEMSCAN™ DATA

## 1. Terminology - Liberation and Association

### Liberation classes were defined as the following;

- **Free:** A mineral with > 95% surface exposure
- **Liberated:** A mineral with ≥ 80% but < 95%surface exposure
- **Middlings (Mids):** A mineral with ≥ 50% but < 80% surface exposure
- **Sub-middlings (Sub-Mids):** A mineral with ≥ 20% but < 50% surface exposure
- **Locked:** A mineral with < 20% surface exposure

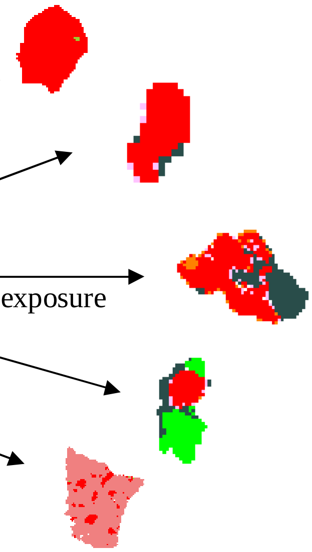


**Figure 1. Legend for liberation classes.**

### Association classes were defined as the following;

- Barren – A particle that has 0% of Ag minerals
- Free **AgS (Ag minerals)** - A particle that has > 95% of AgS
- Binary **AgS:Chalcopyrite (Cpy) -** A particle that has ≥ 95 area% of Ag minerals + Chalcopyrite
- Binary **AgS:Pyrite -** A particle that has ≥ 95 area% of Ag minerals + Pyrite
- Binary **AgS:Sphalerite -** A particle that has ≥ 95 area% of Ag minerals + Sphalerite
- Binary **AgS:Other Sulphides -** A particle that has ≥ 95 area% of Ag minerals + Other Sulphides
- Binary **AgS:Galena -** A particle that has ≥ 95 area% of Ag minerals + Galena
- Ternary **AgS:Galena(Gn): Pyrite(Py): Sphalerite (Sph) -** A particle that has ≥ 95 area% of Ag minerals + Galena + Pyrite + Sphalerite
- Ternary **AgS:Sphalerite(Sph):Galena(Gn) -** A particle that has ≥ 95 area% of Ag minerals + Sphalerite + Galena
- Binary **AgS:Felsic Gangue -** A particle that has ≥ 95 area% of Ag minerals + Felsic Gangue
- Binary **AgS:Mafic Gangue -** A particle that has ≥ 95 area% of Ag minerals + Mafic Gangue
- Binary **AgS:Other Cu minerals -** A particle that has ≥ 95 area% of Ag minerals + Other Cu minerals
- Binary **AgS:Sericite(Ser)/Muscovite(Musc) -** A particle that has ≥ 95 area% of Ag minerals + Sericite/Muscovite
- Binary **AgS:Other -** A particle that has ≥ 95 area% of Ag minerals + Other
- Binary **AgS:Molybdenite(Mo) -** A particle that has ≥ 95 area% of Ag minerals + Molybdenite
- **Complex**: Any combination of the above definitions has been defined as a complex particle.

*Note: the same definitions apply for galena as well.*

Felsic gangue: quartz, K-feldspars, plagioclase; Mafic gangue: amphibole, biotite, chlorite; Other Cu minerals: mainly enargite; Other Sulphides: mainly arsenopyrite; Other: Fe-Mn-oxides.

A list of minerals and their formulas are given in Table 1.

**Table 1. List of Minerals and Abbreviations**

| Mineral | Mineral Formula |
|---|---|
| **Ag minerals** | |
| ***Freibergite*** | $(Ag,Cu,Fe)_{12}(Sb,As)_4S_{13}$ |
| ***Stephanite*** | $Ag_5SbS_4$ |
| | |
| **Arsenopyrite** | FeAsS |
| **Enargite** | $Cu_3AsS_4$ |
| **Molybdenite** | $MoS_2$ |
| **Chalcopyrite** | $CuFeS_2$ |
| **Sphalerite** | (Zn,Fe)S |
| **Galena** | PbS |
| **Pyrite** | $FeS_2$ |
| **Quartz** | $SiO_2$ |
| **Muscovite** | $KAl_2(AlSi_3O_{10})(F, OH)_2$, |
| **Plagioclase** | $(NaSi,CaAl)AlSi_2O_8$ |
| **Chlorites** | $Na_{0.5}(Al,Mg)_6(Si,Al)_8O_{18}(OH)_{12}\cdot 5(H_2O)$ |
| **Biotite** | $K(Mg,Fe)Al_2Si_3AlO_{10}(OH)_2$ |
| **Amphibole (hornblende series)** | $Ca_2(Mg, Fe^{+2})_4 (Al, Fe^{+3})Si_7AlO_{22}(OH)_2$ |
| **K-feldspar** | $KAlSi_3O_8$ |

## 2. QEMSCAN™ Setup, Operational Modes and Quality Control

Each polished section was analyzed using the Particle Mineral Analysis (PMA) method. Particle Mineral Analysis (PMA) is a two-dimensional mapping analysis aimed at resolving liberation and locking characteristics of a generic set of particles. A pre-defined number of particles are mapped at a point spacing selected in order to spatially resolve and describe mineral textures and associations. This mode is often selected to characterize concentrate products, as both gangue and value minerals report in statistically abundant quantities to be resolved.

Approximately greater than ~49,400 particles were analyzed using the PMA mode of operation, creating over 3.8 million points from which the mineralogical data has been derived. The operational statistics of these analyses are presented in Table 2.

### Table 2. Summary of Operational Statistics

| | | | | | |
|---|---|---|---|---|---|
| **Company:** | **Gilead Minerals Corp.** | | | | |
| **Product:** | **12844** | | | | |
| **Fraction:** | **-600/+106um** | | **-106/+53um** | **-53/+25um** | **-25/+3um** |
| **Mass Percent (%):** | 18.16 | | 21.72 | 25.26 | 34.85 |
| **Minimum Size (microns):** | 75 | | 45 | 20 | 3 |
| **Maximum Size (microns):** | 6700 | | 150 | 75 | 38 |
| **Measurement:** | **MI5035-JUL0811A** | **MI5035-JUL0811B** | **MI5035-JUL0812A** | **MI5035-JUL0813A** | **MI5035-JUL0814A** |
| **Sip:** | TONO | TONO | TONO | TONO | TONO |
| **Measurement Mode:** | PMA | PMA | PMA | PMA | PMA |
| **Horizontal Spacing (microns):** | 5 | 5 | 4 | 2.5 | 2 |
| **Vertical Spacing (microns):** | 5 | 5 | 4 | 2.5 | 2 |
| **Particles** | 2117 | 2252 | 5012 | 10002 | 30018 |
| **Total Acquired (points):** | 803242 | 865622 | 977111 | 1048275 | 151649 |

Key QEMSCAN™ mineralogical assays have been regressed with the chemical assays, as presented in Table 3. Overall correlation, as measured by R-squared criteria was 0.9942

### Table 3. Calculated and Chemical Assays

| | | Assays% | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Ag** | | **Al** | | **Cu** | | **Fe** | | **Pb** | | **Si** | | **Zn** | |
| **Sample** | **Fraction** | **QEM** | **Chem.** | **QEM** | **Chem.** | **QEM** | **Chem.** | **QEM** | **Chem.** | **QEM** | **Chem.** | **QEM** | **Chem.** | **QEM** | **Chem.** |
| **"12844"** | **-600/+106um** | 0.24 | 0.23 | 0.19 | 0.16 | 0.03 | 0.07 | 0.26 | 0.54 | 62.75 | 69.50 | 11.88 | 7.57 | 0.35 | 0.23 |
| | **-106/+53um** | 0.13 | 0.11 | 0.04 | 0.16 | 0.02 | 0.08 | 0.11 | 0.33 | 82.04 | 76.20 | 1.98 | 4.45 | 0.19 | 0.21 |
| | **-53/+25um** | 0.10 | 0.11 | 0.06 | 0.16 | 0.05 | 0.10 | 0.22 | 0.39 | 81.42 | 79.00 | 2.16 | 2.96 | 0.18 | 0.24 |
| | **-25/+3um** | 0.07 | 0.12 | 0.04 | 0.26 | 0.03 | 0.11 | 0.10 | 0.40 | 84.14 | 79.60 | 0.57 | 1.97 | 0.07 | 0.18 |

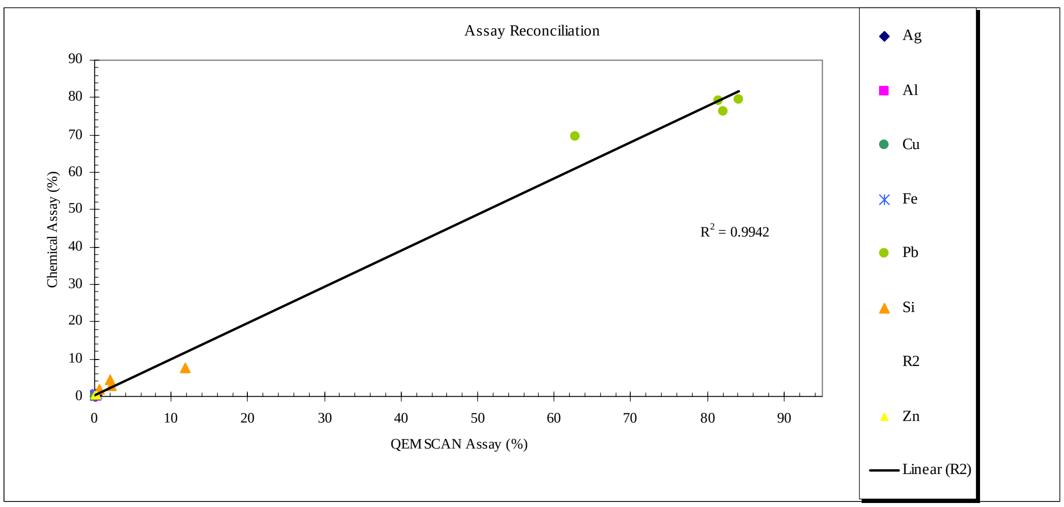



**Figure 2. QEMSCAN™ calculated assay vs. chemical assay reconciliation**

# 3. Mineralogy

## 3.1. Modal Abundance and Grain Size

The modal mineralogy of the minerals in the sample expressed as wt% is given in Table 4 along with the average particle size of each mineral.

The sample consist mainly of galena (91.5%) followed by quartz (6.8%). Other silicate minerals include trace amounts of mafic minerals (biotite, amphibole and chlorite), sericite/muscovite, K-feldspar, plagioclase. Other sulphides include trace amounts of Ag-minerals, sphalerite, chalcopyrite, pyrite, other Cu-Minerals, molybdenite and other-sulphides (mainly enargite). Trace amounts of Fe-Mn-oxides are also present.

The galena content increases from the coarse to the fine fraction by ca. 20% (13.2% to 33.9%). Most of quartz occurs in the coarse fraction (4.5%) and significantly less in the finer fractions (0.9%, 1.1% to 0.4%). Ag minerals, although in trace amounts, occur mainly in the -25/+3 um fraction.

The grain size of galena ranges from, the coarse to the fine fraction, 90 um, 64 um, 29 um to 6 um; quartz ranges from 96 um, 50 um, 23 um to 8 um. The grain size of Ag minerals ranges, in the same order, from 15 um, 12 um, 9 um to 6 um.

# Table 4. Mineral Mass, and Grain Size of Minerals in the Sample

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Id** | MI5035-JUL08 | | | | | | | | |
| **Sample** | **Name** | **12844** | | | | | | | | |
| **Fraction** | **Name** | **Combined** | **-600/+106um** | | **-106/+53um** | | **-53/+25um** | | **-25/+3um** | |
| | **Mass Size Distribution (%)** | **100** | 18.16 | | 21.72 | | 25.26 | | 34.85 | |
| | **Particle Size** | | 108.00 | | 64.00 | | 29.00 | | 7.00 | |
| | | **Combined** | *fraction* | sample | *fraction* | sample | *fraction* | sample | *fraction* | sample |
| **Mineral Mass(%)** | **Chalcopyrite** | 0.07 | 0.07 | 0.01 | 0.04 | 0.01 | 0.10 | 0.02 | 0.06 | 0.02 |
| | **Ag-S** | 0.27 | 0.24 | 0.05 | 0.23 | 0.06 | 0.23 | 0.07 | 0.28 | 0.10 |
| | **Sphalerite** | 0.27 | 0.54 | 0.10 | 0.29 | 0.06 | 0.28 | 0.07 | 0.11 | 0.04 |
| | **Other Cu-Minerals** | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.01 |
| | **Galena** | 91.52 | 72.71 | 13.21 | 94.84 | 20.60 | 94.17 | 23.79 | 97.32 | 33.92 |
| | **Pyrite** | 0.17 | 0.27 | 0.05 | 0.10 | 0.02 | 0.25 | 0.06 | 0.10 | 0.04 |
| | **Other_Sulphides** | 0.27 | 0.04 | 0.01 | 0.04 | 0.01 | 0.06 | 0.02 | 0.68 | 0.24 |
| | **Quartz** | 6.84 | 24.68 | 4.48 | 4.06 | 0.88 | 4.34 | 1.10 | 1.09 | 0.38 |
| | **Mafics** | 0.23 | 0.54 | 0.10 | 0.12 | 0.03 | 0.19 | 0.05 | 0.15 | 0.05 |
| | **Sericite/Muscovite** | 0.16 | 0.48 | 0.09 | 0.11 | 0.02 | 0.11 | 0.03 | 0.06 | 0.02 |
| | **Fe-Mn-Oxides** | 0.06 | 0.10 | 0.02 | 0.07 | 0.02 | 0.09 | 0.02 | 0.01 | 0.00 |
| | **Other** | 0.05 | 0.07 | 0.01 | 0.02 | 0.00 | 0.04 | 0.01 | 0.05 | 0.02 |
| | **Molybdenite** | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.02 |
| | **K-Feldspar** | 0.05 | 0.19 | 0.03 | 0.03 | 0.01 | 0.03 | 0.01 | 0.00 | 0.00 |
| | **Plagioclase** | 0.02 | 0.04 | 0.01 | 0.01 | 0.00 | 0.06 | 0.01 | 0.00 | 0.00 |
| | **Total** | 100.00 | *100.0* | 18.2 | *100.0* | 21.7 | *100.0* | 25.3 | *100.0* | 34.9 |
| **Grain Size** | **Chalcopyrite** | | 26 | | 18 | | 15 | | 5 | |
| | **Ag-S** | | 15 | | 12 | | 9 | | 6 | |
| | **Sphalerite** | | 84 | | 48 | | 22 | | 6 | |
| | **Other Cu-Minerals** | | 8 | | 6 | | 4 | | 4 | |
| | **Galena** | | 90 | | 64 | | 29 | | 6 | |
| | **Pyrite** | | 18 | | 14 | | 14 | | 4 | |
| | **Other_Sulphides** | | 7 | | 6 | | 4 | | 3 | |
| | **Quartz** | | 96 | | 50 | | 23 | | 8 | |
| | **Mafics** | | 26 | | 18 | | 10 | | 5 | |
| | **Sericite/Muscovite** | | 13 | | 11 | | 7 | | 5 | |
| | **Fe-Mn-Oxides** | | 22 | | 18 | | 11 | | 3 | |
| | **Other** | | 13 | | 11 | | 7 | | 3 | |
| | **Molybdenite** | | 7 | | 6 | | 5 | | 3 | |
| | **K-Feldspar** | | 11 | | 9 | | 7 | | 4 | |
| | **Plagioclase** | | 12 | | 15 | | 15 | | 5 | |
| | **Plagioclase** | | 12 | | 15 | | 15 | | 5 | |

### 3.2. Electron Microprobe Analyses

Electron microprobe analyses were carried to determine the chemical composition of the Ag minerals. The analyses yielded two distinct Ag phases, stephanite $Ag_5SbS_4$and freibergite $(Ag,Cu,Fe)_{12}(Sb,As)_4S_{13}$. The minimum (MIN), maximum (MAX), average (AVE) and standard deviation (STDEV) of electron microprobe analyses of Ag-minerals are given in Table 5. Electron microprobe analyses of galena are below or near the detection limit of the analyses (0.0095%).

The complete results are given in Appendix 3.

**Table 5. MIN, MAX, AVE and STDEV of electron microprobe analyses of Ag-minerals**

| **Stephanite** | **Te** | **Sb** | **Ag** | **Au** | **S** | **Pb** | **Bi** | **Fe** | **Cu** | **Zn** | **As** | **Se** | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MIN** | 0.00 | ***8.68*** | ***62.57*** | 0.00 | ***11.42*** | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.00 | 0.00 | 96.26 |
| **MAX** | 0.00 | ***19.05*** | ***78.01*** | 0.06 | ***17.02*** | 3.87 | 0.12 | 0.04 | 2.58 | 0.23 | 1.10 | 0.03 | 101.85 |
| **AVE** | 0.00 | ***11.98*** | ***70.31*** | 0.01 | ***14.92*** | 0.22 | 0.05 | 0.01 | 1.67 | 0.07 | 0.12 | 0.01 | 99.37 |
| **STDEV** | 0.00 | ***1.80*** | ***3.68*** | 0.02 | ***1.48*** | 0.70 | 0.03 | 0.01 | 0.41 | 0.08 | 0.26 | 0.01 | 1.59 |
| | | | | | | | | | | | | | |
| **Freibergite** | **Te** | **Sb** | **Ag** | **Au** | **S** | **Pb** | **Bi** | **Fe** | **Cu** | **Zn** | **As** | **Se** | **Total** |
| **MIN** | 0.00 | ***24.72*** | ***17.76*** | 0.00 | ***22.00*** | 0.00 | 0.00 | 0.44 | ***22.47*** | 2.50 | 0.00 | 0.00 | 96.35 |
| **MAX** | 0.00 | ***27.59*** | ***19.52*** | 0.06 | ***22.80*** | 0.59 | 0.15 | 2.61 | ***23.74*** | 6.24 | 2.17 | 0.03 | 98.63 |
| **AVE** | 0.00 | ***27.14*** | ***18.31*** | 0.01 | ***22.42*** | 0.07 | 0.07 | 1.06 | ***23.24*** | 4.89 | 0.26 | 0.00 | 97.48 |
| **STDEV** | 0.00 | ***0.64*** | ***0.33*** | 0.02 | ***0.20*** | 0.12 | 0.04 | 0.55 | ***0.33*** | 0.90 | 0.51 | 0.01 | 0.56 |

### 3.3. Ag Distribution

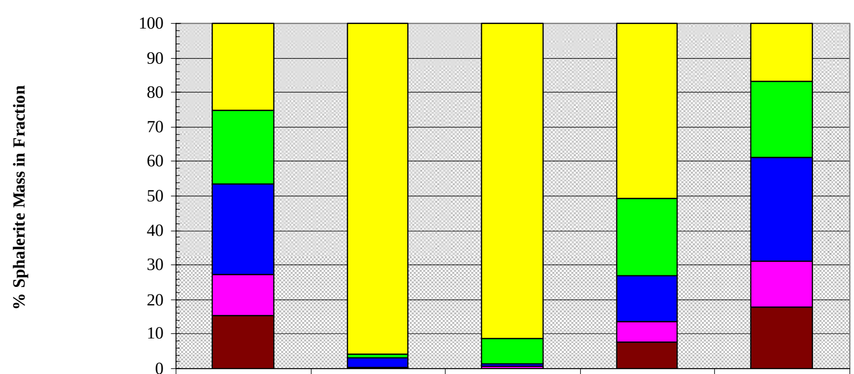
Based on the electron microprobe analyses and the minerals mass of the Ag minerals, it is estimated that stephanite accounts for 98% and freibergite for 2% of the total Ag in the sample. Galena was not included in the calculation because the Ag analyses for the mineral were below the detection limit.

## 3.4. Ag minerals Liberation

Liberation data for Ag minerals are given in Table 6 and graphically presented in Figure 3. Particle maps are given in Figures 4-9. The overall liberation (Free and Liberated combined) of Ag minerals is 27.2%. Middling particles of Ag minerals with other minerals in the sample account for 47.6% and locked particles for 25.3%. Free and liberated Ag minerals increase by ca. 30% from the coarse to the fine fraction (0.4%, 0.7%, 13.5% to 31.2%). However, middling particles increase by 48% from 3.9%, 8.1%, 35.6% to 52.2%, but locked particles decrease by 79% from the coarse to the fine fraction (95.7% to 16.6%).

**Table 6. Liberation Data of Ag Minerals in the Sample**

| Mineral mass % | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| **Free Ag-S** | 15.6 | 0.0 | 0.0 | 7.7 | 17.9 |
| **Lib Ag-S** | 11.6 | 0.4 | 0.7 | 5.8 | 13.3 |
| **Midds Ag-S** | 26.4 | 2.6 | 0.8 | 13.3 | 30.1 |
| **Sub Midds Ag-S** | 21.2 | 1.3 | 7.3 | 22.3 | 22.1 |
| **Locked Ag-S** | 25.3 | 95.7 | 91.2 | 50.8 | 16.6 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |




| | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| Locked Ag-S | 25.3 | 95.7 | 91.2 | 50.8 | 16.6 |
| Sub Midds Ag-S | 21.2 | 1.3 | 7.3 | 22.3 | 22.1 |
| Midds Ag-S | 26.4 | 2.6 | 0.8 | 13.3 | 30.1 |
| Lib Ag-S | 11.6 | 0.4 | 0.7 | 5.8 | 13.3 |
| Free Ag-S | 15.6 | 0.0 | 0.0 | 7.7 | 17.9 |

