INTRODUCTION

The Flammefjeld intrusion is a unique porphyry exploration target that holds the potential for a hidden world-class Mo porphyry deposit on the scale of a Henderson/Mt. Emmons as well as hosting unusually wide and consistent Au-Ag-base metal veining that may be traced on kilometre-scale in the upper parts of the complex. Hence, Flammefjeld represents a rare untested mineral project in Greenland, which exhibits all the geological criteria to support the existence of two significant deposit types within the same area.

THE GEOLOGY OF FLAMMFELD

The Kangerlussuaq region of southern East Greenland is underlain by a Precambrian crystalline basement intruded by magmatic rocks generated during the continental break-up of the North Atlantic in the Early Palaeogene. The magmatic rocks include several felsic and mafic alkaline intrusions (including the world famous Skaergaard Intrusion), which in turn are part of a larger Palaeogene province in East Greenland hosting more than 60 known intrusions. The latter include one of the largest Mo-porphyries in the world, KGHM’s Malmberg Deposit (217Mt @ 0.20% MoS₂).

Flammefjeld is one of several younger syenite satellite intrusions emplaced into quartz syenites at the rim of the so-called Kangerlussuaq alkaline complex. The pre-mineralisation host rock consists of c. 60 Ma old quartz syenitic intrusions and basic dykes. The Flammefjeld diatreme covers a circular area of c. 600 x 800 m on surface comprising hydrothermal and igneous breccias, quartz-feldspar porphyry and felsophyre and granophyric dykes characteristic of porphyry Mo deposits. The breccia zone formed by degassing of a large igneous body and is significant because it transported mineralized samples to the surface from a deeper previously mineralized body at depth.

A large number of xenoliths of local felsic plutonics with high-grade stockwork molybdenite mineralisation up to 0.68% MoS₂ occur in the diatreme/breccia zone. The average grade of all mineralised samples is approximately 0.3% MoS₂, indicating the presence of an unusually rich Mo porphyry in the sub-surface directly below Flammefjeld.

There is compelling evidence for multiple generations of porphyry emplacement, likely over a short time span, although the timing is speculative and based on other porphyry Mo analogues in the world. A possible model that is consistent with these observations includes multiple mineralisation events that originate from a deeper intrusion and formed a molybdenite stockwork of considerable size. A good analogy for the Flammefjeld system is the Urad Mo orebody, post-mineral breccias, and the deeper Henderson Mo orebodies.

Numerous late polymetallic vein systems cut both breccia and quartz porphyry at Flammefjeld. Mineralised vein widths range from a few centimeters to tens of meters. The vein systems show no signs of bottoming out at present erosion levels, which corresponds to more than 600 m vertical depth.

Limited surface exploration work indicates that the veins may be traced in the sub-surface for several kilometers with an average grade of 0.45g/t Au, 135g/t Ag, 0.58% Cu, 5.81% Pb and 1.35% Zn. High-grade grab samples return up to 38g/t Au and 1193g/t Ag.

The average metal value of Yellow Zone and Misty Vein is 285 USD/t (as of 2015) equivalent to 6.8 g/t Au.

EXPLORATION POTENTIAL

All the geological features observed at Flammefjeld supports the existence of a hidden Mo-porphyry target comparable in size to world class deposits. The composition of rock types and the associated alteration indicates such a deposit to lie between the Climax high-silica rhyolite type with Mo (F, Sn) and the monzogranite type associated with Mo (Cu, F). The following geological evidence for a hidden Mo deposit has been observed:

- Molybdenite-veined clasts of felsic rock (granite, quartz-porphyries, aplite) containing up to 0.68 wt.% MoS₂ in the breccia pipe
- In-situ breccia clasts that have net-veined Mo-mineralisation are situated far apart on the mountain, defining a diameter of around 600 meters. This is consistent with either a large footprint for the source region, or with several ore bodies
- Presence of a large sulphur anomaly (minimum 10Mt and 800 m in diameter) consisting mainly of pyritization within the Flammefjeld breccias and porphyry complex
- The size of the breccia pipe complex and associated porphyry intrusions and implied energy release indicates a large system at depth. The scale of the breccia pipe/ porphyry complex is comparable to Henderson
- Polymetallic Au-Ag-Pb-Zn-Cu lode veins are typical at the margins of large porphyry systems.
All geological observations from Flammefjeld are consistent with the presence of a significant Mo porphyry deposit on the scale of Henderson and Mt. Emmons below the subsurface. Conceptual modelling indicates a potential ore body of >200 Mt. Fragments of stockwork mineralisation within the diatreme breccia of Flammefjeld return up to 0.68% MoS$_2$ indicating that the ore grade of a hidden body may be unusually high. Significant Au-Ag-Pb-Zn-Cu vein lode mineralisation with an average grade of 0.45g/t Au, 135g/t Ag, 0.58% Cu, 5.81% Pb and 1.35% Zn occurs over several kilometers strike length associated with the Flammefjeld sub-volcanic complex. Grab sampling up to 38g/t Au and 1193g/t Ag - vein systems show no sign of bottoming out at present erosion levels (>600 meters vertical depth). Located next to deep-water fjord, operations at Flammefjeld can readily be operated by ship and barge. The Sødalen airstrip 45 km away from Flammefjeld provides easy airborne access from Iceland.