Bergvesenet

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Rapportarkivet

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
5383				

Kommer fra ..arkiv	Ekstern rapport nr	Oversendt fra	Fortrolig pga	Fortrolig fra dato:
Sulfidmalm	Sul	Sulfidmalm a.s.		

Tittel

Interim observations on the geology of the Megrundstjern area, Espedalen, with recommendations for continued exploration, after the first 6 holes were completed.

Forfatter	Dato	År	Bedrift (oppdragsgiver og/eller oppdragstaker)
H. Coates	01.09	1975	Falconbridge Nikkelverk AS

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Gausdal	Oppland	Østlandske	17171	Lillehammer

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geologi		Megrunntjern-området

Råstoffgruppe	Råstofftype
Malm/metall	Ni

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

545.02 07.5.
re Nord Hydro
V. Nixon

INTER-OFFICE MEMORANDUM

To: F. Nixon

From: H. Coates

CC: J. Gammon, D. Ellen

Date: 1st October 1975

Subject: Interim observations on the geology of the Megrundstjern area, Espedalen, with recommendations for continued exploration, after the first 6 holes were completed.

Recent diamond drilling and geological reconnaissance have elucidated to a degree the geological history of the Megrundstjern area of the Espedalen basic complex. The most important advances are: -

(a) The recognition of four distinct multiple lithological units within that part of the complex.

(b) The establishment of the orientation at least in part of some of these units and the mineralization contained in them.

(c) The recognition of subsequent geological events which have, or are capable of having displaced, remobilized or otherwise affected potential orebodies.

There are, inevitably, many questions to be answered about the geology and mineralization potential of the area, and what methods should be employed to achieve the best results.

Lithologic units of the Megrundstjern area

One simple and four multiple units lithologic units have been recognized. Four of these belong to what has been termed the Espedalen basic complex, while the fifth structurally underlies it, occupying a zone between the complex and the sedimentary rocks termed "Valdres Sparagmite".

(a) The Espedalen basic complex: -

(i) Pyroxenite - norite (anorthosite) suite: -

This unit consists of coarse to very coarse grained (up to 20 mm) euhedral to subhedral pyroxenes in a homogeneous altered white feldspar matrix. The sub-units are based on pyroxene ($\pm$ minor olivine) - feldspar proportions, and in the Megrundstjern area vary in field classification from essentially monomineralic pyroxenite through feldspathic pyroxenite to varieties of gabbro. Rocks of identical character have been observed below the Evans mine on the east side of the valley which are pyroxene-bearing anorthosite in composition. They are tentatively included in the suite.

Although in the Megrundstjern area there are numerous varieties of this suite, there is little evidence of systematic differentiation on the scale of a drill hole intersection.(Contacts between the varieties are relatively sharp (but diffuse in minute detail) and apparently igenous, suggesting that the suite was emplaced as a series of compositionally independent pulses that were being actively differentiated elsewhere.

This suite is important as a host for nickel-copper sulphides and contains from trace to about 10% coarse to very coarse grained disseminated pyrrhotite, chalcopyrite and pentlandite in decreasing order of abundance.

(ii) Peridotite-olivine pyroxenite-pyroxenite-olivine gabbro suite:-

This suite is uniformly coarse grained and consists (on present information) primarily of serpentinized peridotite and olivine pyroxenite with minor pyroxenite and olivine gabbro.
In DDH MG-4 there is systematic differentiation from olivine gabbro to periodotite over an apparent distance of 20 meters.

Trace sulphides, essentially pyrite, occur throughout the known portions of the suite.

(iii) Leuco-gabbro sill (or dyke)

This is a 10 - 20 meters thick, sub-horizontal body consisting of about 50% mafic minerals and 50% feldspar. It has distinct chilled margins on both contacts and intrudes both the above units, and at least locally occupies their mutual boundary.

(iv) Tectonites derived from the above units: -

Tectonically overprinted on the above rocks, especially in the southern portion of the Megrundstjern area is a locally strong but non-penetrative schistosity which obliterates original igneous textures.
However, the economically important pyroxenite-norite-(anorthosite) suite is recognizable by its distinctive variation in grain size even in the strained state.

The disseminated sulphides typical of the non-schistose portions of the complex are remobilized in the tectonites along the planes of schistosity and into fractures. Occasionally, as in MG 6 sulphides occur as bands of semi-massive sulphides in shear zones.

b. Structurally underlying unit: -

This unit is a banded and strongly lineated quartz-feldspar-amphibole-chlorite rock of uncertain origin. It strikes roughly north-south with a moderate easterly dip. It is in igeneous contact with the leucogabbro sill, but its relationship to the earlier units is unknown.

Orientation of units

In the Megrundstjern area the lineations in the underlying amphibolite are sub-horizontal and the unit as a whole dips moderately to the east surfacing in the vicinity of Megrundstjern, and again about one third of the way down the stream section down from Megrundstjern. The resulting picture is that the Espedalen basic complex is draped over the amphibolite. In the absence of topographic control, no estimate of the overall dip and thickness of the complex is attempted.

The various units within the complex (including the sulphide concentrations) are oriented in roughly the same manner varying in attitude from nearly flat-lying to moderately easterly dipping.

Subsequent tectono-metamorphic factors:

The complex is cut by a series of shallow to moderate westerly dipping faults of unknown displacement. These are potentially capable of displacing, repeating or otherwise affecting the various lithologic units and concentrations of sulphides.

A non-penetrative but locally strong schistosity is overprinted on the rocks, especially in the southern part of Megrundstjern area. The only sulphides thus far encountered in schistose complex rocks are remobilized along the schistosity and into fractures and shear zones.

Recommendations for future exploration

The understanding of the geology of an area is a vital prerequisite to the logical and efficient execution of any exploration programme. It is therefore recommended that if further exploration is deemed necessary in the Espedalen area that a geological map on a scale of 1:5000 be produced at the earliest opportunity.

Prior to implementing a geological mapping programme, an adequate series of base maps with both horizontal and vertical control should be produced utilizing both skeleton ground control surveying and aerial photography. This base map should be used for all future exploration (where scale factors permit). Earlier grids should be marked and tied in to each other.

On a local scale, at Megrundstjern, and before further diamond drilling takes place, a surveyed grid with accurate elevation control is necessary to interpret the present holes and for placing of future holes.

An induced polarization survey and possibly mise à la masse survey should be given serious consideration before proceeding to further drilling.

Slingram anomalies to the east of MG 7 should be field checked and drilled if necessary.