**Figure 3. Liberation profile of Ag mineral in the sample**

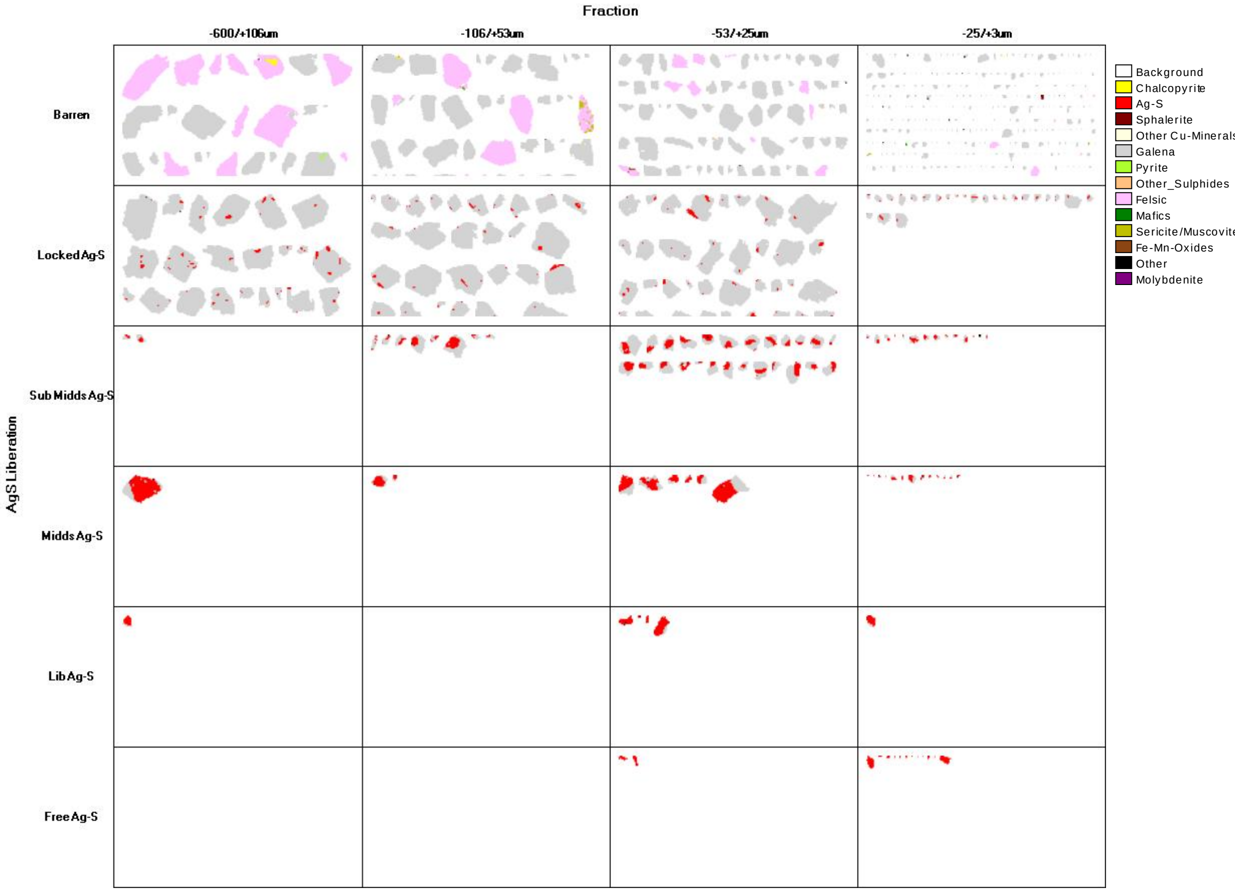



**Figure 4. Particle maps of Ag minerals sorted on the basis of liberation in the sample (PMA)**

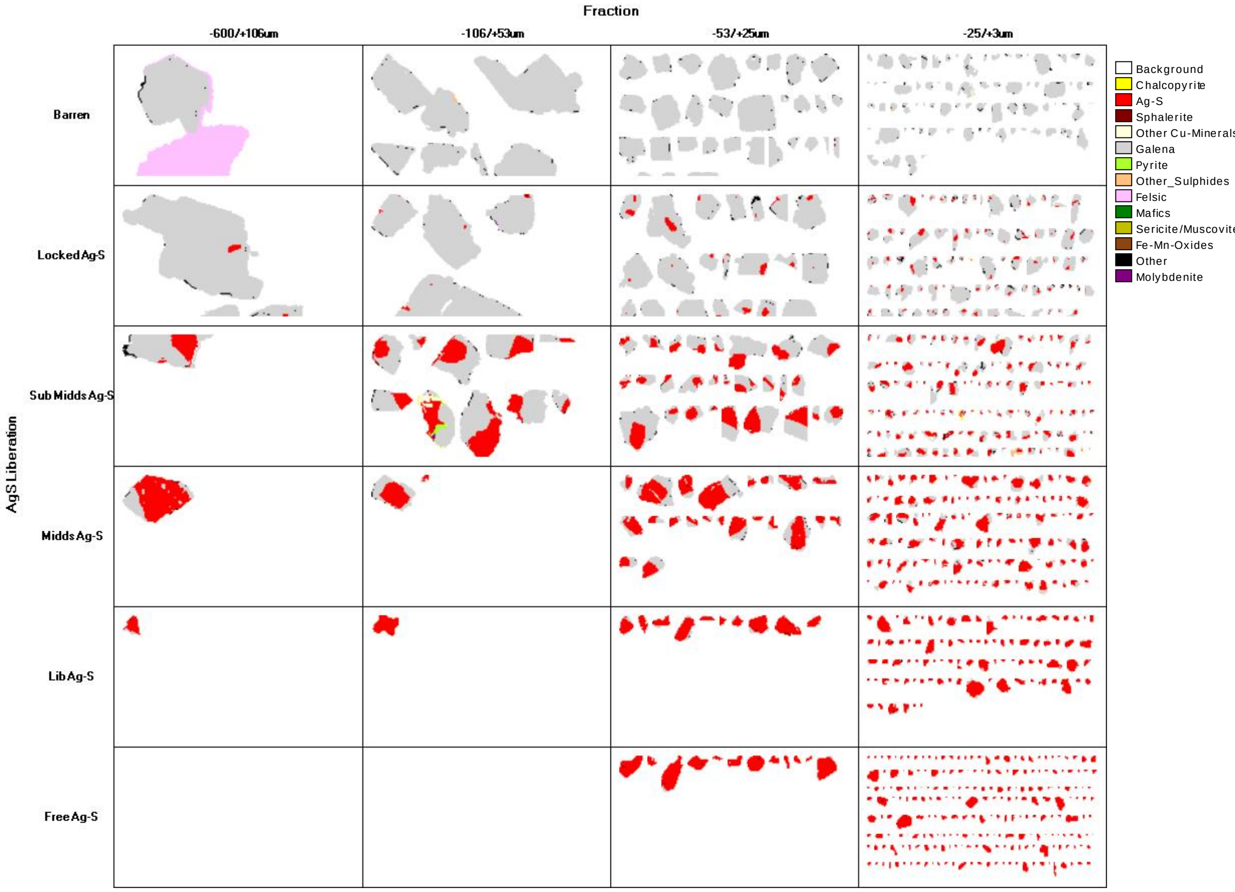



**Figure 5. Particle maps of Ag minerals sorted on the basis of liberation in the sample (TMS)**

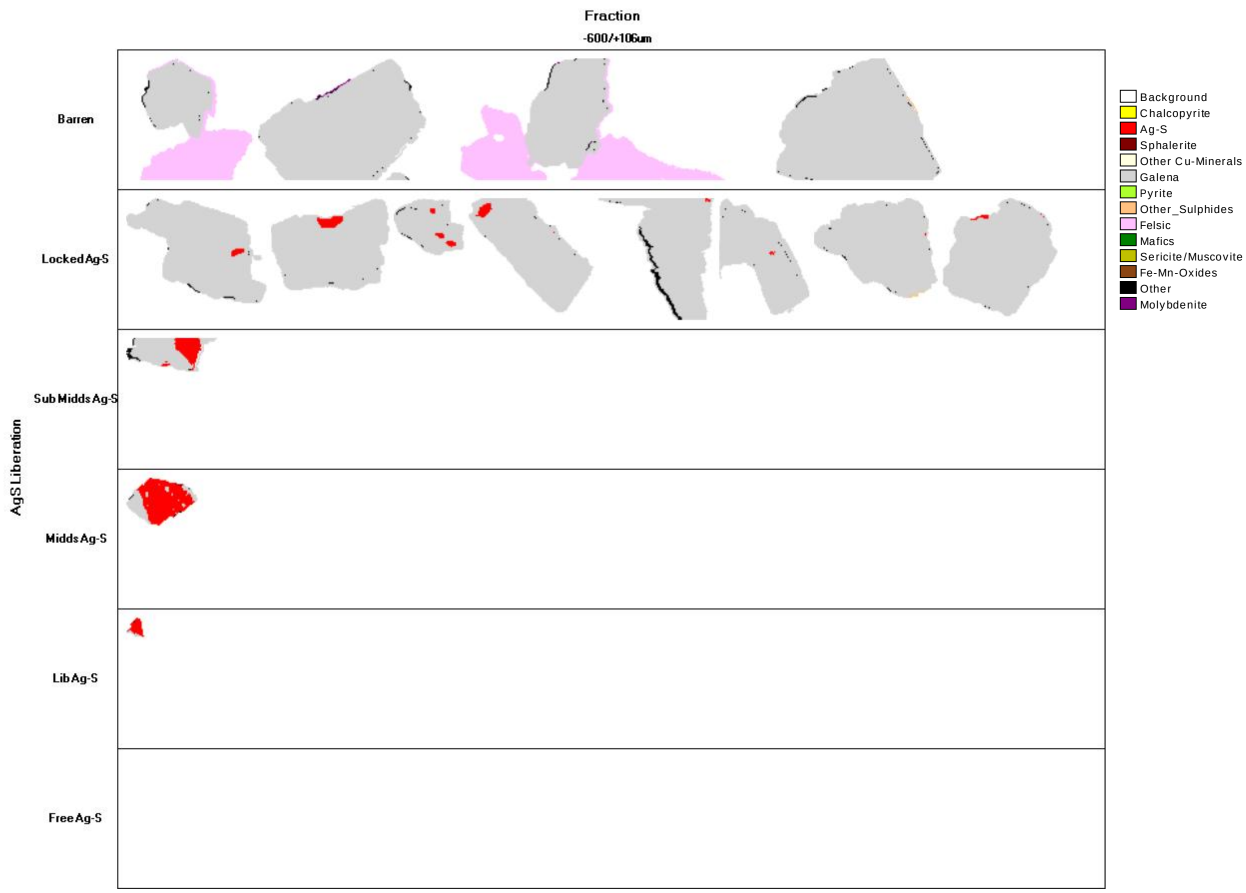



**Figure 6. Particle maps of Ag minerals sorted on the basis of liberation in the +106 um fraction (TMS)**

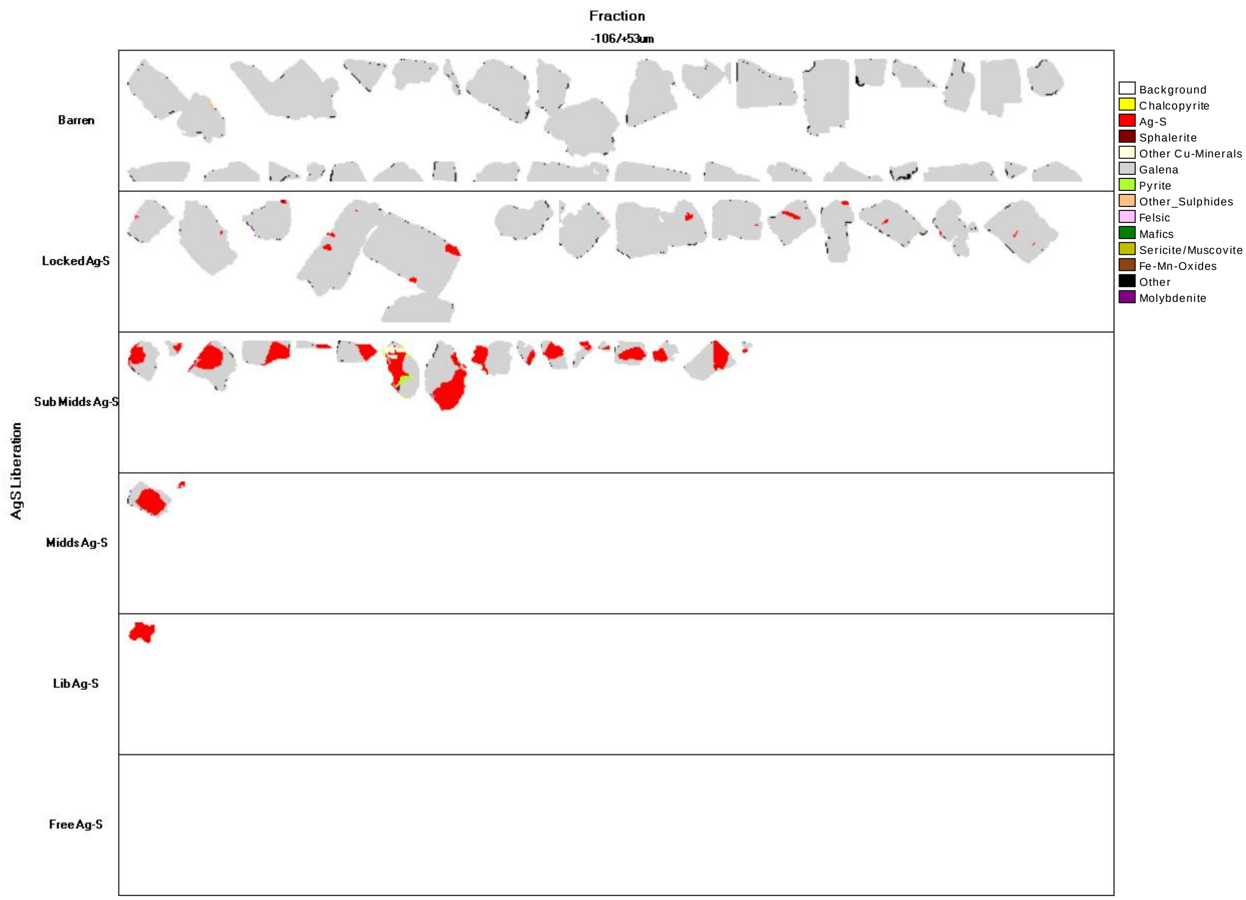



**Figure 7. Particle maps of Ag minerals sorted on the basis of liberation in the -106/+53 um fraction (TMS)**

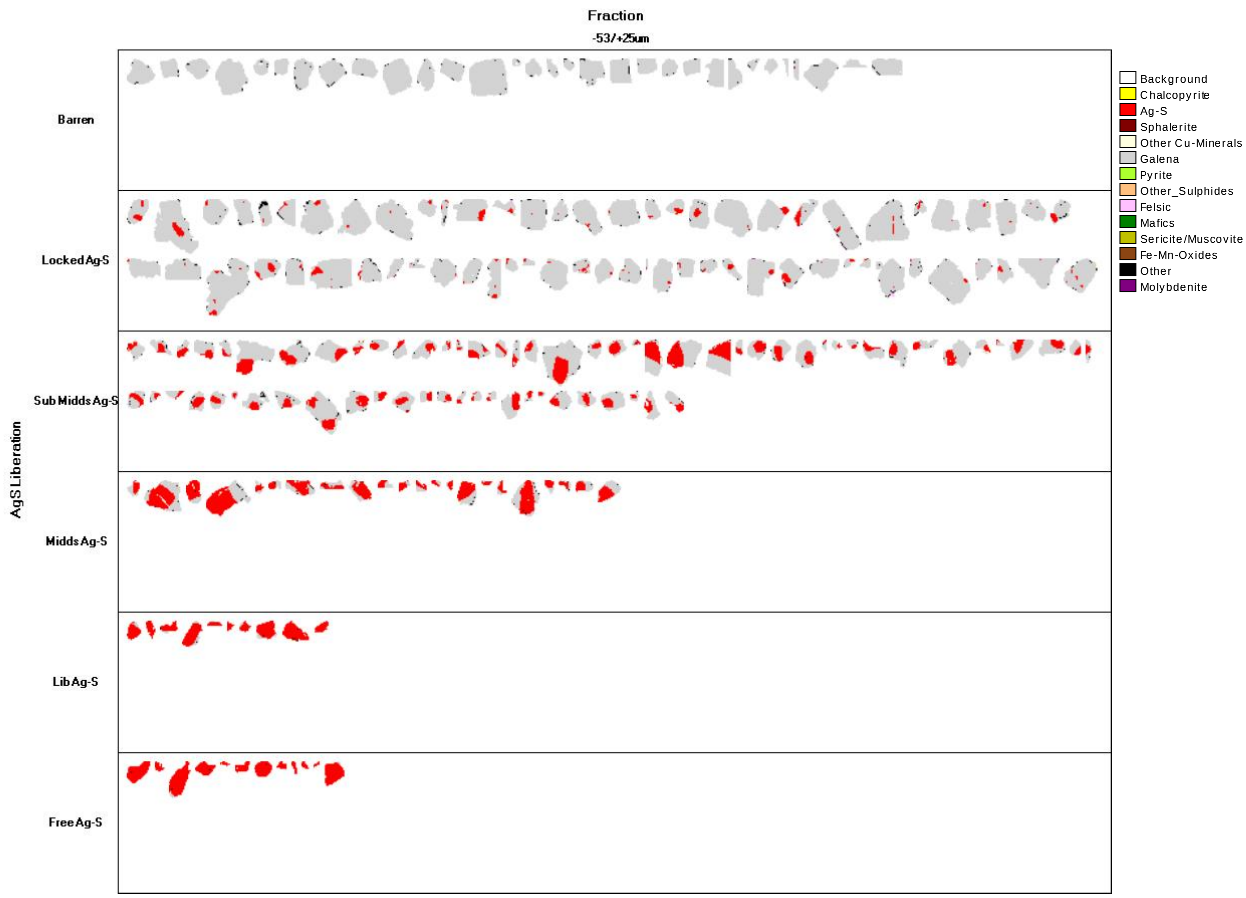



**Figure 8. Particle maps of Ag minerals sorted on the basis of liberation in the -53/+25 um fraction (TMS)**

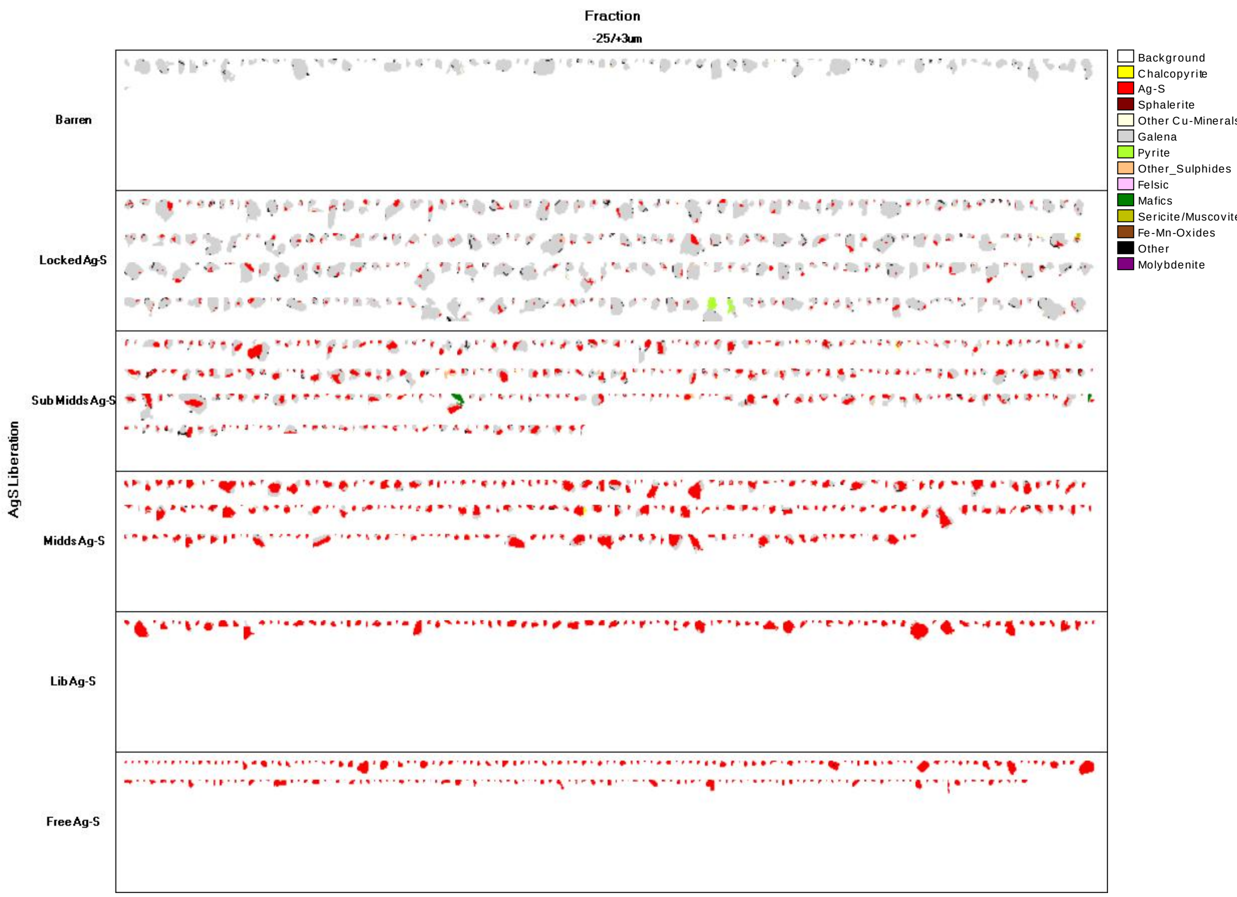



**Figure 9. Particle maps of Ag minerals sorted on the basis of liberation in the -25 um fraction (TMS)**

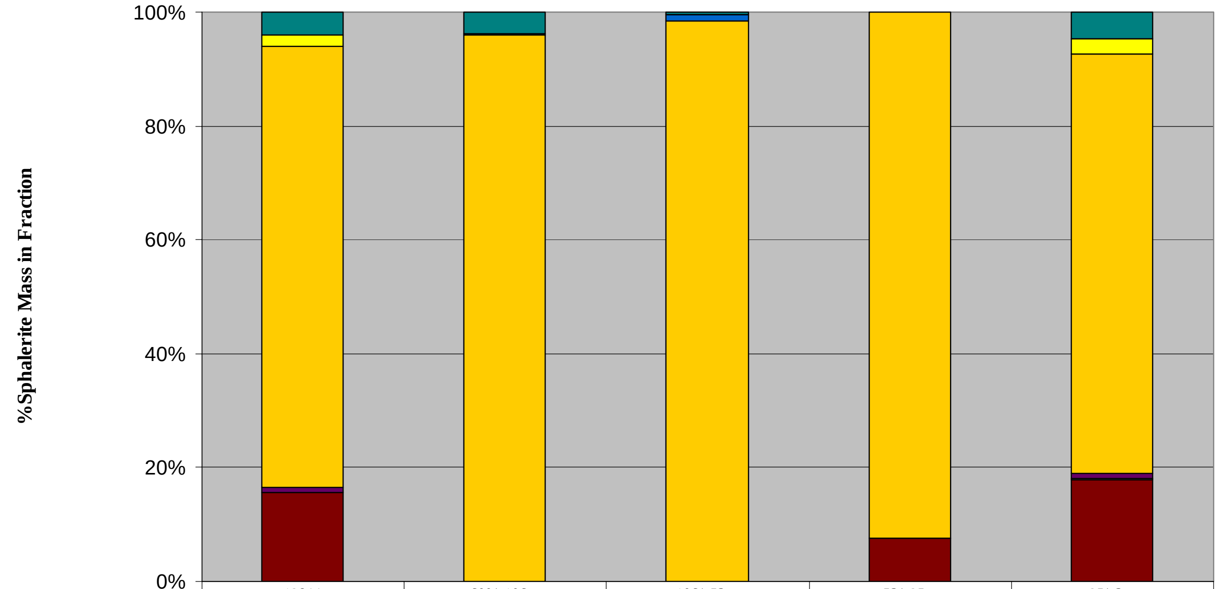
## 3.5. Ag Mineral Association

Association data for Ag minerals are given in Table 7 and graphically presented in Figure 10. Particle maps are given in Figures 11-16. The main association of Ag minerals is the form of middling particles with galena (77.4%) followed by complex (4.0%) and other Cu minerals (2.0%). Liberation is essentially nil in the two coarse fractions and 7.7% to 17.9%% in the two finer fractions. Middlings with galena decrease by 22% from the coarse to the fine fraction.

**Table 7. Association Data of Ag Minerals in the Sample**

| Mineral mass | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| **Free AgS** | 15.6 | 0.0 | 0.0 | 7.7 | 17.9 |
| **AgS:Cpy** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Pyrite** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Sphalerite** | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| **AgS:Other Sulphides** | 0.8 | 0.0 | 0.0 | 0.0 | 1.0 |
| **AgS:Galena** | 77.4 | 96.1 | 98.4 | 92.2 | 73.7 |
| **AgS:Gn:Py:Sph** | 0.1 | 0.0 | 1.1 | 0.0 | 0.0 |
| **AgS:Sph:Gn Tern** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Felsic Gangue** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Mafic Gangue** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Other Cu minerals** | 2.0 | 0.0 | 0.0 | 0.0 | 2.5 |
| **AgS:Ser/Musc** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Other** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **AgS:Mo** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Complex** | 4.0 | 3.9 | 0.5 | 0.0 | 4.8 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Cpy: chalcopyrite; Gn: galena; Py: pyrite, Sph: sphalerite; Tern: ternary; Ser/Musc: sericite/muscovite; Mo: molybdenite.




| | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| Complex | 4.0 | 3.9 | 0.5 | 0.0 | 4.8 |
| AgS:Mo | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Ser/Musc | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Other Cu minerals | 2.0 | 0.0 | 0.0 | 0.0 | 2.5 |
| AgS:Mafic Gangue | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Felsic Gangue | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Sph:Gn Tern | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Gn:Py:Sph | 0.1 | 0.0 | 1.1 | 0.0 | 0.0 |
| AgS:Galena | 77.4 | 96.1 | 98.4 | 92.2 | 73.7 |
| AgS:Other Sulphides | 0.8 | 0.0 | 0.0 | 0.0 | 1.0 |
| AgS:Sphalerite | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| AgS:Pyrite | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AgS:Cpy | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Free AgS | 15.6 | 0.0 | 0.0 | 7.7 | 17.9 |

**Fraction**

**Figure 10. Association profile of Ag minerals in the sample**

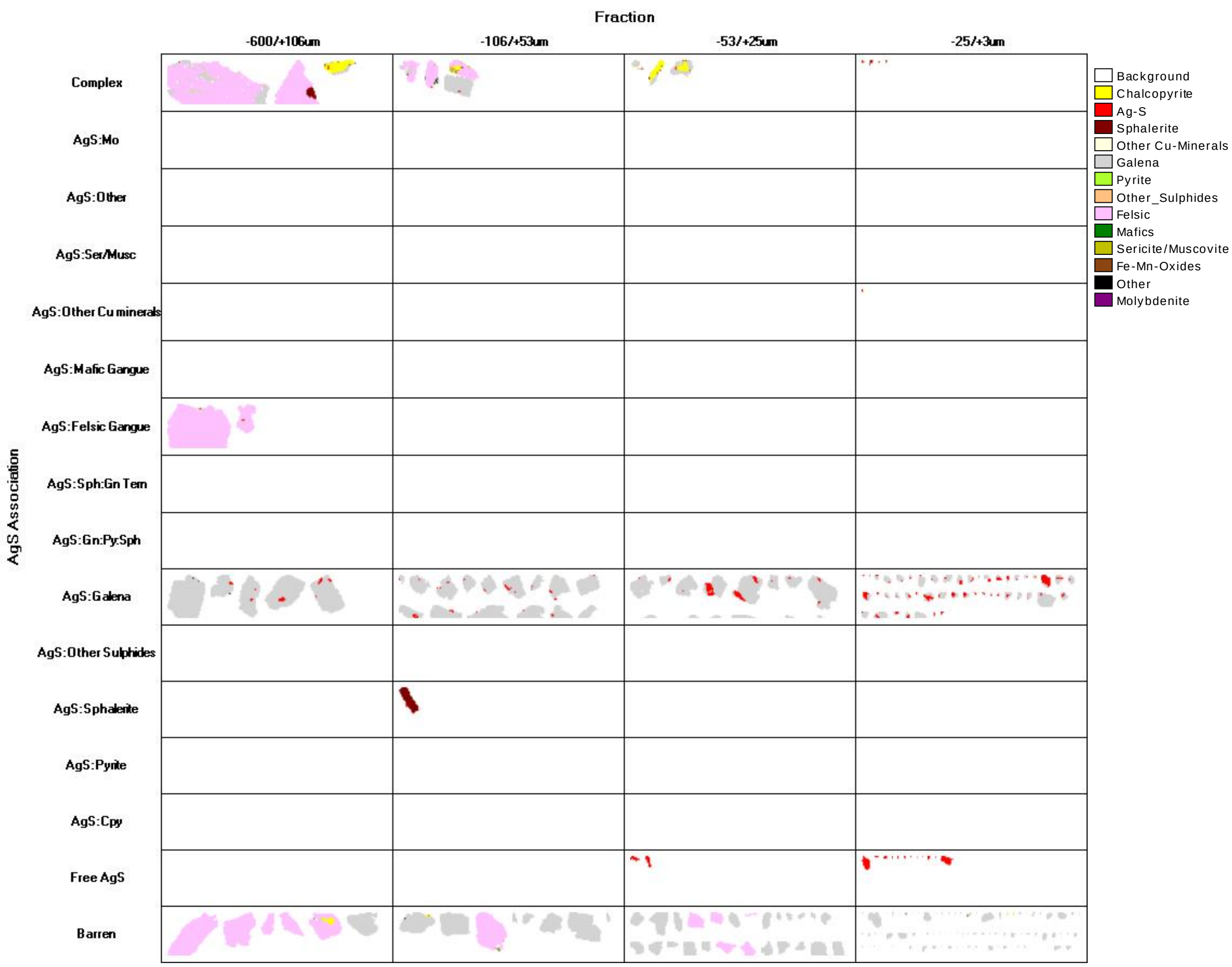



**Figure 11. Particle maps of Ag minerals sorted on the basis of association in the sample (PMA)**

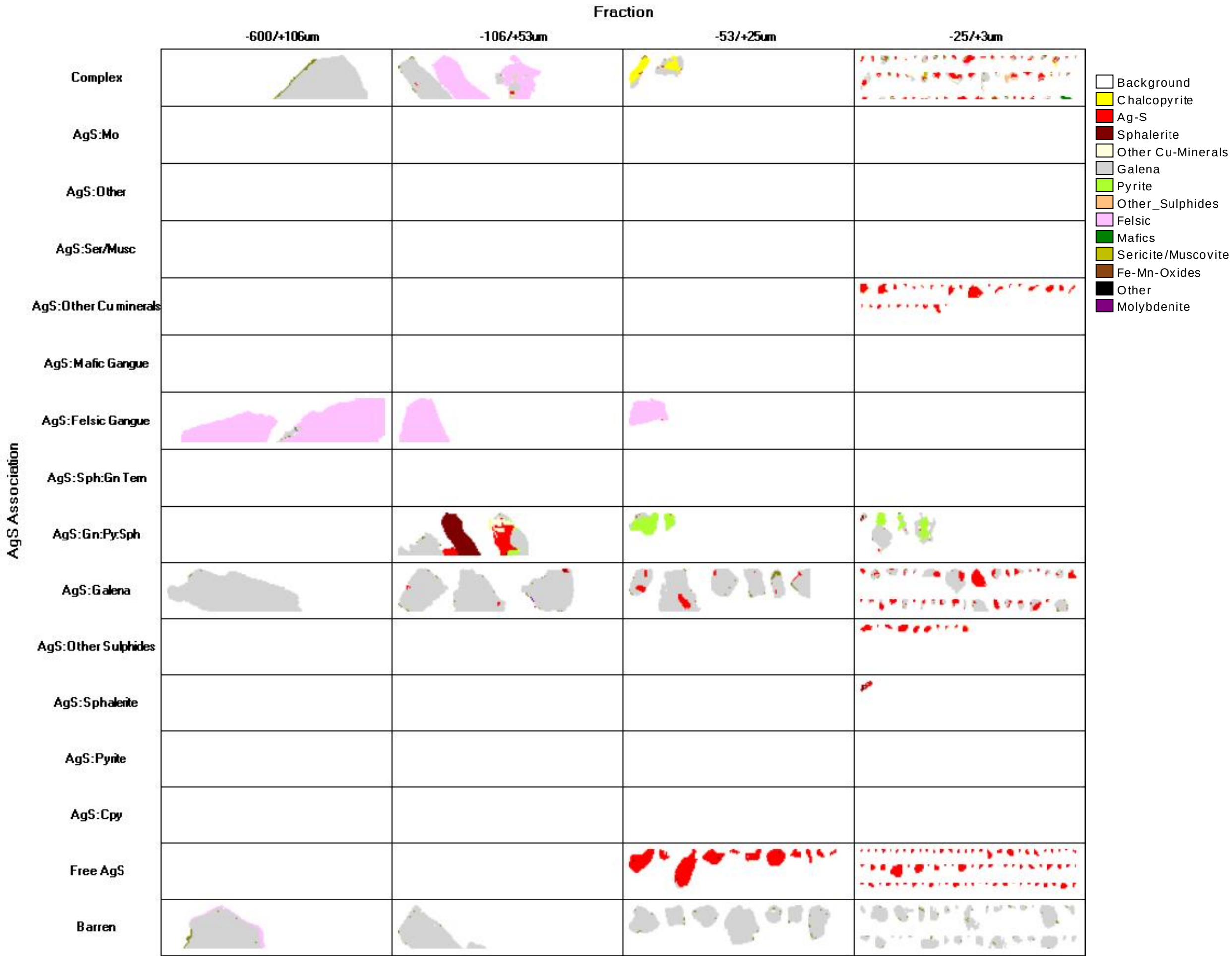



**Figure 12. Particle maps of Ag minerals sorted on the basis of association in the sample (TMS)**

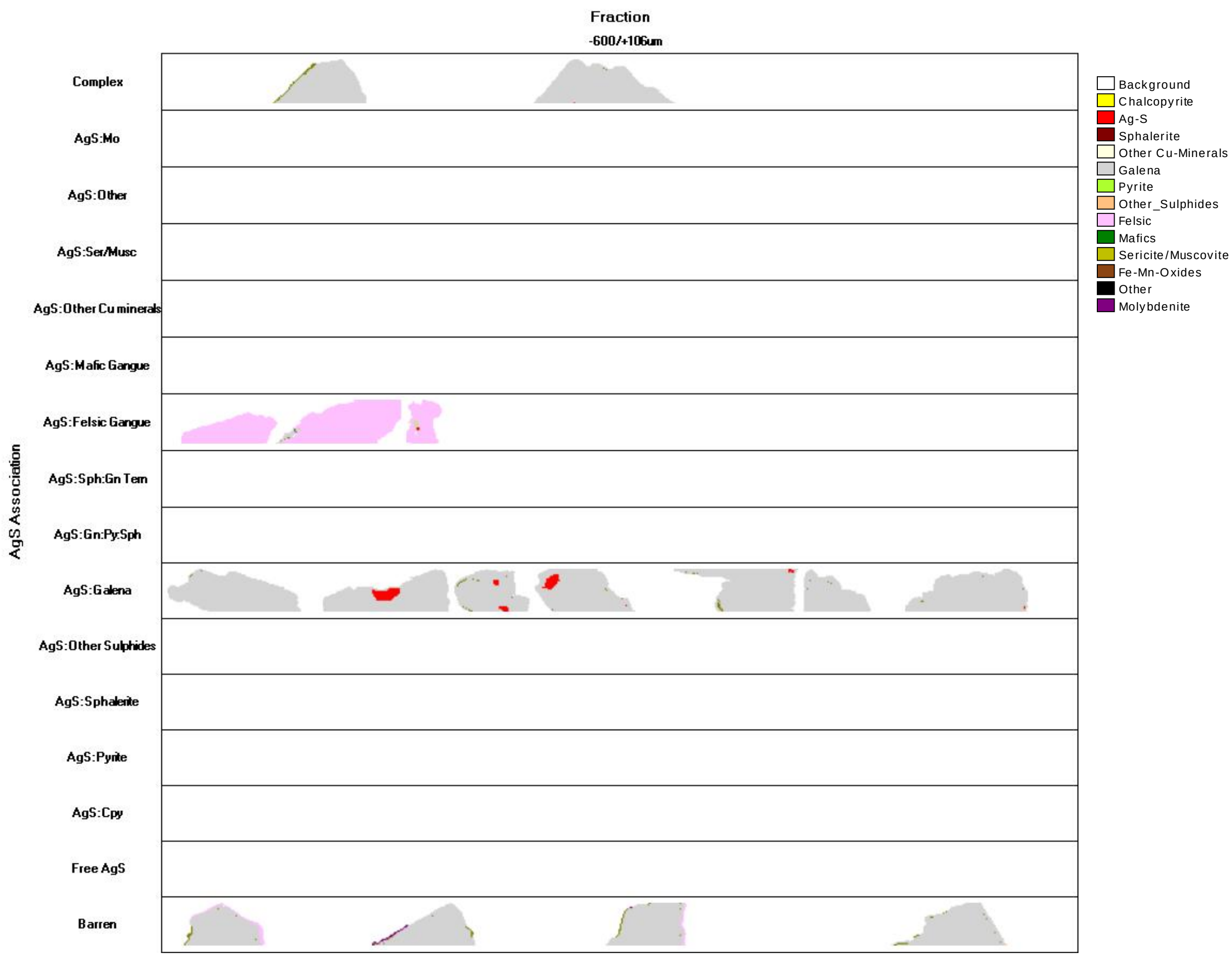



**Figure 13. Particle maps of Ag minerals sorted on the basis of association in the +106 um fraction (TMS)**


**Figure 14. Particle maps of Ag minerals sorted on the basis of association in the 106/+53 um fraction (TMS)**

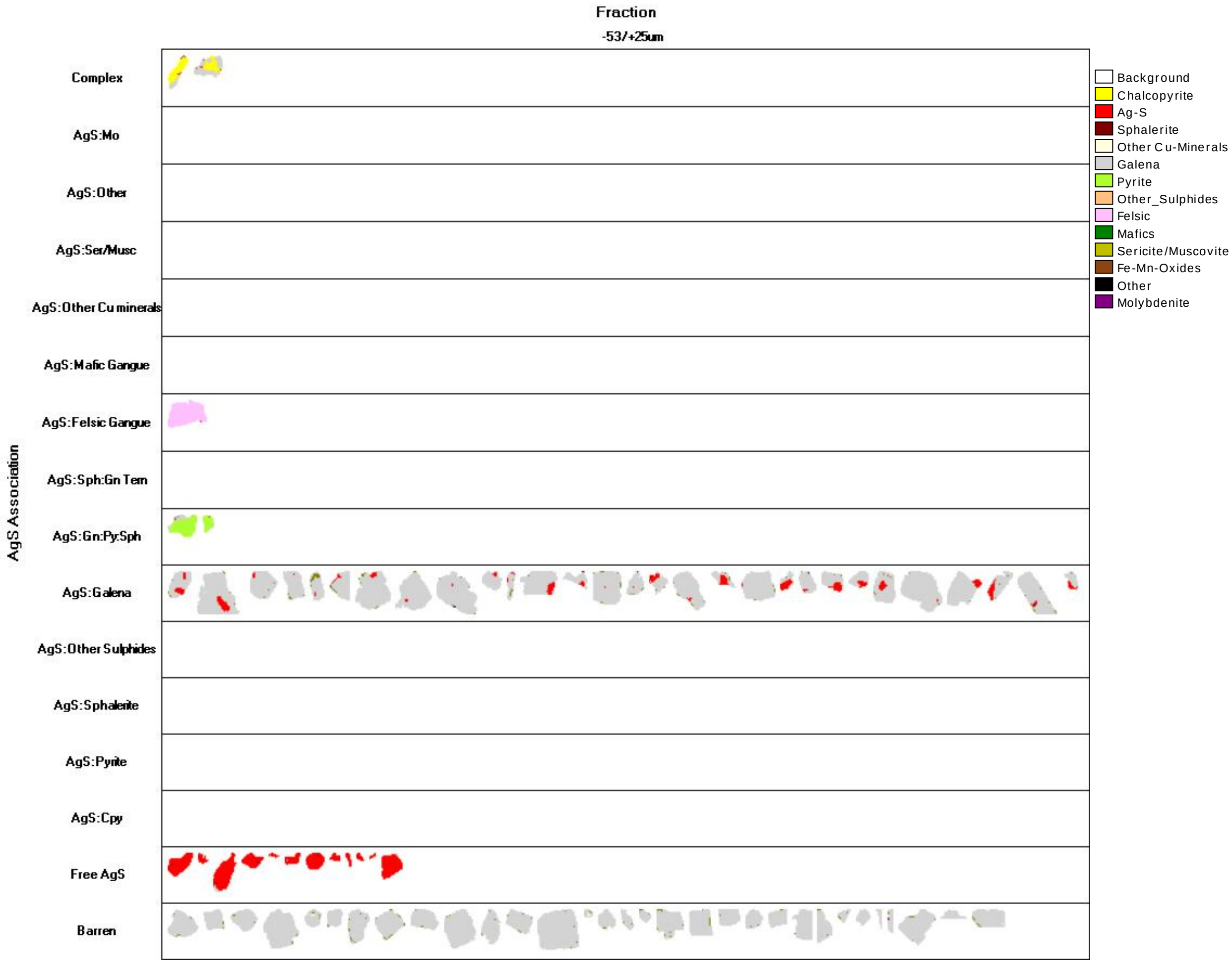



**Figure 15. Particle maps of Ag minerals sorted on the basis of association in the -53/+25 um fraction (TMS)**

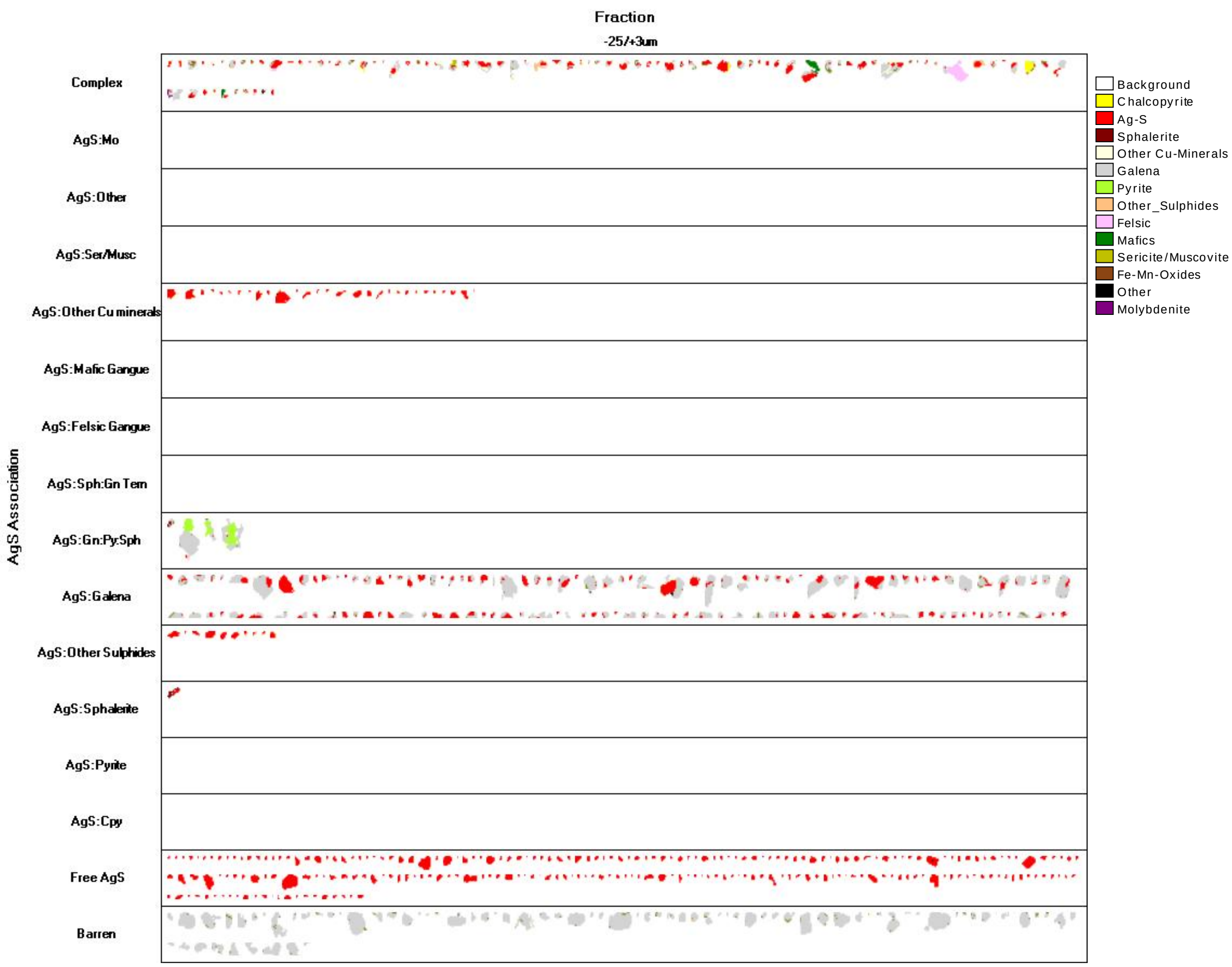



**Figure 16. Particle maps of Ag minerals sorted on the basis of association in the -25 um fraction (TMS)**

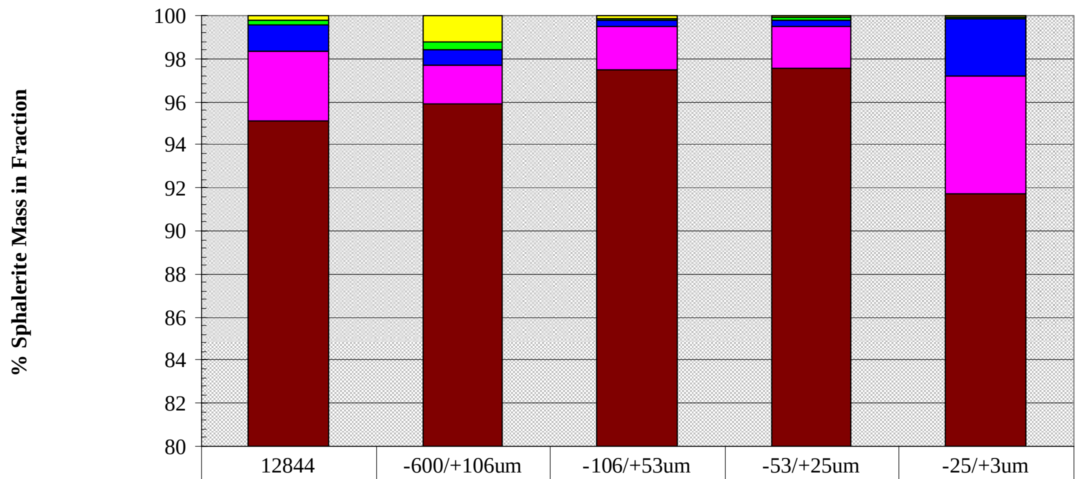
## 3.6. Galena Liberation

Liberation data for spodumene are given in Table 8 and graphically presented in Figure 17. Particle maps are given in Figures 18-22. The overall liberation (Free and Liberated combined) of galena is 98.4%. Middling particles of galena with other minerals in the sample account for 1.4% and locked particles for 0.2%. Free and liberated galena exhibit a minor increase (roughly similar in all fractions (97.7%, 99.5%, 99.5% to 97.2%). However, middling particles are slightly higher in the fine fraction (2.8%). Locked galena drops by 1% from the coarse to the fine fraction.

**Table 8. Liberation Data of Galena in the Sample**

| Mineral mass % | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| **Free Gn** | 95.1 | 95.9 | 97.4 | 97.6 | 91.7 |
| **Lib Gn** | 3.2 | 1.8 | 2.0 | 1.9 | 5.4 |
| **Midds Gn** | 1.2 | 0.7 | 0.3 | 0.3 | 2.6 |
| **Sub Midds Gn** | 0.2 | 0.3 | 0.1 | 0.2 | 0.1 |
| **Locked Gn** | 0.2 | 1.2 | 0.1 | 0.1 | 0.0 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Gn: galena




| | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| Locked Gn | 0.2 | 1.2 | 0.1 | 0.1 | 0.0 |
| Sub Midds Gn | 0.2 | 0.3 | 0.1 | 0.2 | 0.1 |
| Midds Gn | 1.2 | 0.7 | 0.3 | 0.3 | 2.6 |
| Lib Gn | 3.2 | 1.8 | 2.0 | 1.9 | 5.4 |
| Free Gn | 95.1 | 95.9 | 97.4 | 97.6 | 91.7 |

**Fraction**

**Figure 17. Galena liberation profile in the sample**

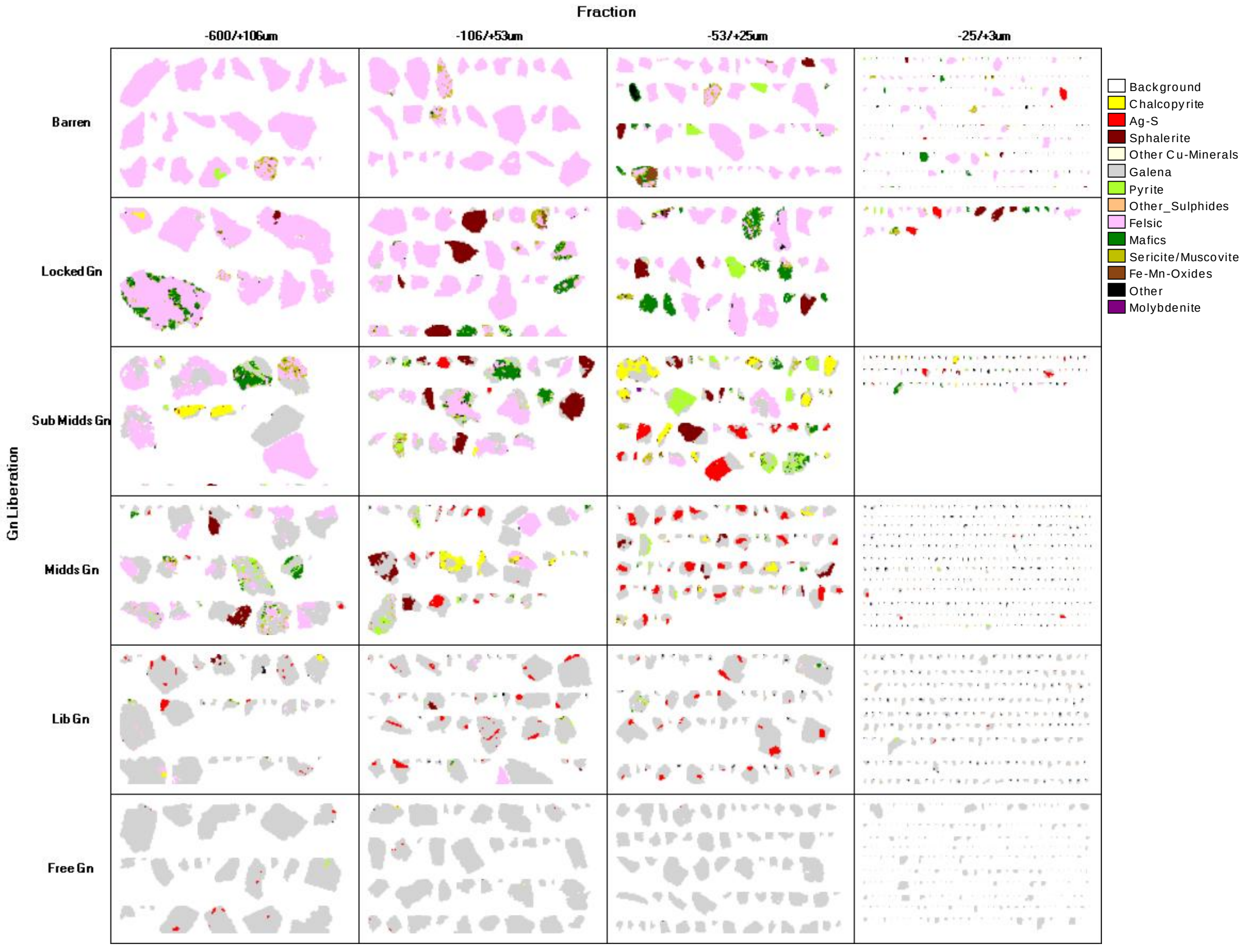



**Figure 18. Galena particle maps sorted on the basis of liberation in the sample (PMA)**

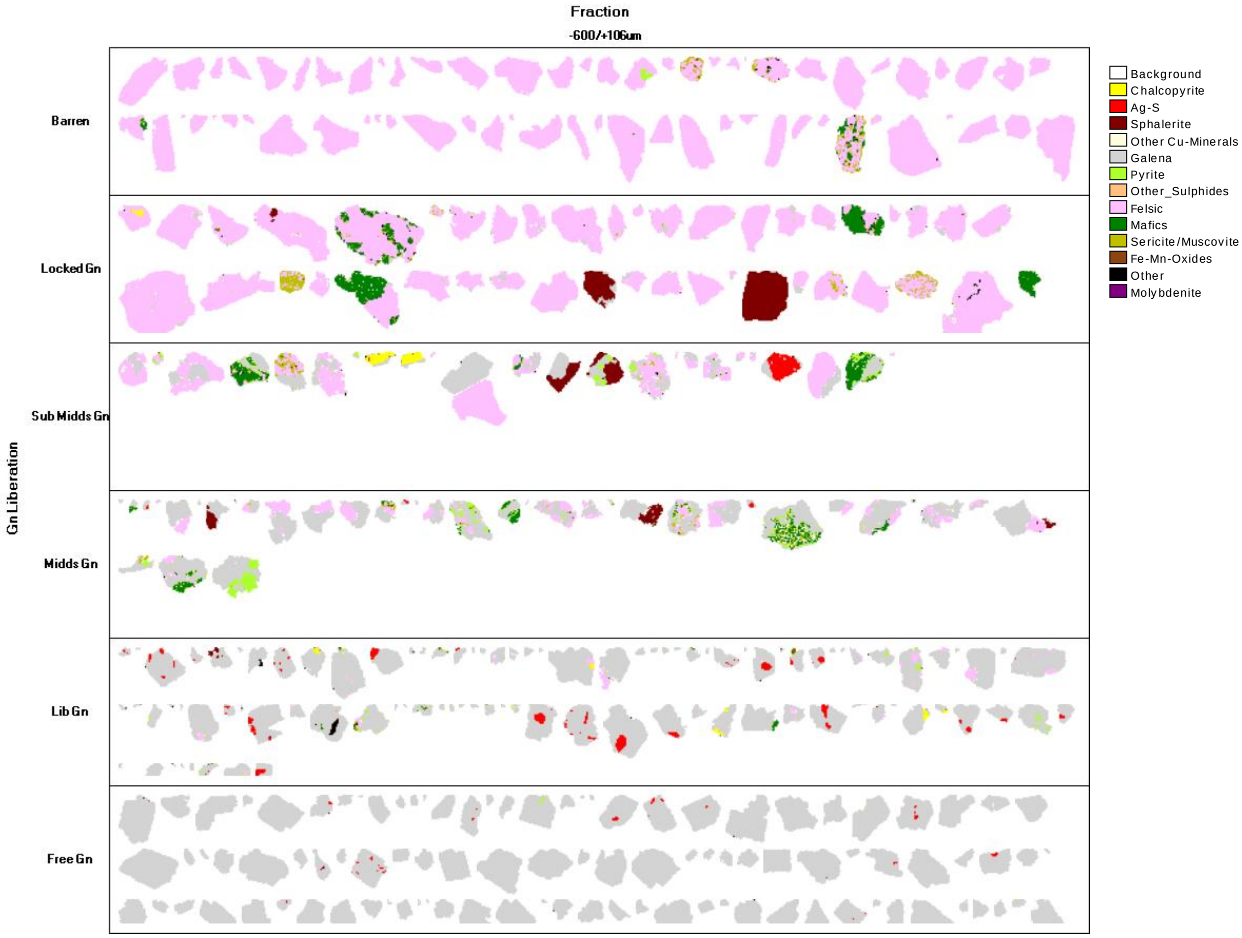



**Figure 19. Galena particle maps sorted on the basis of liberation in the +106 um fraction (PMA)**

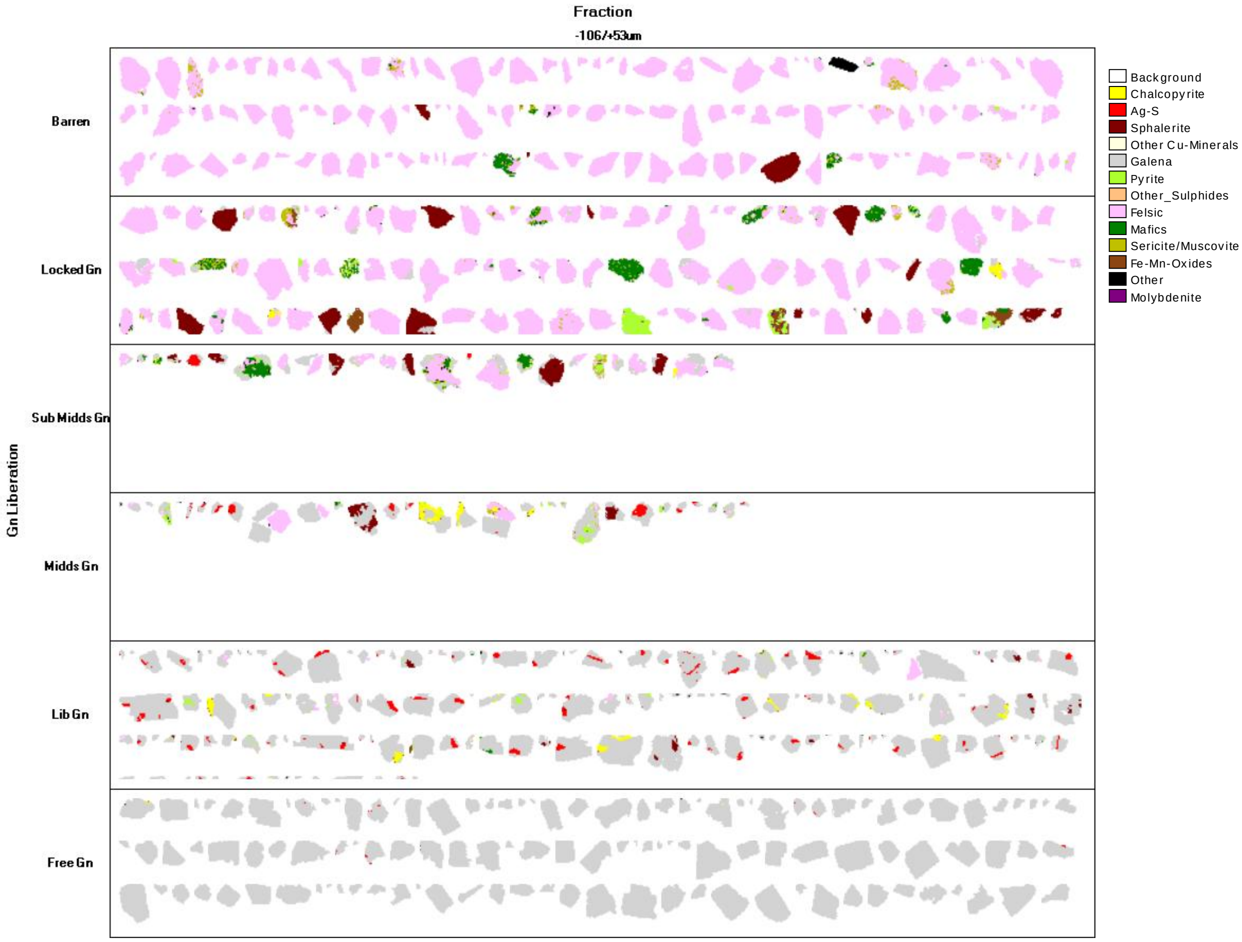



**Figure 20. Galena particle maps sorted on the basis of liberation in the -106/+53 um fraction (PMA)**

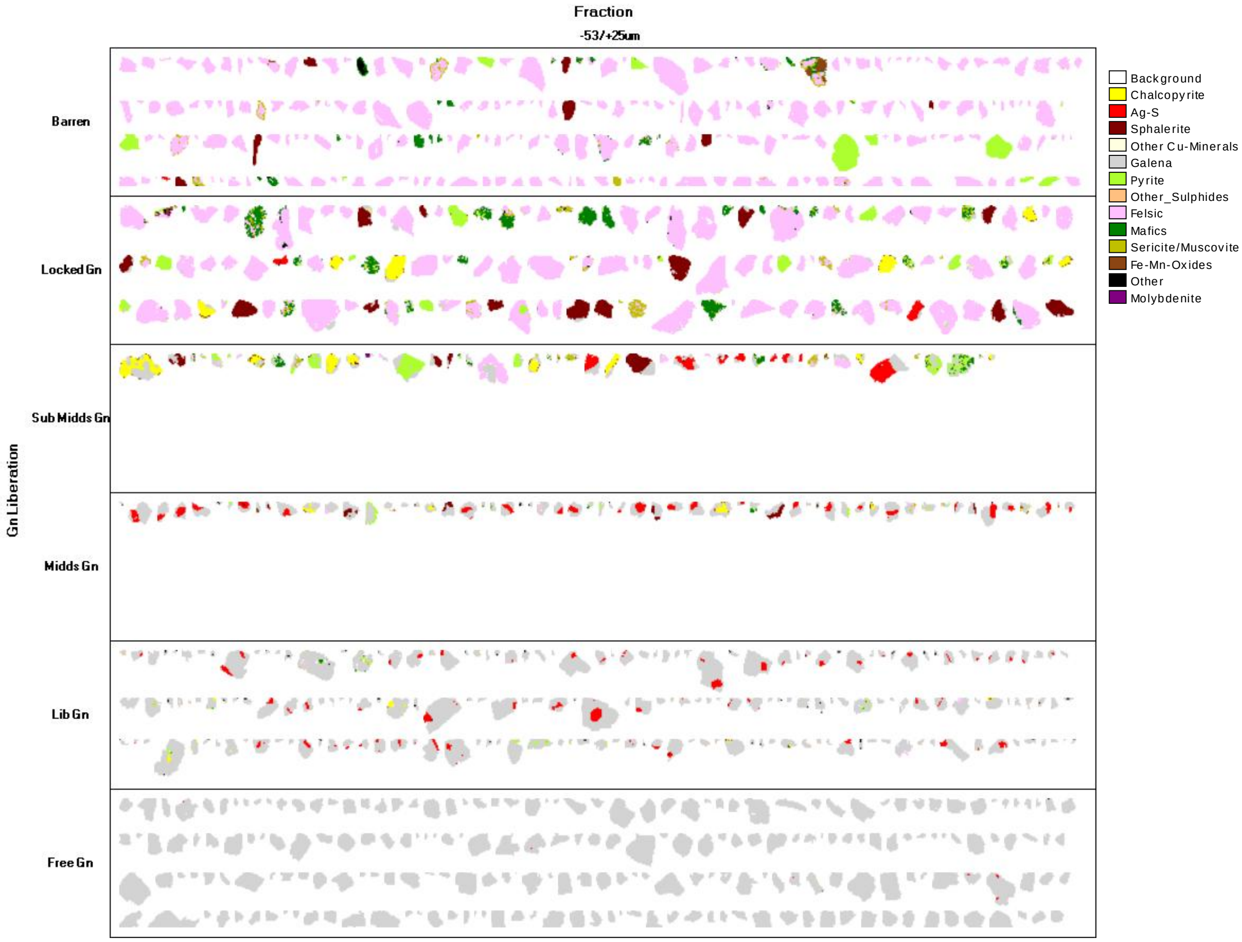



**Figure 21. Galena particle maps sorted on the basis of liberation in the -53/+25 um fraction (PMA)**

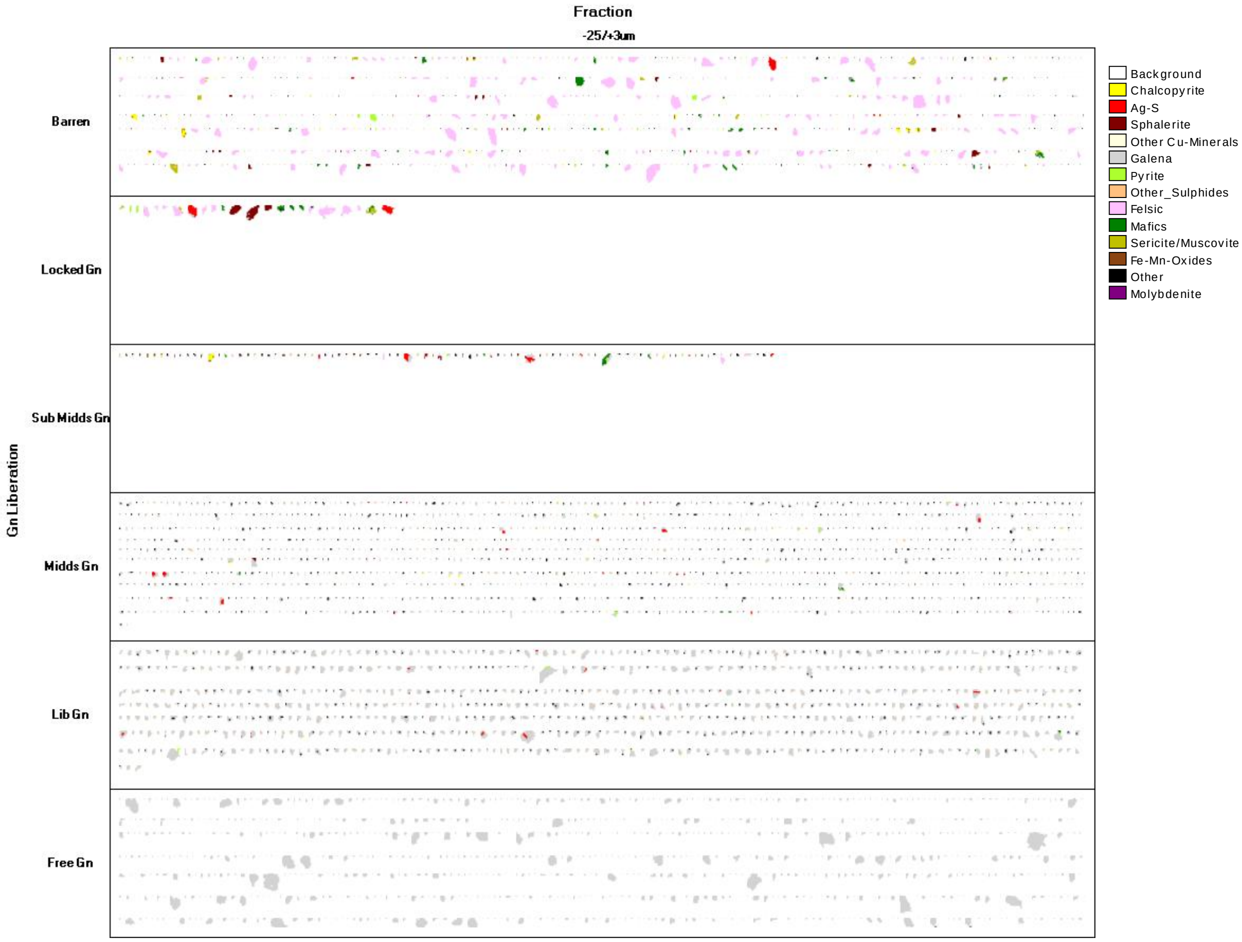
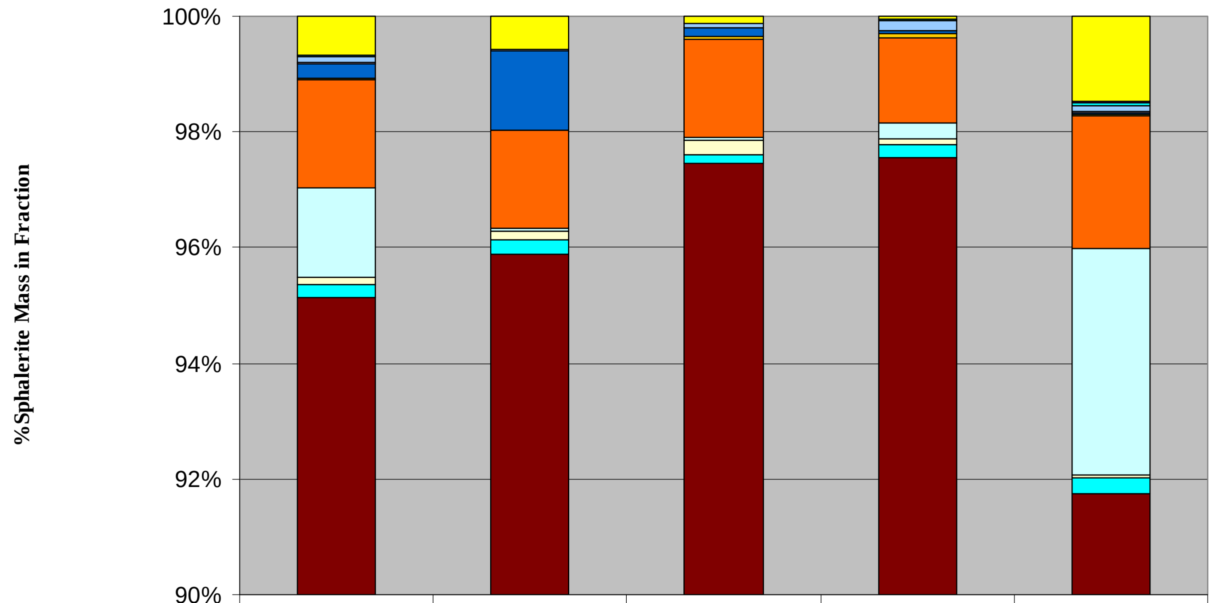



**Figure 22. Galena particle maps sorted on the basis of liberation in the -25 um fraction (PMA)**

## 3.7. Galena Association

Association data for galena association are given in Table 9 and graphically presented in




| | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| Complex | 0.7 | 0.6 | 0.1 | 0.1 | 1.5 |
| Gn:Fe-Mn oxides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Mo | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Gn:Ser/Musc | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Other Cu minerals | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Ag-S | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 |
| Gn:Mafic Gangue | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Felsic Gangue | 0.3 | 1.4 | 0.2 | 0.0 | 0.0 |
| Gn:Sph:Cpy:Py Complex | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Gn:Sph:Py Tern | 1.9 | 1.7 | 1.7 | 1.5 | 2.3 |
| Gn:Other Sulphides | 1.5 | 0.0 | 0.1 | 0.3 | 3.9 |
| Gn:Sphalerite | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 |
| Gn:Pyrite | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 |
| Free Gn | 95.1 | 95.9 | 97.4 | 97.6 | 91.7 |

**Fraction**

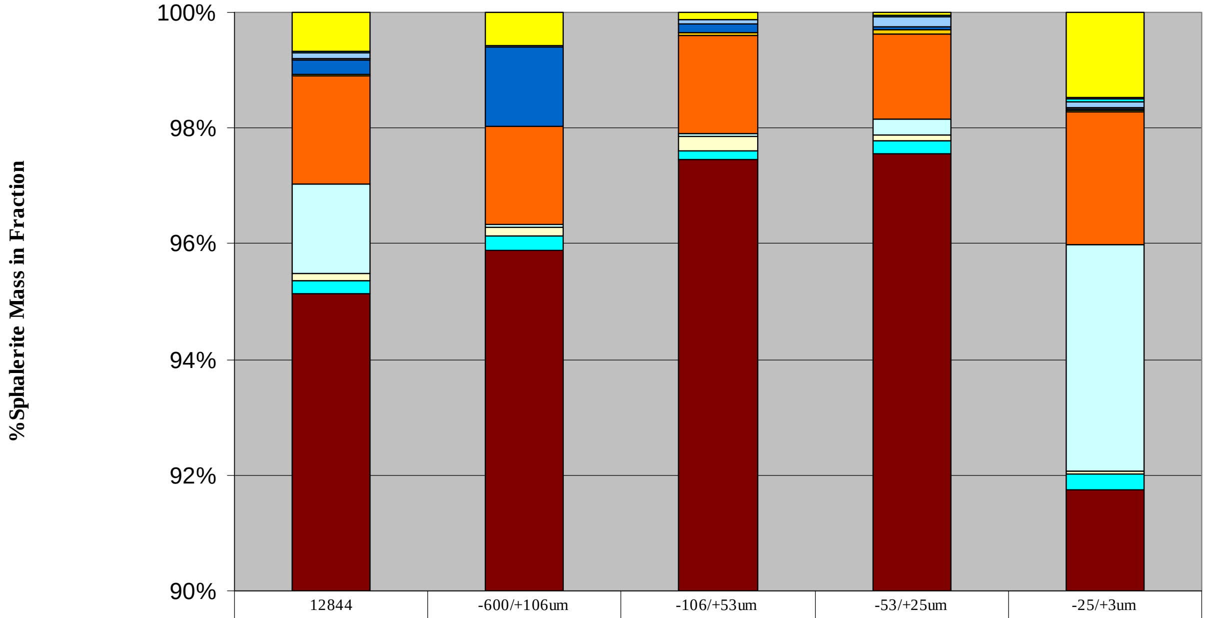
Figure 23. Particle maps are given in Figures 24-28. The main association of galena is the form of ternary middling particles with sphalerite-pyrite (1.9%), other sulphides (1.5%), and complex particles (0.7%). Middling particles show minor variations across the size fractions.

**Table 9. Association Data of Galena in the Sample**

| Mineral mass | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| **Free Gn** | 95.1 | 95.9 | 97.4 | 97.6 | 91.7 |
| **Gn:Pyrite** | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 |

| | | | | | |
|---|---|---|---|---|---|
| **Gn:Sphalerite** | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 |
| **Gn:Other Sulphides** | 1.5 | 0.0 | 0.1 | 0.3 | 3.9 |
| **Gn:Sph:Py Tern** | 1.9 | 1.7 | 1.7 | 1.5 | 2.3 |
| **Gn:Sph:Cpy:Py Complex** | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| **Gn:Felsic Gangue** | 0.3 | 1.4 | 0.2 | 0.0 | 0.0 |
| **Gn:Mafic Gangue** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Gn:Ag-S** | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 |
| **Gn:Other Cu minerals** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Gn:Ser/Musc** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Gn:Mo** | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| **Gn:Fe-Mn oxides** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Complex** | 0.7 | 0.6 | 0.1 | 0.1 | 1.5 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Cpy: chalcopyrite; Gn: galena; Py: pyrite, Sph: sphalerite; Tern: ternary; Ser/Musc: sericite/muscovite; Mo: molybdenite.




| | 12844 | -600/+106um | -106/+53um | -53/+25um | -25/+3um |
|---|---|---|---|---|---|
| Complex | 0.7 | 0.6 | 0.1 | 0.1 | 1.5 |
| Gn:Fe-Mn oxides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Mo | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Gn:Ser/Musc | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Other Cu minerals | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Ag-S | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 |
| Gn:Mafic Gangue | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gn:Felsic Gangue | 0.3 | 1.4 | 0.2 | 0.0 | 0.0 |
| Gn:Sph:Cpy:Py Complex | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Gn:Sph:Py Tern | 1.9 | 1.7 | 1.7 | 1.5 | 2.3 |
| Gn:Other Sulphides | 1.5 | 0.0 | 0.1 | 0.3 | 3.9 |
| Gn:Sphalerite | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 |
| Gn:Pyrite | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 |
| Free Gn | 95.1 | 95.9 | 97.4 | 97.6 | 91.7 |

**Fraction**

**Figure 23. Galena association profile in the sample**

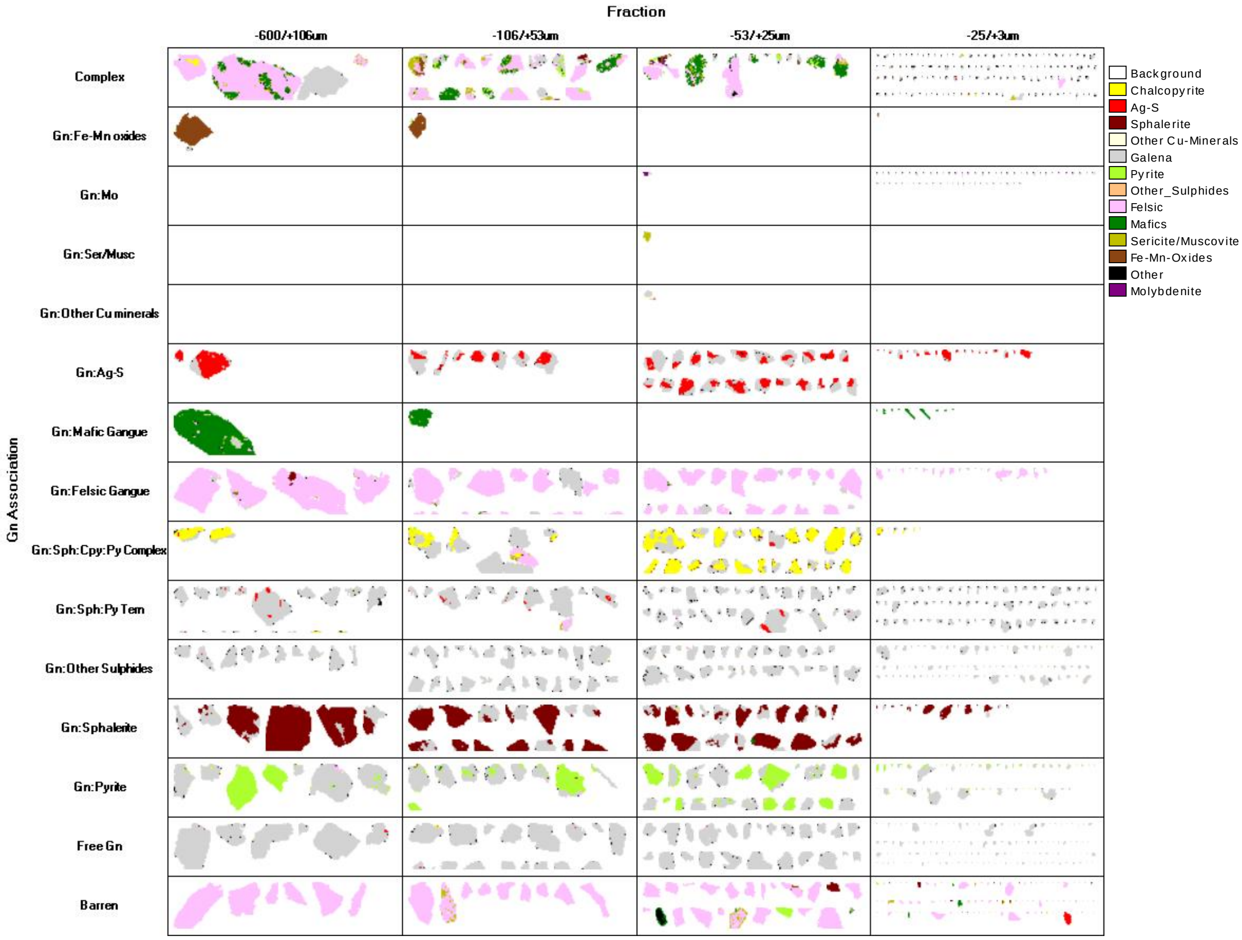



**Figure 24. Galena particle maps sorted on the basis of association in the sample (PMA)**

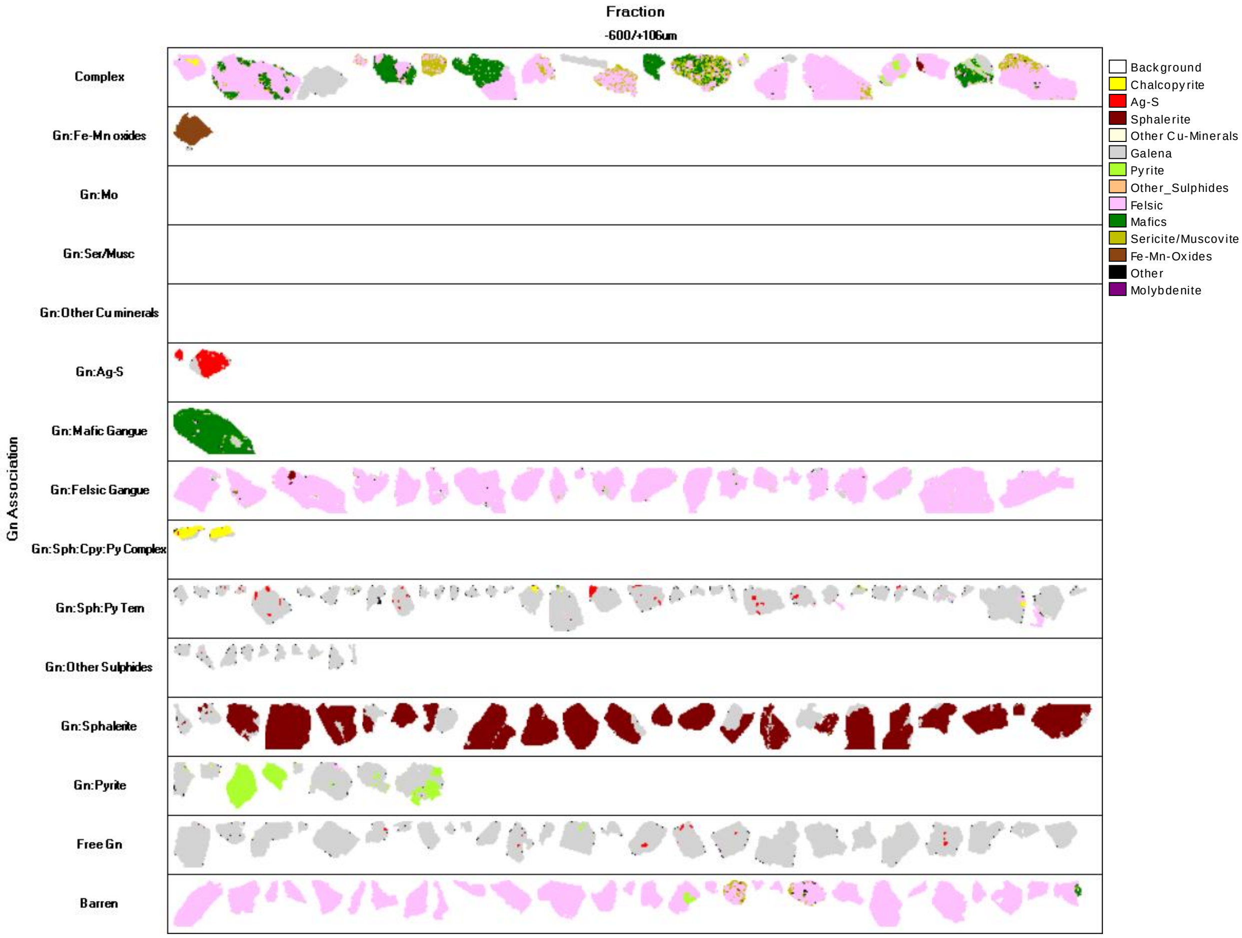



**Figure 25. Galena particle maps sorted on the basis of association in the +106 um fraction (PMA)**

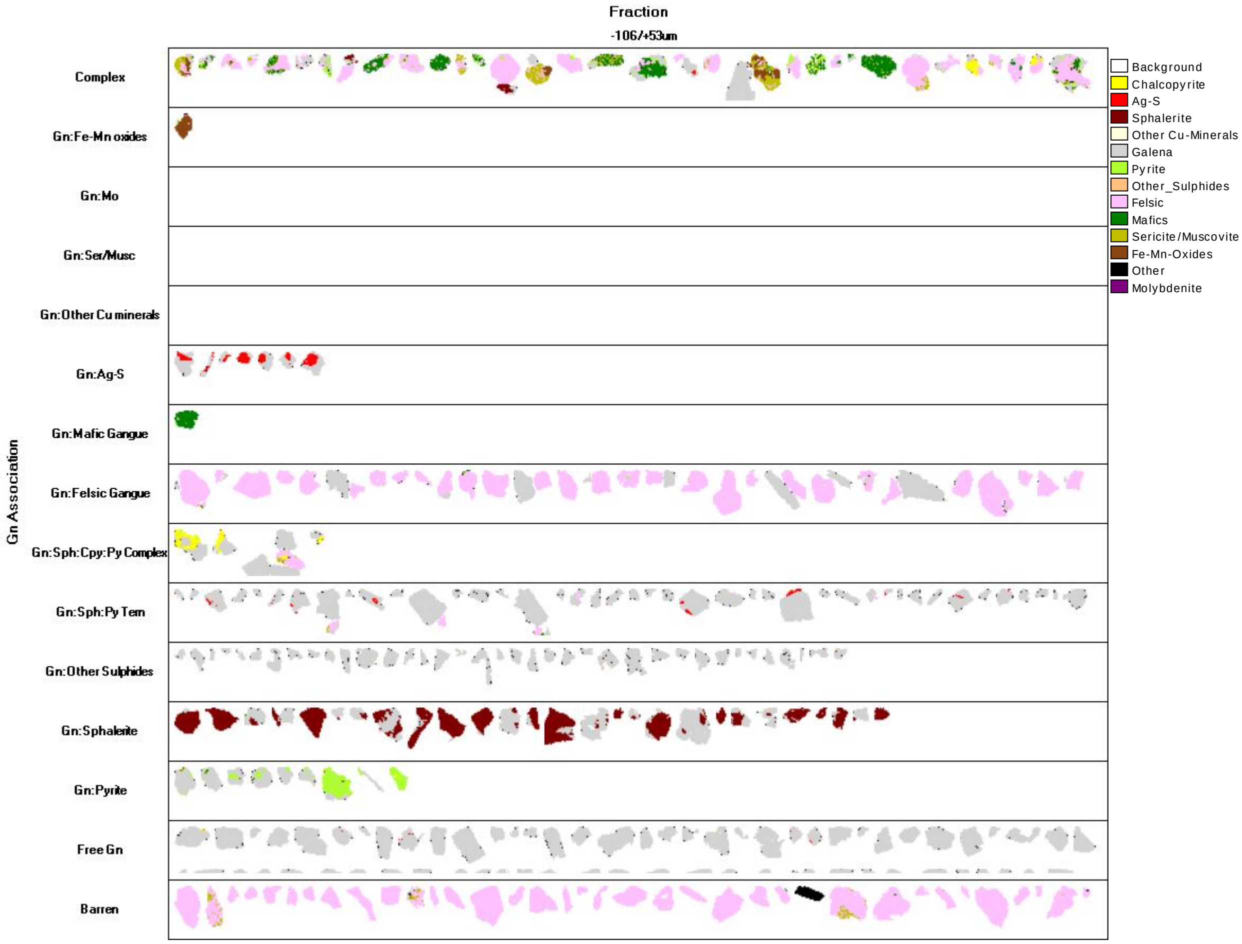



**Figure 26. Galena particle maps sorted on the basis of association in the 106/+53 um fraction (PMA)**

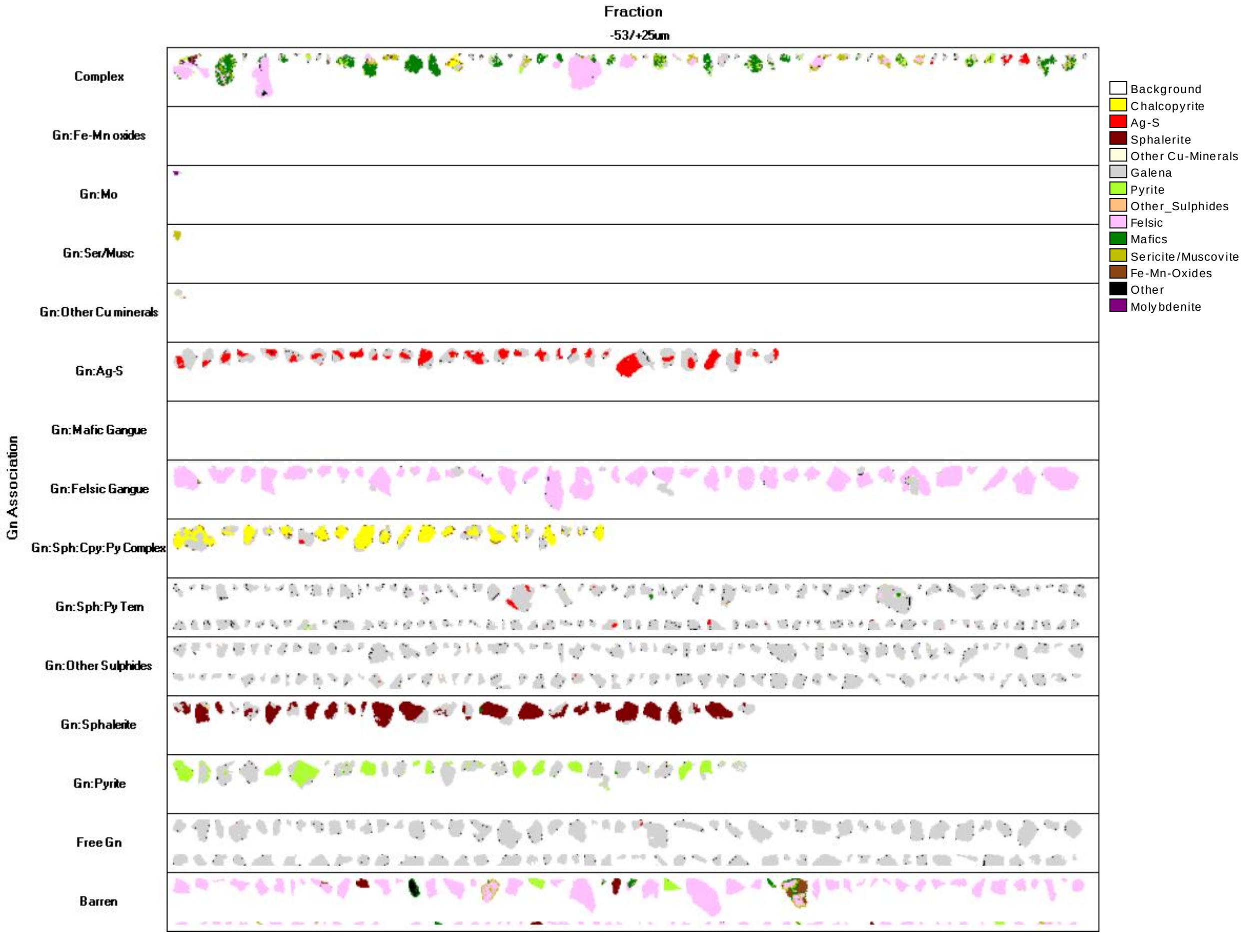



**Figure 27. Galena particle maps sorted on the basis of association in the -53/+25 um fraction (PMA)**

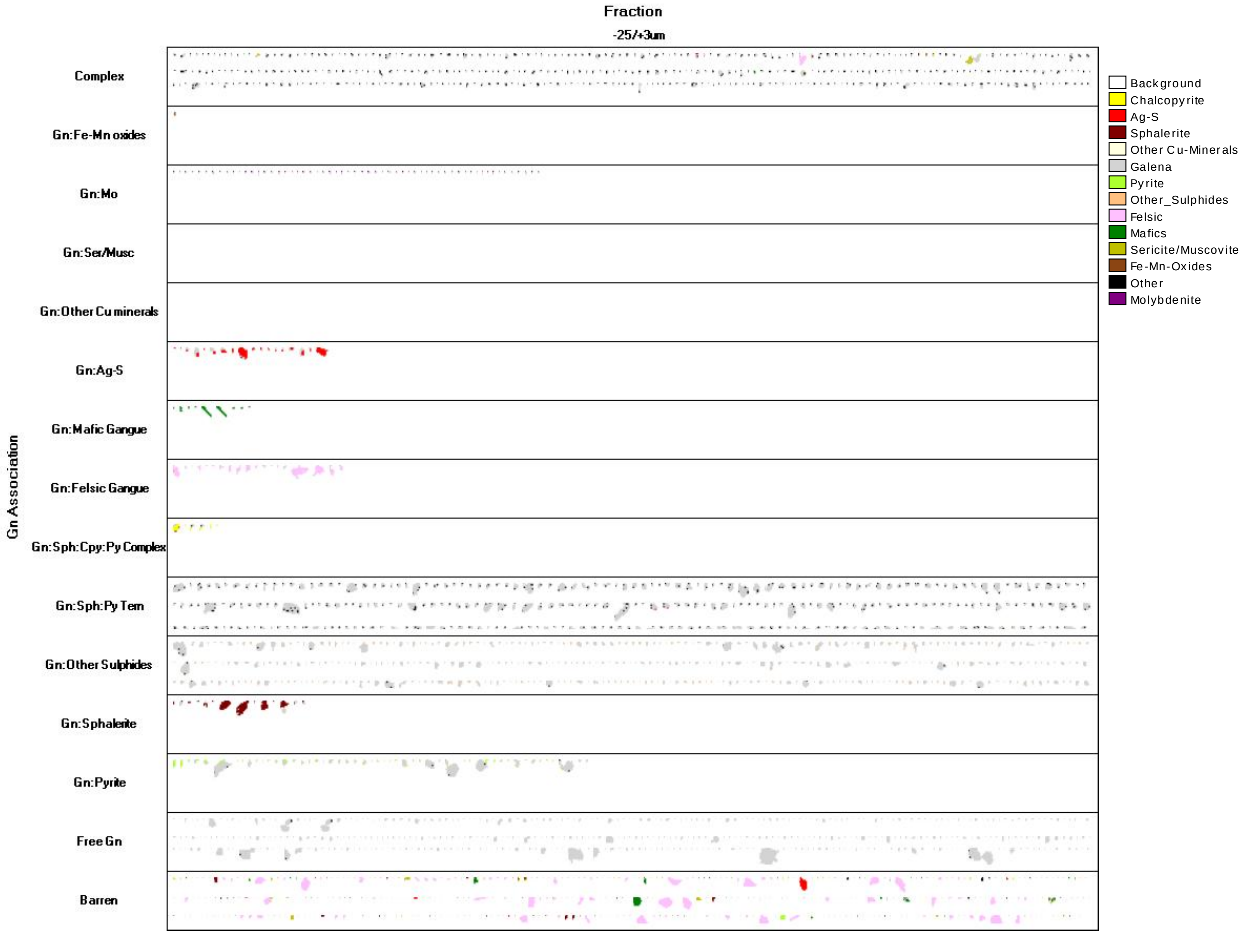



**Figure 28. Galena particle maps sorted on the basis of association in the -25 um fraction (PMA)**

## 3.8. Grain Size Distribution

Figure 29 presents the cumulative grain size distribution for Ag minerals and galena in the sample. The "particle category" reflects the size of all the minerals in the sample. Ag minerals are apparently finer grained than galena. The "particle" curve follows that of the galena reflecting its high abundance in the sample.

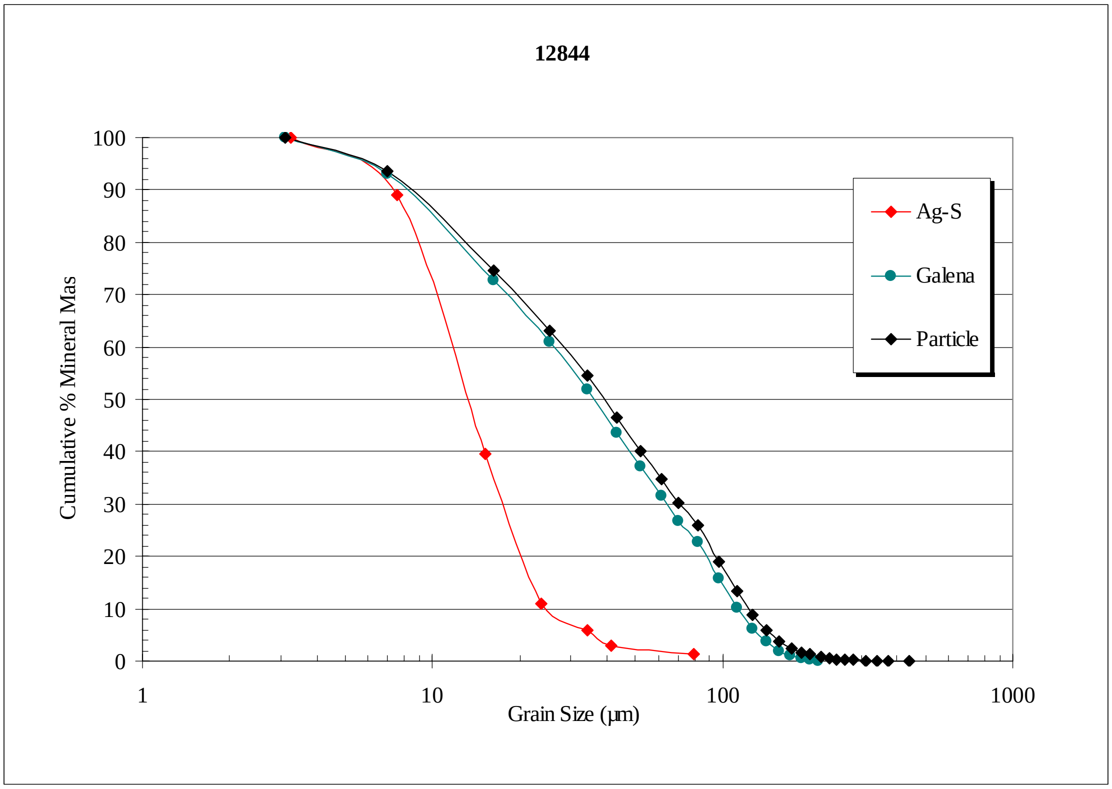



**Figure 29. Grain size distribution of Ag minerals, galena and the whole sample**

# *Appendix 2:* Particle Maps (PMA)


**Figure 30. Particle maps from the +106 um fraction (PMA)**


**Figure 31. Particle maps from the +106 um fraction (PMA)**

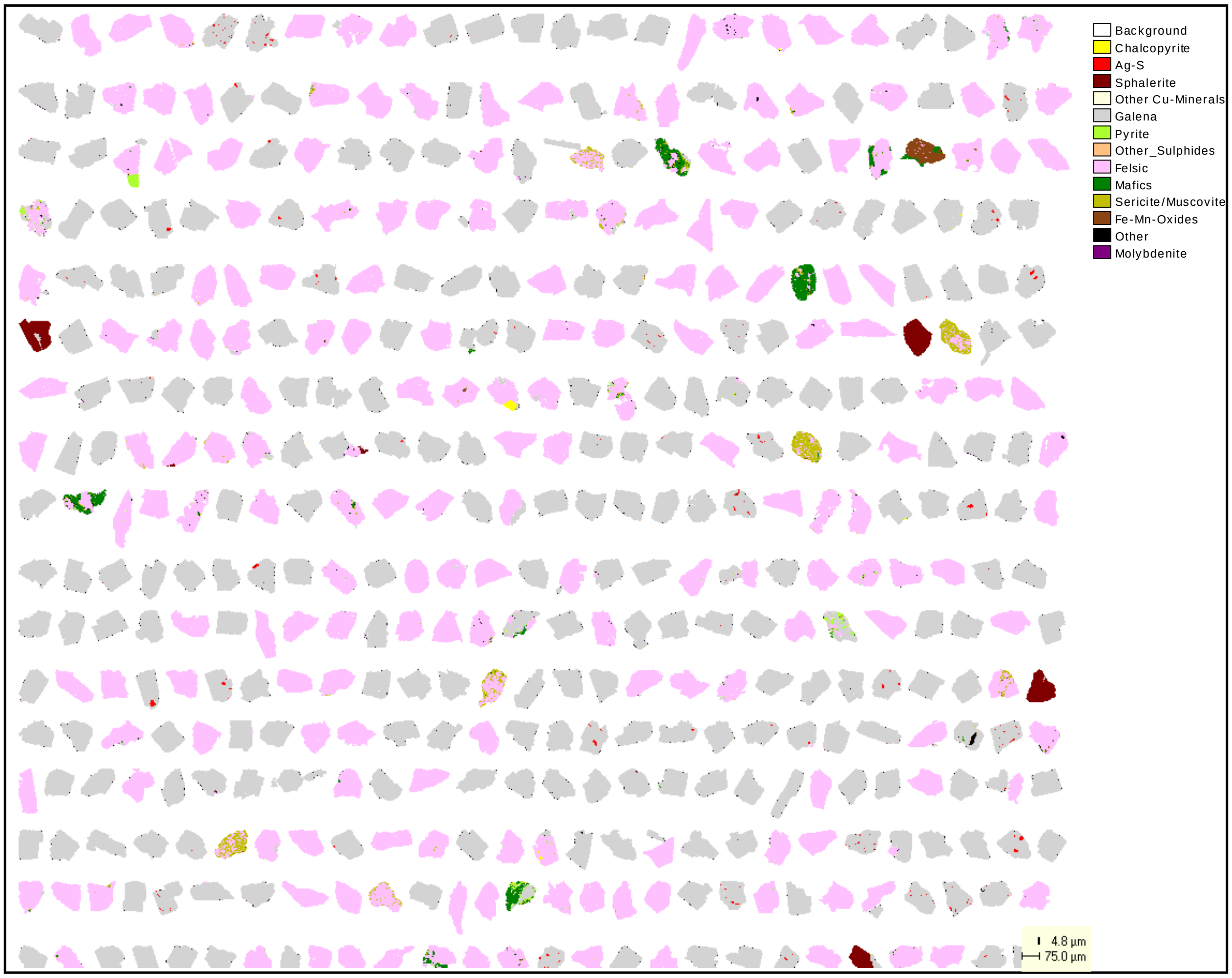



**Figure 32. Particle maps from the +106 um fraction (PMA)**

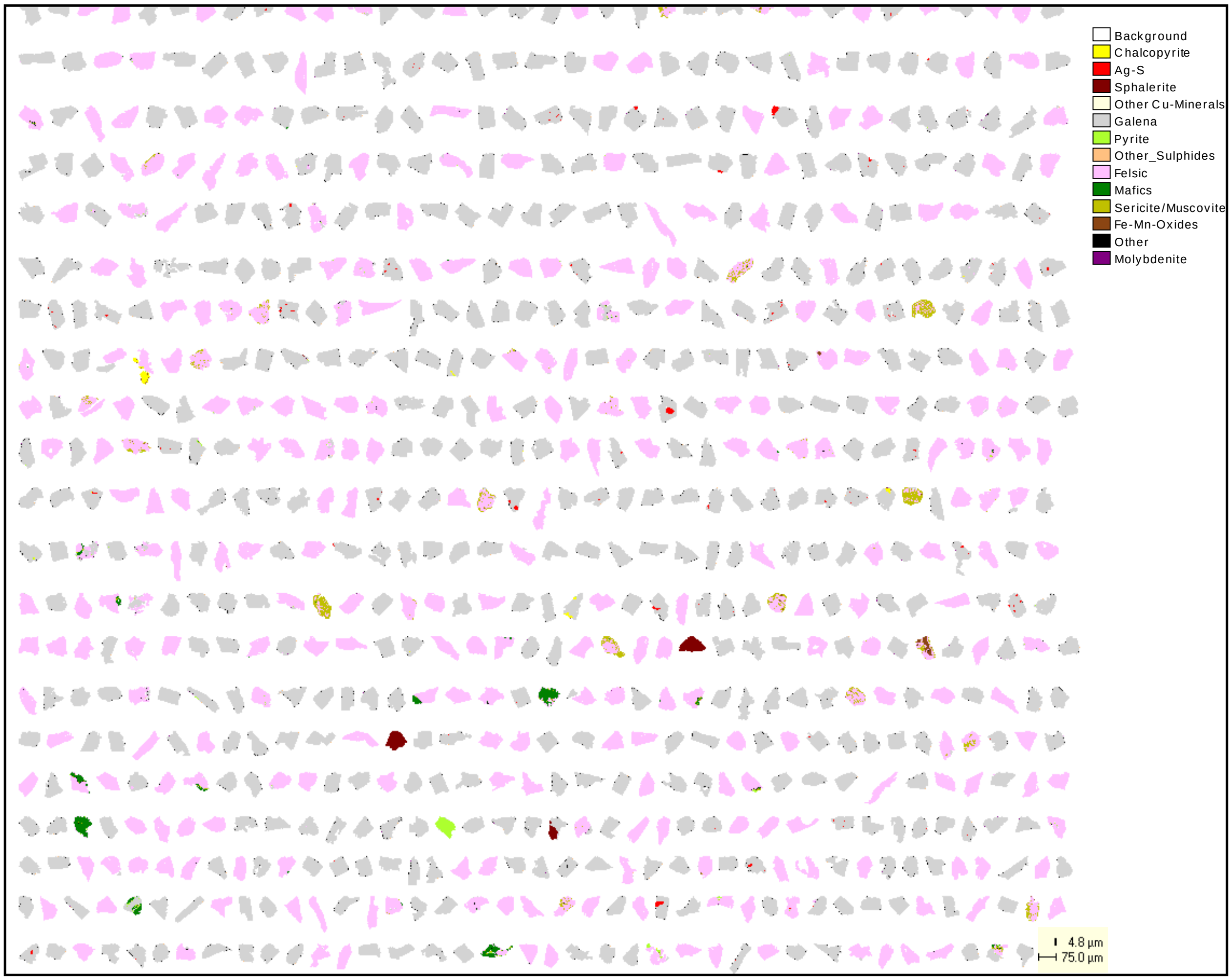



**Figure 33. Particle maps from the +106 um fraction (PMA)**


**Figure 34. Particle maps from the +106 um fraction (PMA)**

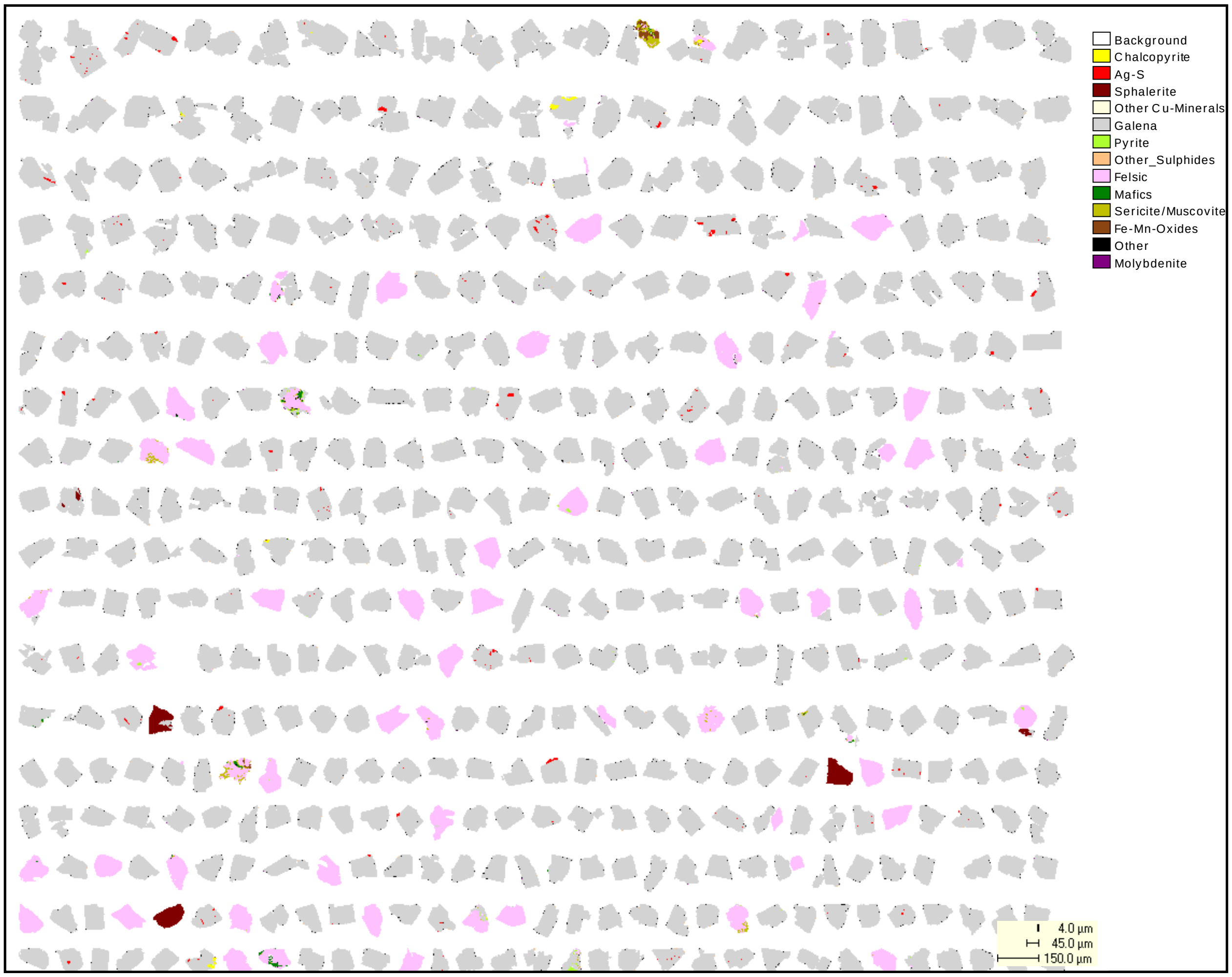



**Figure 35. Particle maps from the -106/+53 um fraction (PMA)**

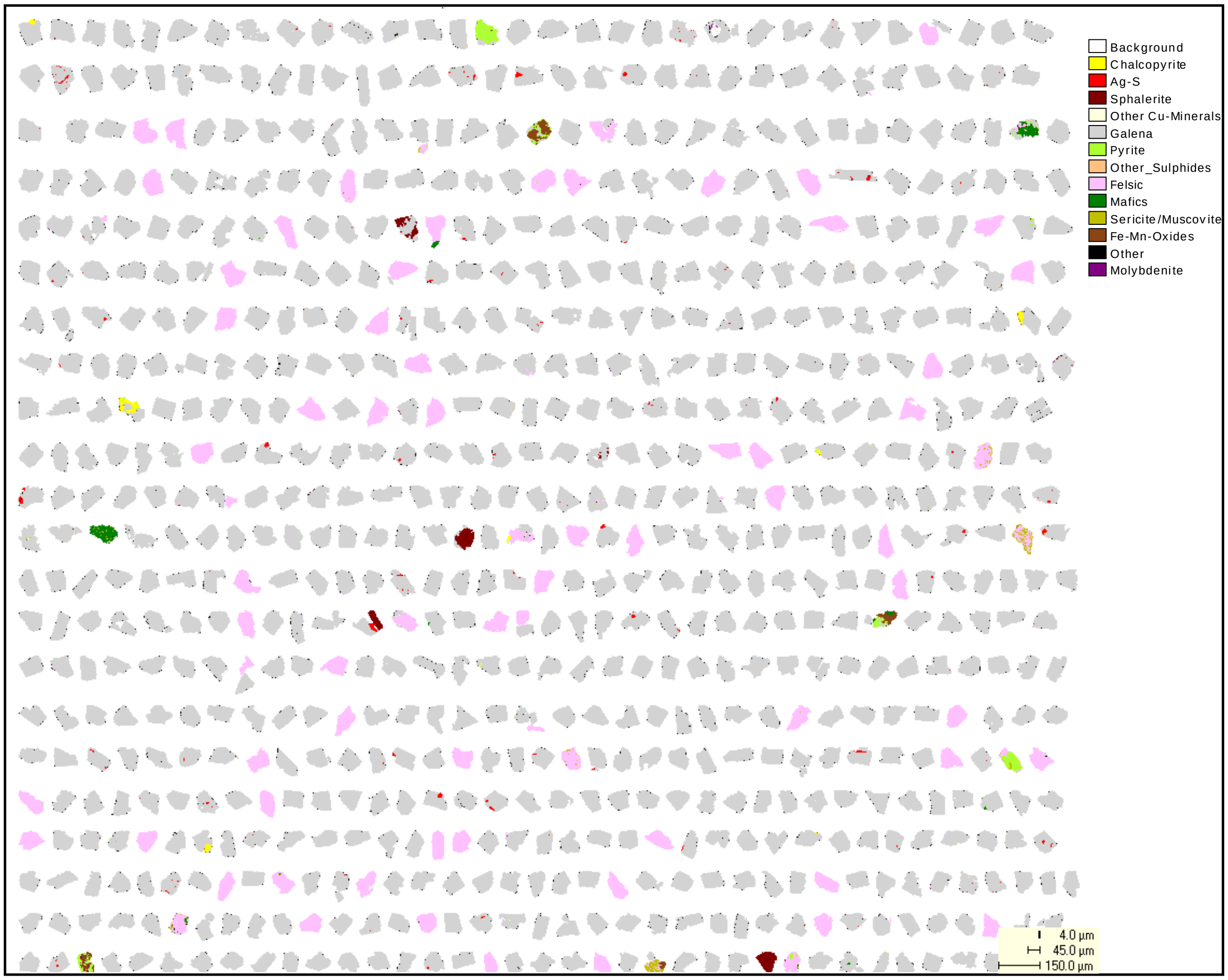



**Figure 36. Particle maps from the -106/+53 um fraction (PMA)**

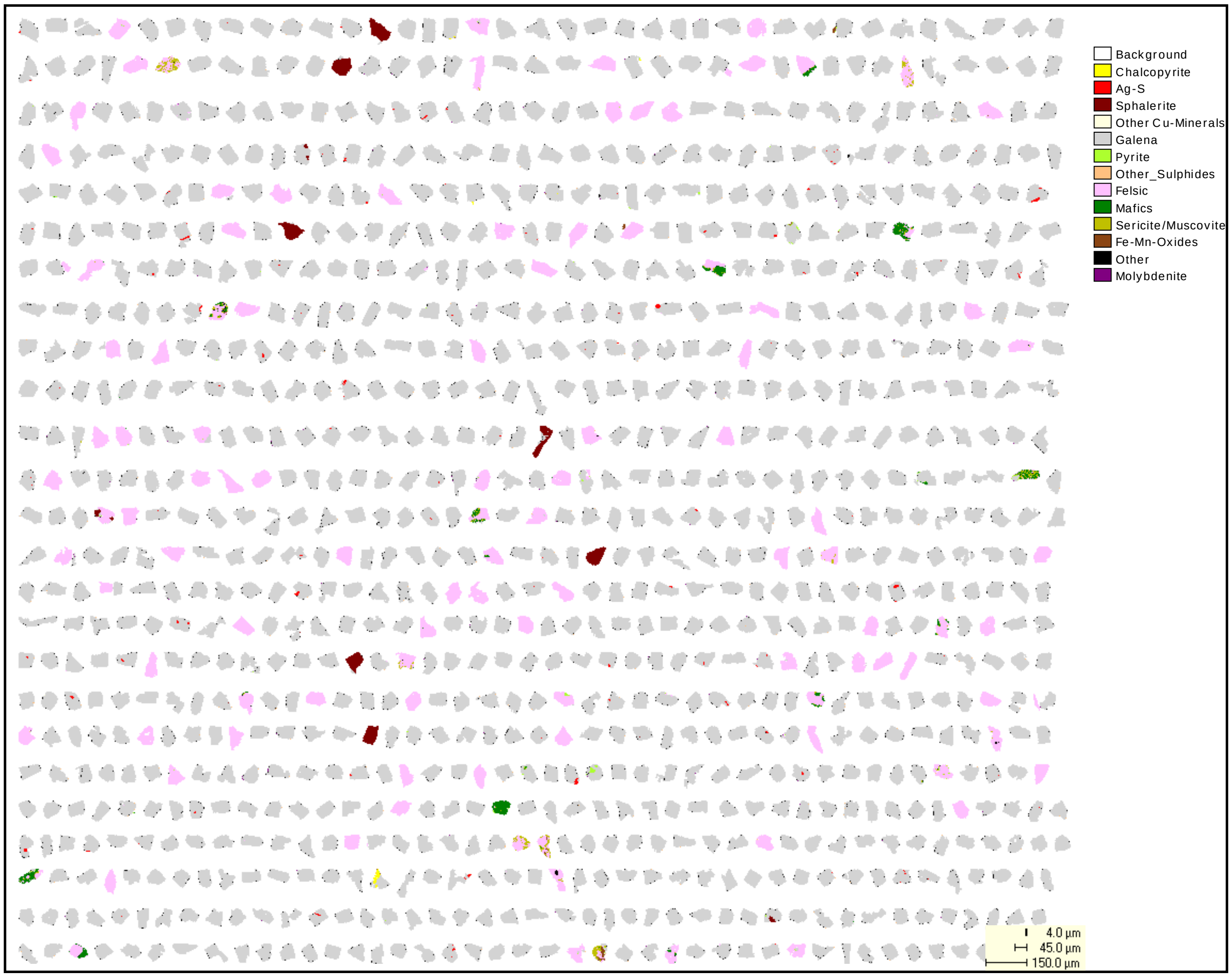



**Figure 37. Particle maps from the -106/+53 um fraction (PMA)**

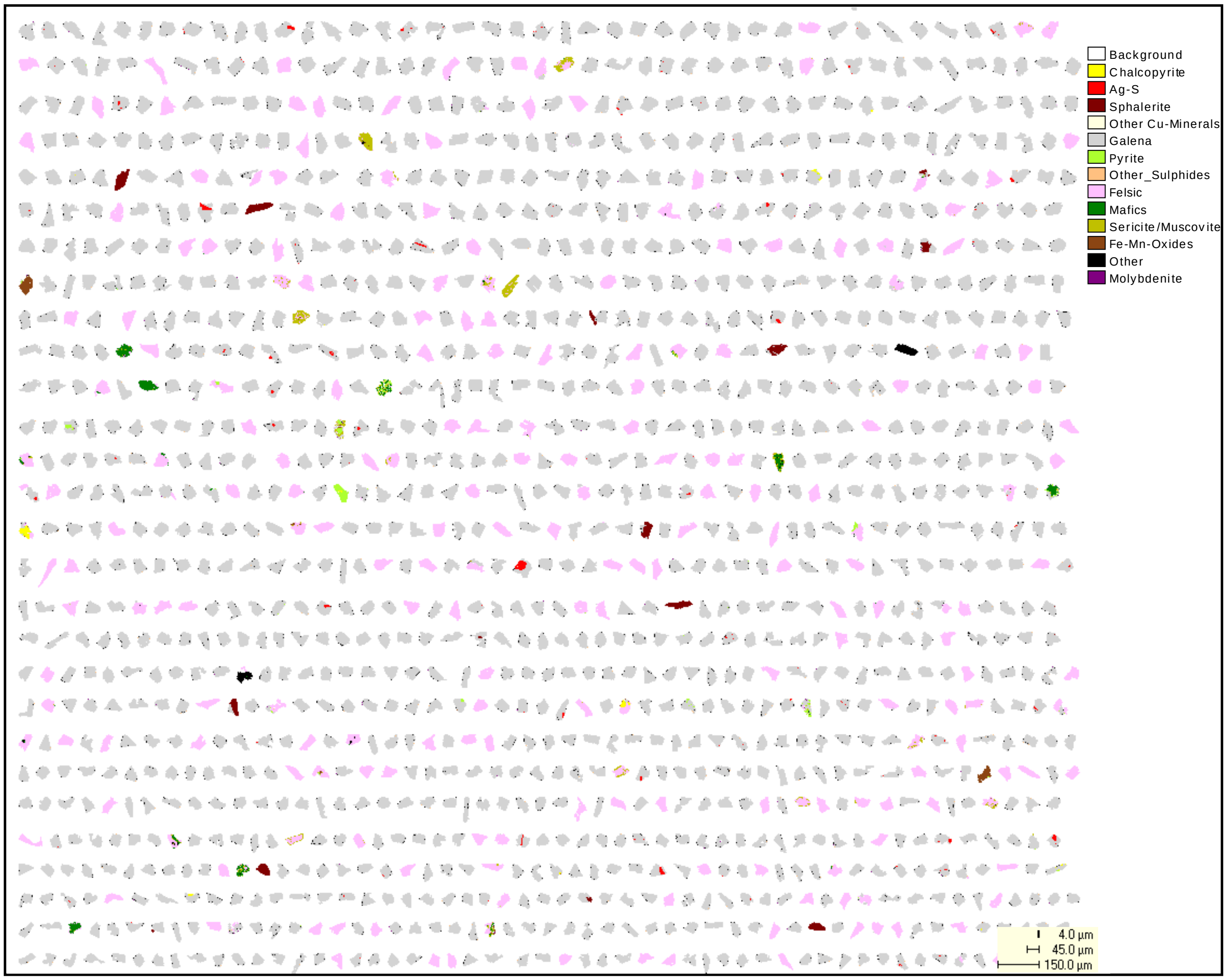



**Figure 38. Particle maps from the -106/+53 um fraction (PMA)**

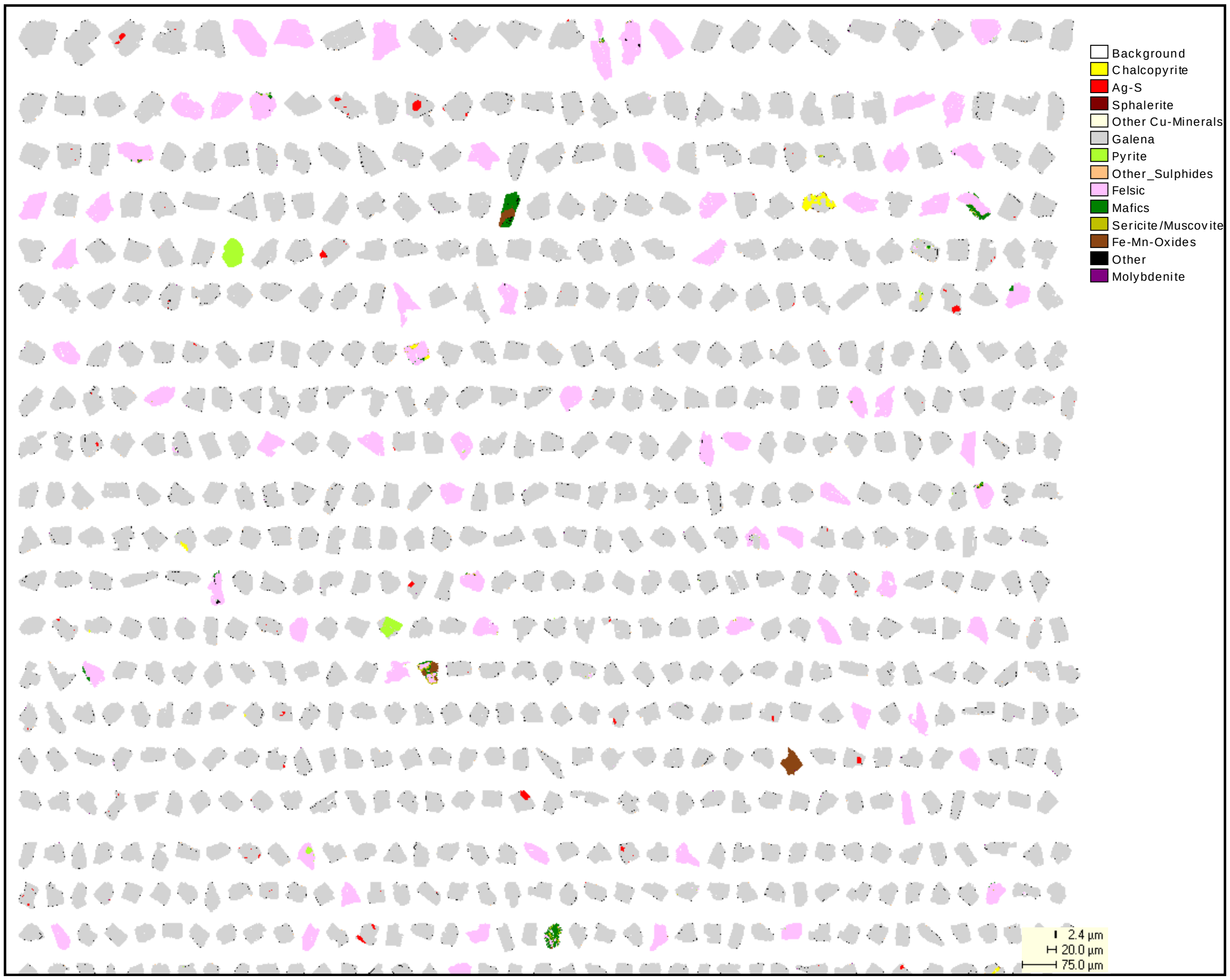



**Figure 39. Particle maps from the -53/+25 um fraction (PMA)**

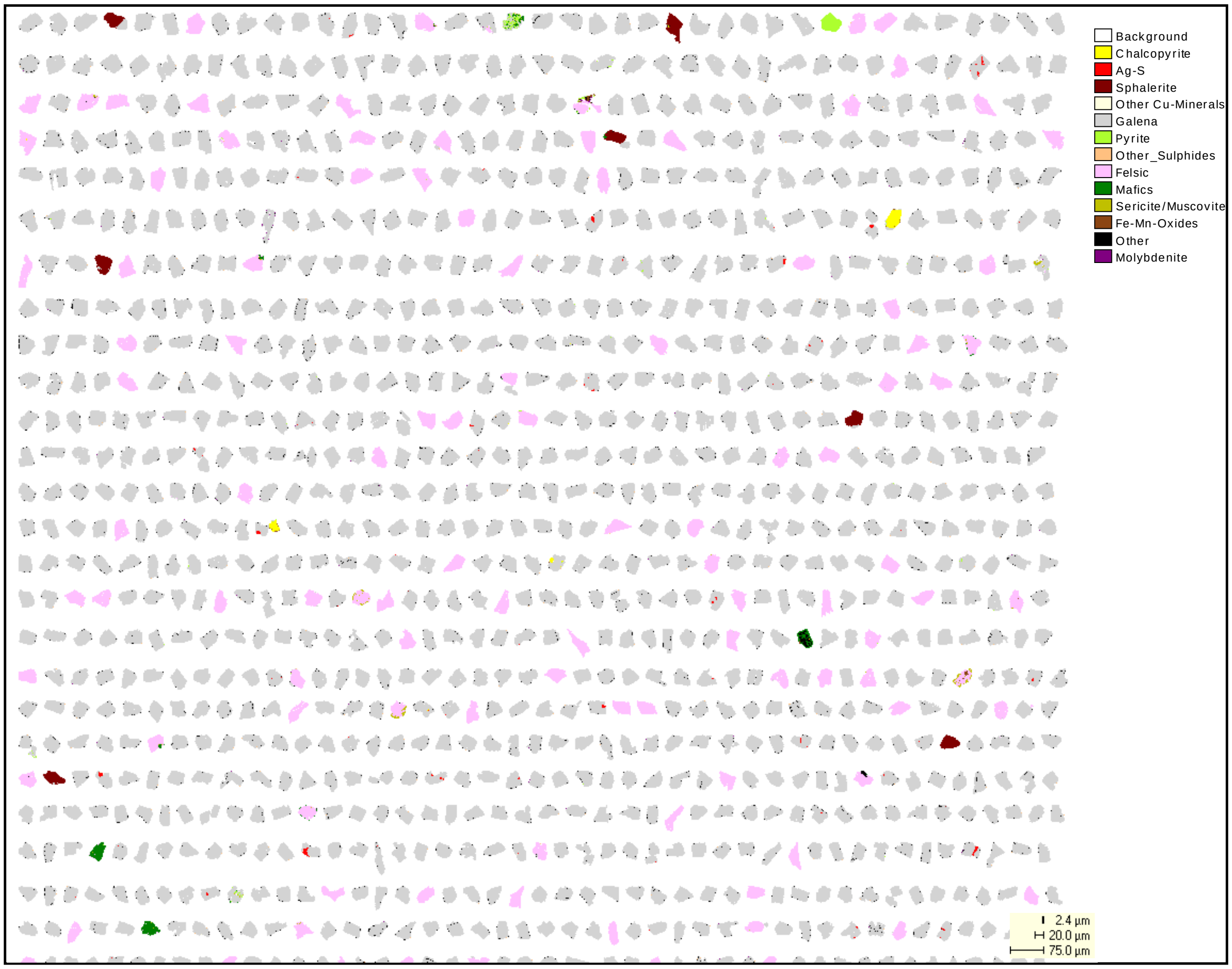



**Figure 40. Particle maps from the -53/+25 um fraction (PMA)**

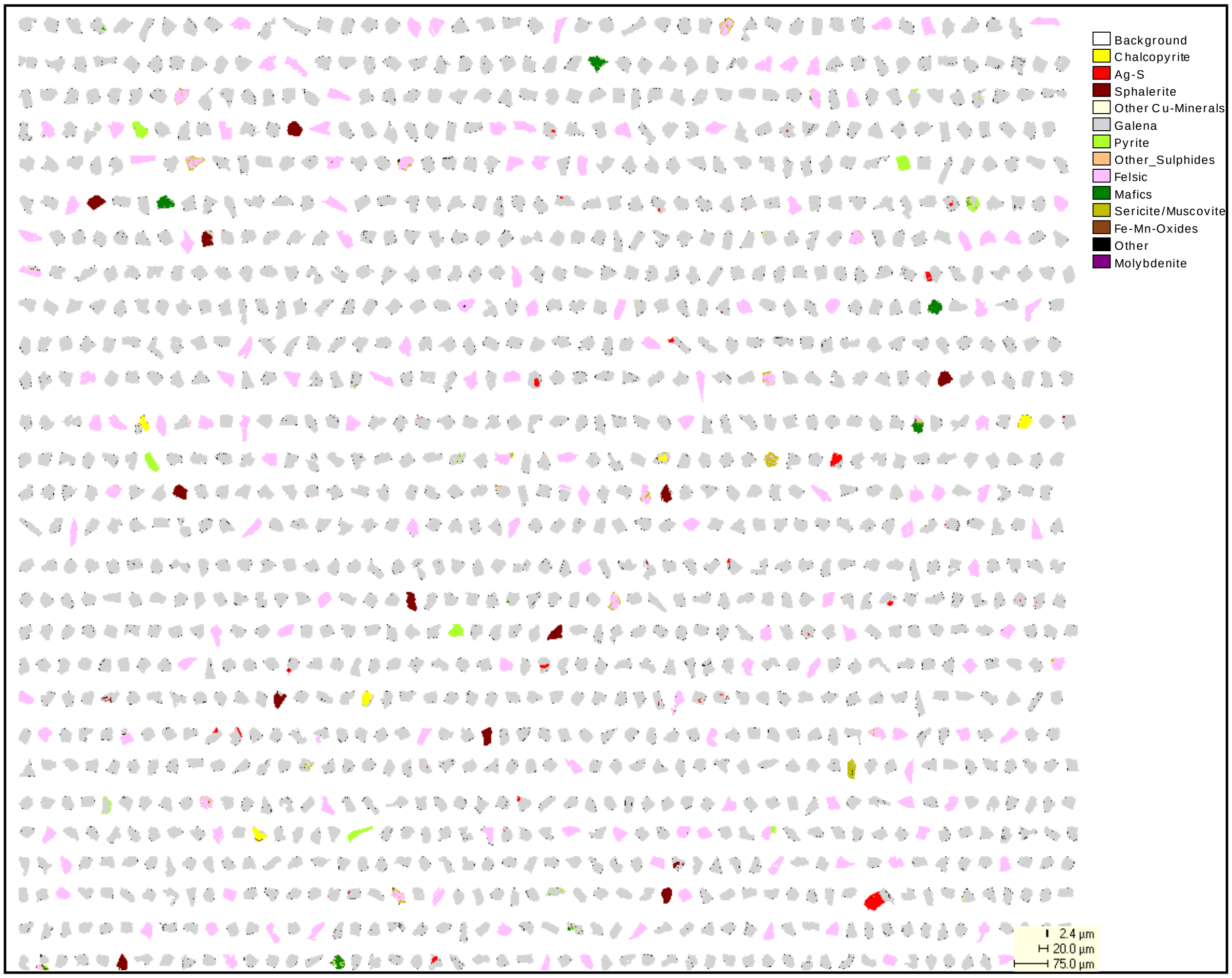



**Figure 41. Particle maps from the -53/+25 um fraction (PMA)**

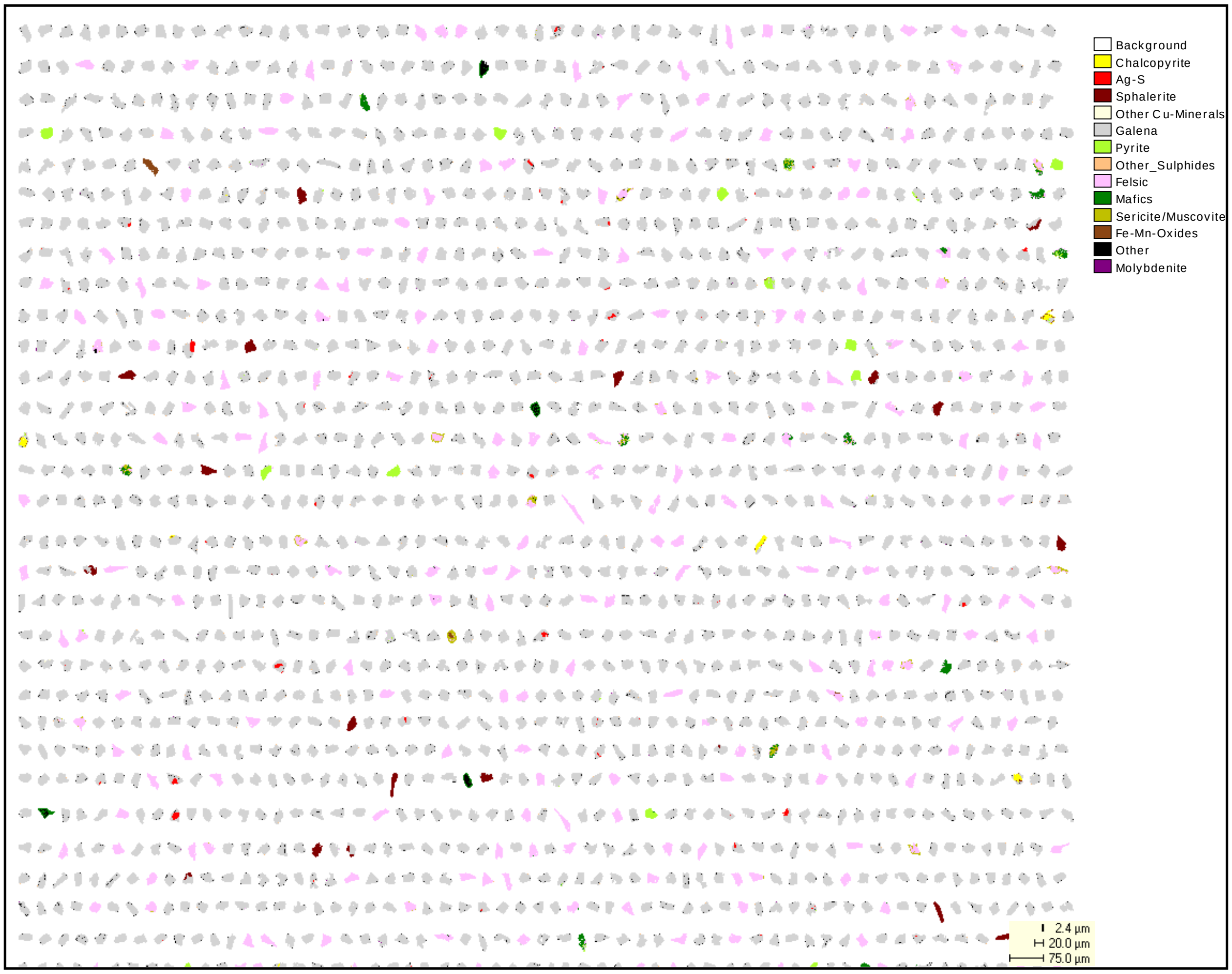



**Figure 42. Particle maps from the -53/+25 um fraction (PMA)**

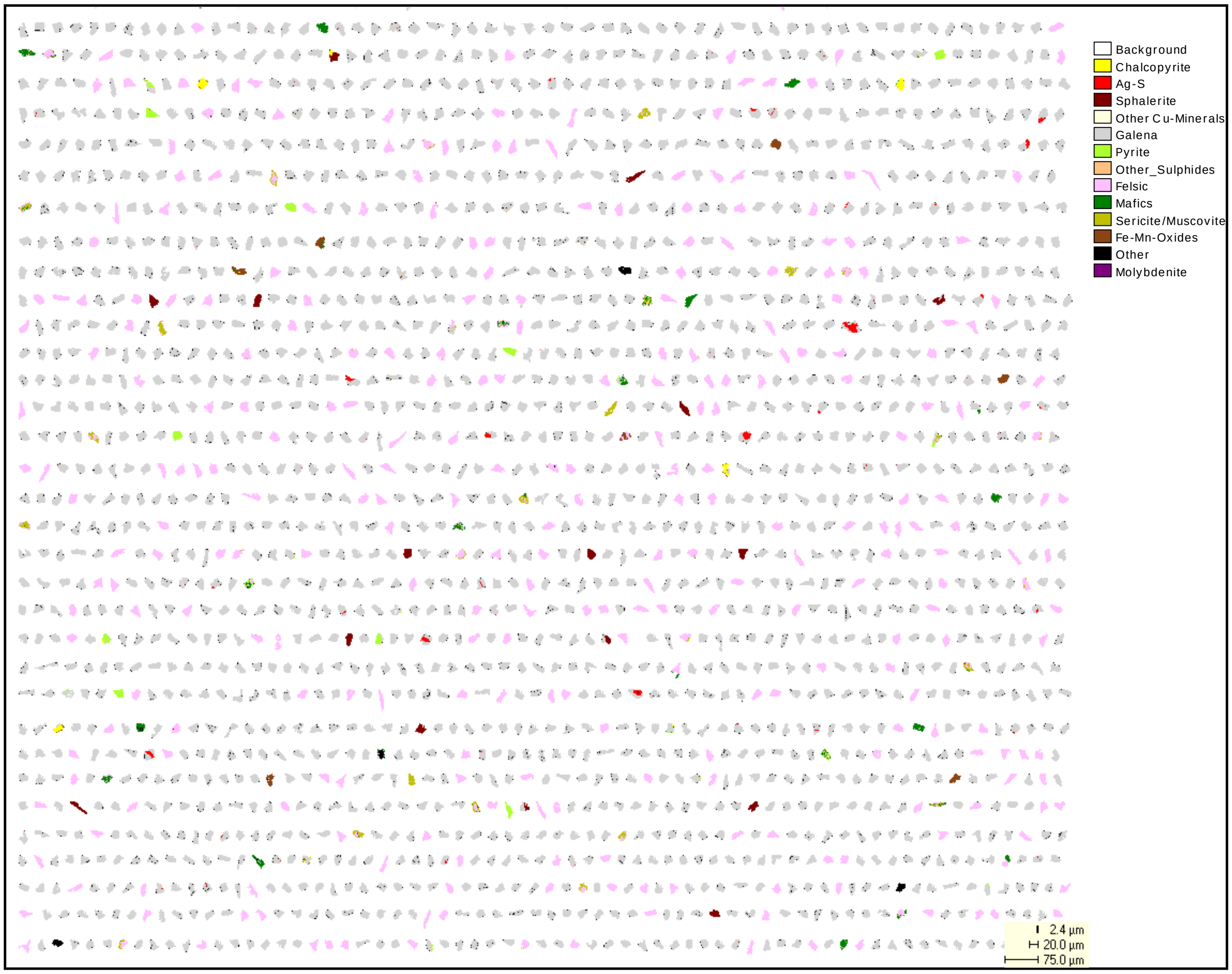



**Figure 43. Particle maps from the -53/+25 um fraction (PMA)**

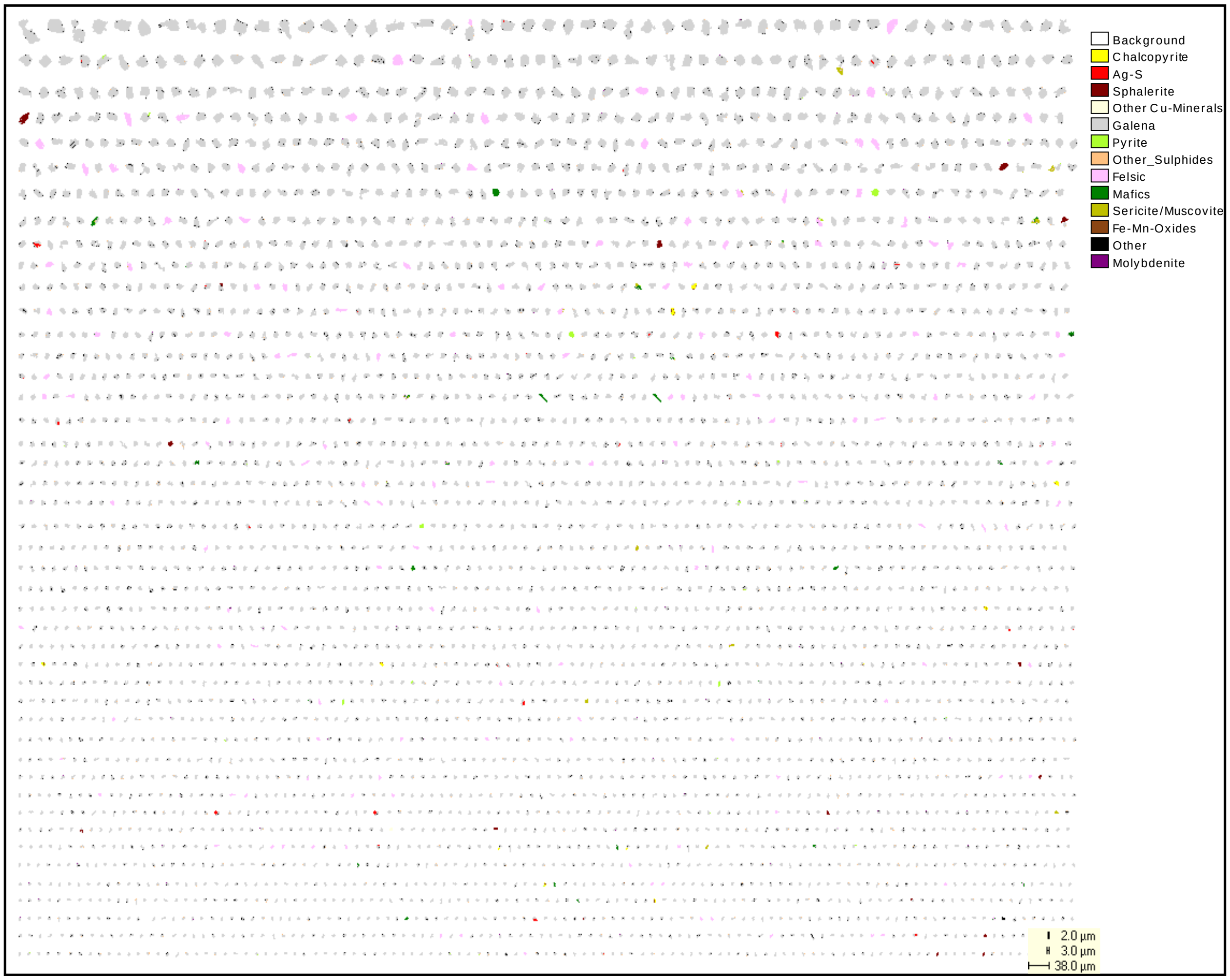



**Figure 44. Particle maps from the -25 um fraction (PMA)**

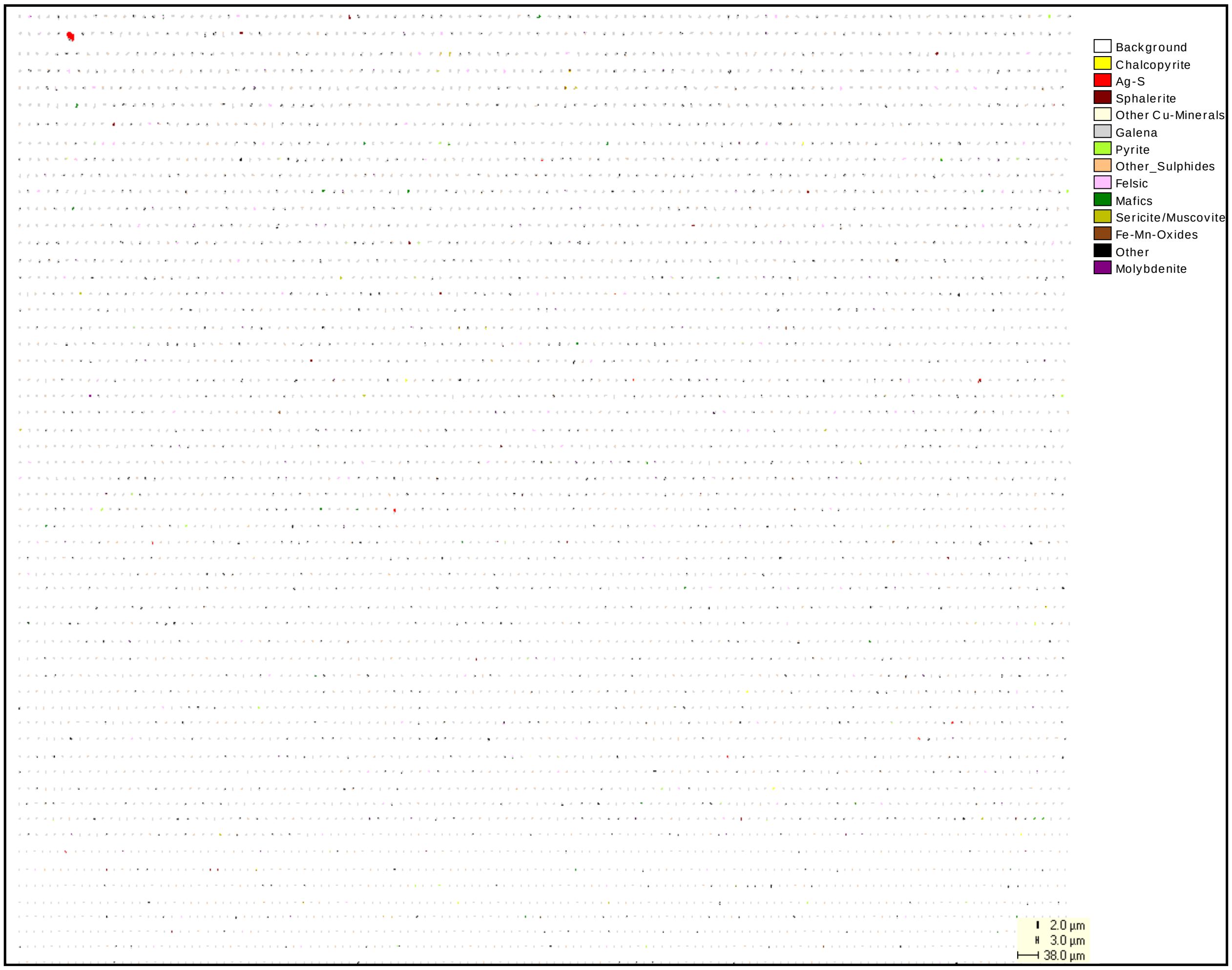



**Figure 45. Particle maps from the -25 um fraction (PMA)**

# ***Appendix 3:*** **Electron Microprobe Analyses**

# Table 10. Electron microprobe analyses of stephanite

| Sample/point | Te | Sb | Ag | Au | S | Pb | Bi | Fe | Cu | Zn | As | Se | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12A-10 | 0.00 | 19.05 | 62.57 | 0.00 | 15.64 | 0.15 | 0.04 | 0.03 | 0.88 | 0.00 | 0.06 | 0.00 | 98.42 |
| 12A 1a | 0.00 | 9.91 | 78.01 | 0.00 | 12.11 | 0.07 | 0.05 | 0.00 | 1.03 | 0.00 | 0.37 | 0.00 | 101.56 |
| 12A-3b | 0.00 | 11.68 | 73.37 | 0.00 | 13.88 | 0.02 | 0.01 | 0.01 | 1.04 | 0.03 | 0.00 | 0.00 | 100.03 |
| 11A 15 | 0.00 | 9.92 | 77.84 | 0.00 | 11.78 | 0.08 | 0.04 | 0.00 | 1.11 | 0.22 | 0.00 | 0.00 | 100.99 |
| 11A 2a | 0.00 | 13.46 | 69.88 | 0.06 | 16.27 | 0.02 | 0.10 | 0.00 | 1.25 | 0.19 | 0.07 | 0.01 | 101.30 |
| 11A 13 | 0.00 | 12.96 | 69.82 | 0.06 | 16.16 | 0.05 | 0.04 | 0.00 | 1.28 | 0.08 | 0.02 | 0.01 | 100.48 |
| 11A 14 | 0.00 | 11.06 | 75.93 | 0.01 | 13.32 | 0.09 | 0.05 | 0.00 | 1.30 | 0.08 | 0.00 | 0.02 | 101.85 |
| 11A 16 | 0.00 | 13.21 | 68.28 | 0.00 | 16.21 | 0.23 | 0.07 | 0.03 | 1.39 | 0.00 | 0.05 | 0.00 | 99.46 |
| 12A-14 | 0.00 | 13.56 | 66.69 | 0.02 | 17.02 | 0.06 | 0.04 | 0.00 | 1.46 | 0.19 | 0.00 | 0.00 | 99.04 |
| 12A 2a | 0.00 | 12.65 | 66.95 | 0.00 | 14.59 | 0.18 | 0.00 | 0.02 | 1.48 | 0.23 | 0.90 | 0.01 | 97.01 |
| 12A 3a | 0.00 | 10.55 | 77.43 | 0.00 | 11.42 | 0.11 | 0.07 | 0.03 | 1.49 | 0.09 | 0.00 | 0.03 | 101.21 |
| 12A-25 | 0.00 | 11.86 | 70.06 | 0.02 | 15.67 | 0.32 | 0.06 | 0.01 | 1.52 | 0.06 | 0.00 | 0.02 | 99.59 |
| 12A 1c | 0.00 | 12.38 | 69.47 | 0.00 | 15.56 | 0.19 | 0.03 | 0.00 | 1.57 | 0.00 | 0.07 | 0.00 | 99.27 |
| 12A-3a | 0.00 | 10.04 | 75.90 | 0.00 | 12.44 | 0.32 | 0.00 | 0.00 | 1.57 | 0.10 | 0.12 | 0.00 | 100.49 |
| 12A-15 | 0.00 | 11.74 | 70.01 | 0.03 | 16.22 | 0.06 | 0.03 | 0.00 | 1.63 | 0.03 | 0.00 | 0.00 | 99.75 |
| 12A-1 | 0.00 | 13.08 | 69.87 | 0.00 | 15.38 | 0.06 | 0.00 | 0.00 | 1.69 | 0.00 | 0.00 | 0.00 | 100.08 |
| 12A-8 | 0.00 | 13.01 | 69.79 | 0.00 | 15.28 | 0.05 | 0.00 | 0.00 | 1.70 | 0.07 | 0.06 | 0.02 | 99.96 |
| 12A-21 | 0.00 | 13.38 | 68.82 | 0.00 | 16.89 | 0.26 | 0.06 | 0.00 | 1.74 | 0.07 | 0.00 | 0.00 | 101.22 |
| 12A-6 | 0.00 | 12.12 | 69.68 | 0.04 | 16.08 | 0.00 | 0.11 | 0.00 | 1.79 | 0.21 | 0.00 | 0.01 | 100.03 |
| 11A 3a | 0.00 | 12.47 | 68.23 | 0.00 | 14.76 | 0.00 | 0.05 | 0.00 | 1.79 | 0.08 | 0.00 | 0.00 | 97.38 |
| 11A 11 | 0.00 | 11.75 | 67.56 | 0.00 | 15.18 | 0.04 | 0.11 | 0.00 | 1.87 | 0.00 | 0.00 | 0.00 | 96.51 |
| 11A 12 | 0.00 | 11.77 | 68.67 | 0.02 | 15.55 | 0.00 | 0.04 | 0.00 | 2.00 | 0.03 | 0.23 | 0.03 | 98.33 |
| 12A-27 | 0.00 | 11.05 | 71.04 | 0.00 | 15.45 | 0.10 | 0.06 | 0.00 | 2.02 | 0.00 | 0.00 | 0.00 | 99.72 |
| 12A-22 | 0.00 | 11.70 | 69.28 | 0.03 | 15.17 | 0.00 | 0.05 | 0.00 | 2.07 | 0.09 | 0.00 | 0.00 | 98.38 |
| 12A-7 | 0.00 | 11.78 | 67.55 | 0.00 | 16.38 | 0.10 | 0.09 | 0.00 | 2.10 | 0.00 | 0.00 | 0.01 | 98.00 |
| 12A-24 | 0.00 | 11.31 | 68.17 | 0.03 | 15.42 | 0.14 | 0.03 | 0.00 | 2.10 | 0.06 | 0.00 | 0.00 | 97.25 |
| 11A 17 | 0.00 | 10.44 | 65.49 | 0.02 | 13.83 | 3.87 | 0.12 | 0.04 | 2.14 | 0.01 | 0.29 | 0.02 | 96.26 |
| 11A 1a | 0.00 | 12.18 | 70.90 | 0.00 | 15.30 | 0.00 | 0.08 | 0.01 | 2.17 | 0.00 | 0.07 | 0.00 | 100.71 |
| 12A-16 | 0.00 | 10.64 | 69.21 | 0.00 | 14.40 | 0.00 | 0.06 | 0.00 | 2.27 | 0.13 | 0.24 | 0.02 | 96.95 |
| 12A 4b (vein) | 0.00 | 8.68 | 72.95 | 0.00 | 14.32 | 0.00 | 0.08 | 0.02 | 2.58 | 0.18 | 1.10 | 0.02 | 99.94 |
| MIN | 0.00 | 8.68 | 62.57 | 0.00 | 11.42 | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.00 | 0.00 | 96.26 |
| MAX | 0.00 | 19.05 | 78.01 | 0.06 | 17.02 | 3.87 | 0.12 | 0.04 | 2.58 | 0.23 | 1.10 | 0.03 | 101.85 |
| AVE | 0.00 | 11.98 | 70.31 | 0.01 | 14.92 | 0.22 | 0.05 | 0.01 | 1.67 | 0.07 | 0.12 | 0.01 | 99.37 |
| STDEV | 0.00 | 1.80 | 3.68 | 0.02 | 1.48 | 0.70 | 0.03 | 0.01 | 0.41 | 0.08 | 0.26 | 0.01 | 1.59 |

| | Detection limits (%) |
|---|---|
| Te | 0.05 |
| Sb | 0.044 |
| Ag | 0.064 |
| Au | 0.136 |
| S | 0.027 |
| Pb | 0.104 |
| Bi | 0.135 |
| Fe | 0.097 |
| Ni | 0.141 |
| Zn | 0.24 |
| Cu | 0.189 |
| As | 0.043 |
| Se | 0.042 |

# Table 11. Electron microprobe analyses of freibergite

| Sample/point | Te | Sb | Ag | Au | S | Pb | Bi | Fe | Cu | Zn | As | Se | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11A 2 | 0.00 | 27.38 | 18.41 | 0.00 | 22.28 | 0.15 | 0.03 | 0.51 | 22.47 | 5.81 | 0.54 | 0.00 | 97.58 |
| 11A 4 | 0.00 | 27.37 | 18.41 | 0.00 | 22.16 | 0.06 | 0.12 | 0.44 | 22.83 | 6.24 | 0.00 | 0.03 | 97.66 |
| 11A 10 | 0.00 | 27.31 | 18.43 | 0.01 | 22.29 | 0.01 | 0.00 | 0.57 | 22.84 | 6.00 | 0.04 | 0.00 | 97.50 |
| 12A-18 | 0.00 | 27.18 | 18.14 | 0.00 | 22.60 | 0.15 | 0.07 | 0.83 | 22.94 | 5.07 | 0.00 | 0.00 | 96.97 |
| 11A 6 | 0.00 | 27.22 | 18.23 | 0.00 | 22.20 | 0.14 | 0.08 | 1.64 | 22.99 | 3.70 | 0.16 | 0.00 | 96.35 |
| 12A-17 | 0.00 | 27.06 | 18.13 | 0.00 | 22.55 | 0.11 | 0.08 | 0.69 | 22.99 | 5.20 | 0.49 | 0.00 | 97.31 |
| 12A-19 | 0.00 | 27.37 | 18.05 | 0.00 | 22.73 | 0.16 | 0.08 | 1.11 | 23.01 | 4.89 | 0.31 | 0.01 | 97.72 |
| 11A 7 | 0.00 | 27.38 | 17.99 | 0.02 | 22.49 | 0.06 | 0.09 | 0.94 | 23.02 | 5.12 | 0.18 | 0.00 | 97.29 |
| 12A-26 | 0.00 | 27.57 | 18.34 | 0.03 | 22.57 | 0.06 | 0.11 | 0.76 | 23.03 | 5.59 | 0.00 | 0.00 | 98.05 |
| 11A 1 | 0.00 | 27.59 | 18.49 | 0.00 | 22.39 | 0.00 | 0.04 | 2.61 | 23.03 | 2.50 | 0.22 | 0.00 | 96.86 |
| 12A-11 | 0.00 | 27.14 | 18.35 | 0.05 | 22.43 | 0.10 | 0.15 | 0.85 | 23.15 | 4.70 | 0.00 | 0.00 | 96.92 |
| 11A 3 | 0.00 | 26.85 | 17.76 | 0.00 | 22.31 | 0.59 | 0.10 | 1.40 | 23.21 | 4.53 | 0.00 | 0.00 | 96.75 |
| 12A 4b | 0.00 | 24.72 | 19.52 | 0.06 | 22.00 | 0.00 | 0.06 | 1.11 | 23.32 | 4.52 | 2.17 | 0.02 | 97.50 |
| 12A-13 | 0.00 | 27.39 | 18.16 | 0.00 | 22.44 | 0.00 | 0.06 | 1.07 | 23.36 | 4.93 | 0.00 | 0.02 | 97.42 |
| 11A 8 | 0.00 | 27.47 | 18.34 | 0.04 | 22.38 | 0.00 | 0.04 | 1.97 | 23.38 | 3.50 | 0.00 | 0.01 | 97.13 |
| 12A-12 | 0.00 | 27.17 | 18.47 | 0.01 | 22.43 | 0.04 | 0.04 | 1.31 | 23.39 | 3.82 | 0.12 | 0.01 | 96.80 |
| 12A 5a | 0.00 | 27.56 | 18.39 | 0.04 | 22.37 | 0.00 | 0.07 | 0.84 | 23.48 | 5.66 | 0.07 | 0.00 | 98.50 |
| 12A-20 | 0.00 | 27.14 | 18.38 | 0.00 | 22.32 | 0.06 | 0.07 | 0.97 | 23.49 | 4.96 | 0.00 | 0.00 | 97.40 |
| 11A 9 | 0.00 | 27.39 | 18.23 | 0.00 | 22.38 | 0.00 | 0.10 | 2.15 | 23.55 | 3.73 | 0.26 | 0.00 | 97.80 |
| 12A-4a | 0.00 | 27.33 | 18.04 | 0.00 | 22.63 | 0.00 | 0.00 | 0.72 | 23.58 | 5.45 | 0.00 | 0.00 | 97.74 |
| 12A-4b | 0.00 | 27.32 | 18.18 | 0.01 | 22.80 | 0.09 | 0.06 | 0.77 | 23.59 | 5.28 | 0.18 | 0.01 | 98.29 |
| 12A-9 | 0.00 | 27.26 | 18.05 | 0.00 | 22.60 | 0.00 | 0.06 | 0.45 | 23.69 | 5.47 | 0.00 | 0.00 | 97.59 |
| 12A-23 | 0.00 | 27.54 | 18.14 | 0.00 | 22.69 | 0.00 | 0.02 | 0.60 | 23.72 | 5.81 | 0.12 | 0.00 | 98.63 |
| 12A 4a | 0.00 | 25.68 | 18.82 | 0.02 | 22.07 | 0.00 | 0.03 | 1.21 | 23.74 | 4.87 | 1.40 | 0.01 | 97.85 |
| MIN | 0.00 | 24.72 | 17.76 | 0.00 | 22.00 | 0.00 | 0.00 | 0.44 | 22.47 | 2.50 | 0.00 | 0.00 | 96.35 |
| MAX | 0.00 | 27.59 | 19.52 | 0.06 | 22.80 | 0.59 | 0.15 | 2.61 | 23.74 | 6.24 | 2.17 | 0.03 | 98.63 |
| AVE | 0.00 | 27.14 | 18.31 | 0.01 | 22.42 | 0.07 | 0.07 | 1.06 | 23.24 | 4.89 | 0.26 | 0.00 | 97.48 |
| STDEV | 0.00 | 0.64 | 0.33 | 0.02 | 0.20 | 0.12 | 0.04 | 0.55 | 0.33 | 0.90 | 0.51 | 0.01 | 0.56 |

| | Detection limits (%) |
|---|---|
| Te | 0.05 |
| Sb | 0.044 |
| Ag | 0.064 |
| Au | 0.136 |
| S | 0.027 |
| Pb | 0.104 |
| Bi | 0.135 |
| Fe | 0.097 |
| Ni | 0.141 |
| Zn | 0.24 |
| Cu | 0.189 |
| As | 0.043 |
| Se | 0.042 |

**Table 12. Ag content from the electron microprobe analyses of galena**

| Sample | Ag | Sample | Ag |
|---|---|---|---|
| 12A | 0.01 | 12A | *0.01* |
| 12A | *0.00* | 12A | 0.02 |
| 12A | *0.01* | 12A | *0.00* |
| 12A | *0.01* | 12A | 0.03 |
| 12A | *0.00* | 12A | 0.01 |
| 12A | 0.01 | 12A | 0.02 |
| 12A | 0.02 | 12A | *0.00* |
| 12A | 0.01 | 12A | *0.00* |
| 12A | 0.02 | 12A | 0.02 |
| 12A | *0.01* | 12A | 0.00 |
| 12A | *0.00* | 12A | 0.02 |
| 12A | *0.01* | 12A | *0.00* |
| 12A | *0.00* | 12A | 0.02 |
| 12A | 0.02 | Average | 0.01 |
| 12A | *0.00* | Std.Dev | 0.01 |

Ag Detection limit (%) : 0.0095

# *Appendix 4:* Certificate of Analysis

**SGS**
**SGS Lakefield Research Limited**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

**Mineralogical Services LRL Canada**
Attn : ---

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---, ---
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Phone: ---
Fax:---

Monday, September 08, 2008

**Date Rec. :** 25 July 2008
**LR Report :** **CA00764-JUL08**
**Client Ref :** MI15035-Jul08 11007-001

# CERTIFICATE OF ANALYSIS

## Final Report

| Sample ID | Ag g/t | Al g/t | As g/t | Ba g/t | Be g/t | Bi g/t | Ca g/t | Cd g/t | Co g/t | Cr g/t | Cu g/t | Fe g/t | K g/t | Li g/t | Mg g/t | Mn g/t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: 12844 AS Received | 1700 | 1900 | < 30 | 2.3 | < 0.05 | 23 | 110 | 34 | 6 | 30 | 960 | 4200 | 400 | < 5 | 450 | 72 |

| Sample ID | Mo g/t | Na g/t | Ni g/t | P g/t | Sb g/t | Se g/t | Sn g/t | Sr g/t | Ti g/t | Tl g/t | U g/t | V g/t | Y g/t | Zn g/t | Te g/t | S % | Pb % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: 12844 AS Received | < 5 | 150 | < 20 | < 30 | 580 | < 30 | < 20 | 1.2 | 50 | < 60 | < 20 | < 4 | 0.3 | 2400 | < 100 | 12.0 | 76.4 |

*Debbie Waldon*
*Project Coordinator,*
*Minerals Services, Analytical*

OnLine LIMS

# ***Appendix 5:*** **SEM Images and Spectra**

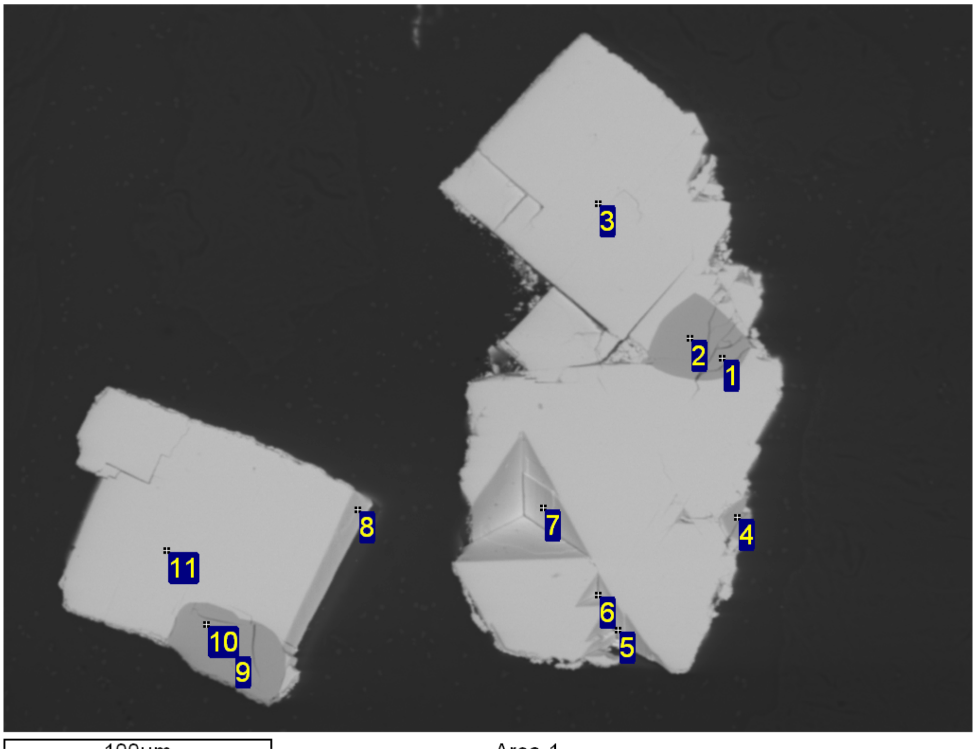


**Figure 40. Back scattered image from the electron microscope of stephanite locked in galena**

- Points 1, 2, 4, 9 and 10 : stephanite
- Points 3, 5, 6, 7, 8: galena

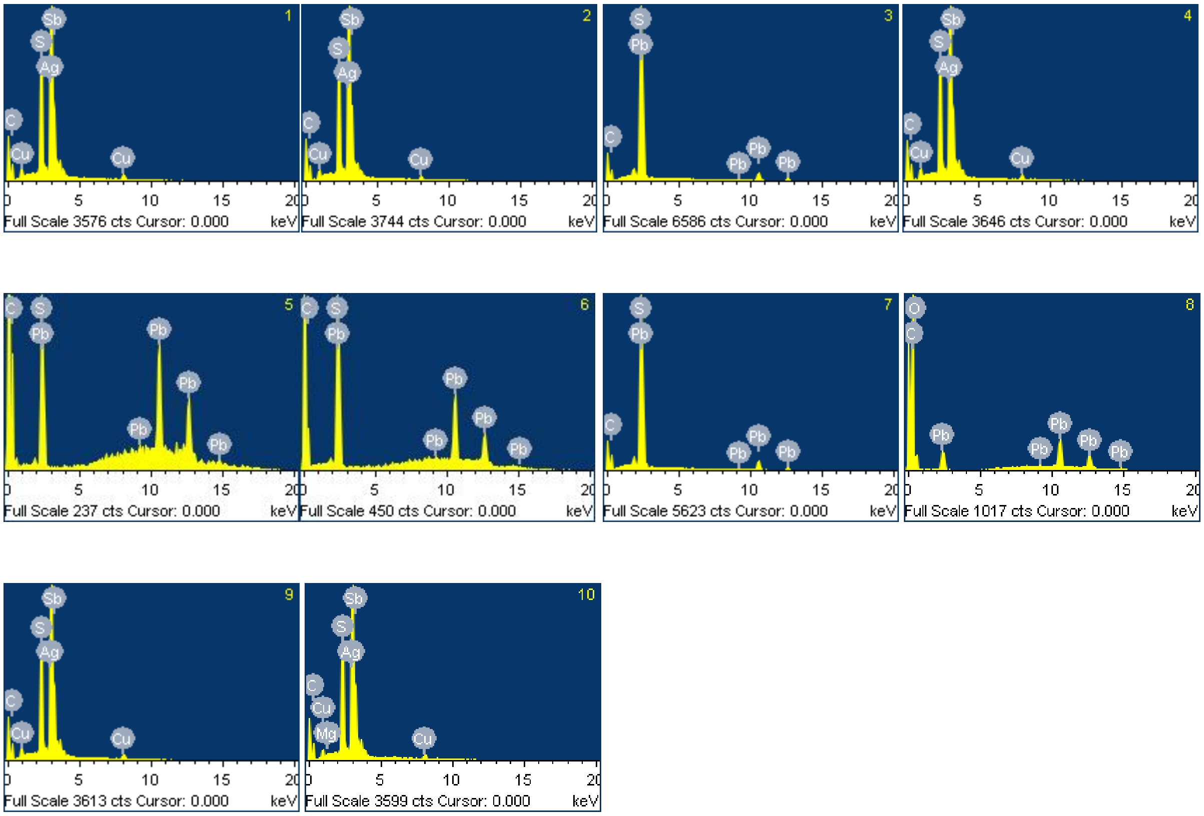


**Figure 47. Spectra corresponding to Figure 46**

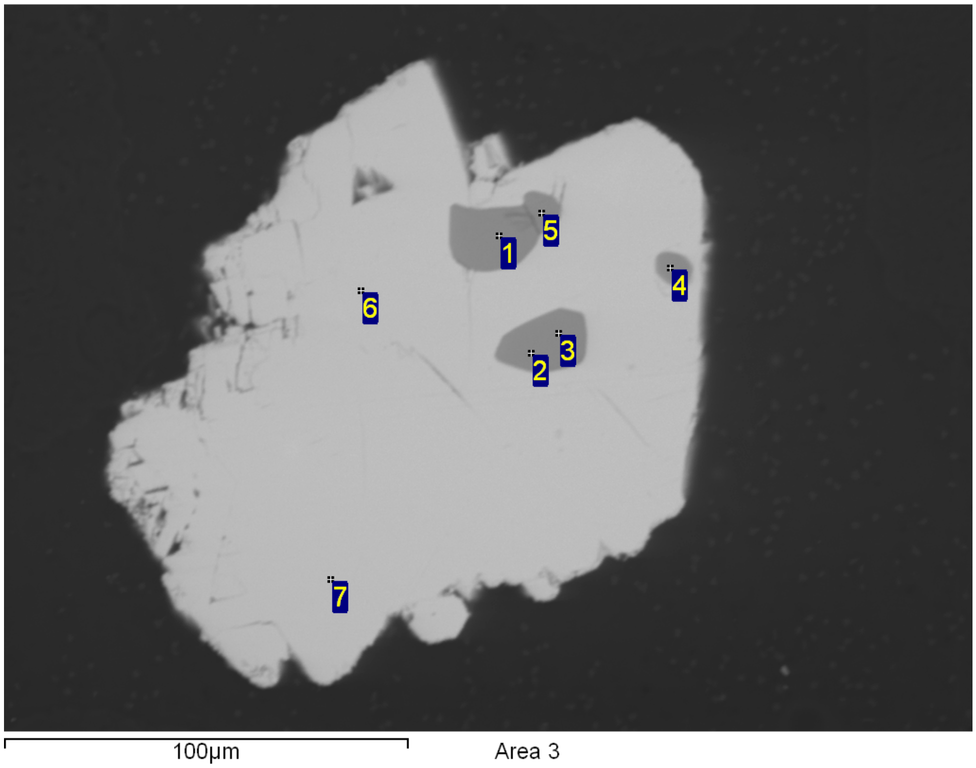


**Figure 48. Back scattered image from the electron microscope of freibergite locked in galena**

- Points 1, 2, 3, 4, 5 : freibergite
- Points 6, and 7: galena

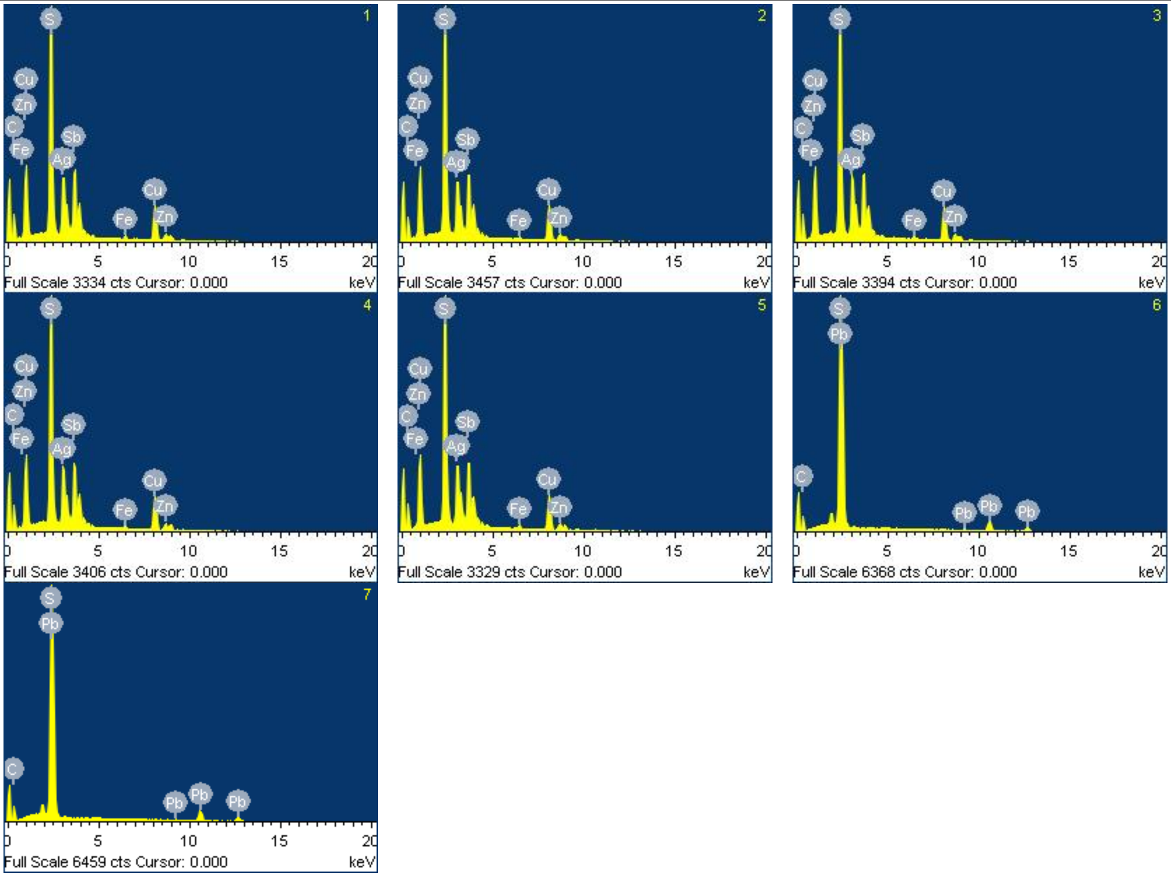


**Figure 49. Spectra corresponding to Figure 48**