



# Bergvesenet

Postboks 3021, N-7441 Trondheim

## Rapportarkivet.

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
5363				

Kommer fra ..arkiv	Ekstern rapport nr	Oversendt fra	Fortrolig pga	Fortrolig fra dato:
Falconbridge				

Tittel

Evje-lveland prosjektet. Diverse rapporter fra 1969.

Forfatter	Dato	År	Bedrift (oppdragsgiver og/eller oppdragstaker)
			Falconbridge Nikkelverk AS

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Evje og Hornnes	Aust-Agder	Østlandske	15123	Mandal

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geologi		Åvitslandsheiea
Kjemiske analyser		

Råstoffgruppe	Råstofftype
Malm/metall	

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

AGDER  
EVE-IVELAND

Vortikalmappe nr. 1026  
For A 4



SS4. 02. 16. GEOLOGI ARVITSLANDS HEIA

SS4. 02. 16

ARVITSLANDS HEIA

EVE-IVELAND

LOCATION

Prospect pit on west side of swamp between Langtjern and Store Øygårdsvn. Map unit F6. Air photograph I 61 64-2927. Access - with car along Evje-Gautestad road to big sand pit just beyond Aavesland, from here on foot in a SSE direction for approximately 1.4 km to the south end of Langtjern, over pegmatite ridge to the east and down into NW/SE running swamp. The prospect lies about 40 m SE of small lake in this swamp.

STATUS

Nothing known. Sulfidmalm have been calling this prospect Vikstøl. It now seems certain that this name is not correct. It is possible that this prospect is called Tellismyr or Rusåsen in which case it is a government holding.

HISTORY

Nothing known.

GEOLOGICAL SETTING

A small prospect pit in amphibolite in a predominantly acid area. The pit measures approximately 5 m x 3 m x 2 m deep. The outcrops in the actual pit are of a medium grained amphibolite, in part sheared and in part slightly granitized. To the north of the pit are outcrops of fine grained granitized amphibolite which is intruded by fine grained granite which forms a ridge running in a NNW/SSE direction. Quite a lot of material on the dumps is pegmatitic and outcrops of pegmatite occur to the west.

STRUCTURES

The general trend of the granitic rocks in this area is NW/SE. Foliation in the amphibolite at the pit is 54/50E. There is also a small shear zone in the pit that trends 360/10E.

CHARACTERISTICS OF ORE

The amount of sulphides seen in actual outcrop was very limited. In the accessible outcrops sulphides were noted at one place only, these being disseminated chalcopyrite and pyrite in a very rusty sheared amphibolite. One piece of massive pyrrhotite was found on the dumps.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S	
2468F6	1.58	0.07	0.35	49	32.5	massive ore from dump

Analysis carried out at FN K'sand, Sept. 1968.

NAME of examiner: *Frank Nixon*

FN/hm Feb. 15, 1969.

## FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

LOCATION

Name. LOMTJERN exploration shaft. Map unit F6. Air photograph 1-61 64-2927. Access: - with car along the Evje-Gautestad road to the big sand pit just beyond Aavesland, from here on foot in a SSE direction for approx. 1.4 km. The shaft lies at the eastern end of Lomtjern (dried up).

STATUS

A government holding.

HISTORY

Mentioned in "Beretning om Evje Nikkelverk 1872-1897". The first owners were A/S Evje Nikkelverk, taken over by Raffineringsverket A/S in 1925. Both magnetometer work (see Fig. 1) and drilling (Fig. 2) were carried out in 1914. Four holes were bored. Hole No. 1 found impregnation but no ore. Hole No. 2 found ore at 12 m, 1.5 m of pure ore and aplite holding 2% Ni. Holes 3 and 4 proved to be barren.

Drilling was taken up again in 1938 when 6 holes were put down.  
(See Fig. 2 and below)

HOLE No. 1

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
15 m	0	0.05	2.20	impregnated gabbro
17 m	0.18	0.05	5.51	" "
21 m	0.15	0.05	5.5	" "

HOLE No. 2

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
7 m	0.13	0.20	1.61	impregnated gabbro
10 m	0.63	0.44	13.10	ore

HOLE No. 3

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
14 m	0.10	0.18	1.77	impregnated gabbro
15 m	0.13	0.16	1.92	" "

HOLE No. 4

Barren.

HOLE No. 5

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
5 m	0.00	0.04	1.68	mica rich rock
7 m	0.05	0.08	5.51	" " "

HOLE No. 6

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
6 m	0.03	0.08	3.30	compressed gabbro



FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

Geophysical work was carried out by A/S SULFIDMALM in Aug. 1967 and further work was done on frozen lakes in March 1968. The results are combined on "Electromagnetic map of Lomtjern in Aaveslandsheia, Evje, Norway" scale 1:1'000.

The area was mapped by Wiik in 1967 on a scale of 1:15'000. Mapping on a scale of 1:5'000 was carried out by Nixon in 1968.

Unpublished records

Mørch Olsen, H. Rapport over Aavitslandsheiens skjærp.  
Sulfidmalm files. Evje-Iveland file 3.

GEOLOGICAL SETTING

The Lomtjern exploration shaft measures roughly 2 m x 5 m. It is water filled and its depth is estimated at being about 8 m.

Generally speaking the shaft is situated in an area of predominantly amphibolitic rocks. The dominant rock type is a massive amphibolite. This is invariably a small to medium grained granular to granoblastic rock, often with a slight linear structure. In the hand specimen hornblende and plagioclase seem to be the major minerals.

A thin section of the rock outcropping at the actual pit shows the texture to be xenomorphic granular. Equant grains of fresh well twinned plagioclase (Albite, Carlsbad, Pericline twins) separate irregular aggregates of hornblende in a state of polygonization and recrystallization. Orthopyroxene and clinopyroxene are present as minor constituents. The plagioclase is fresh, the hornblende in a state of recrystallization, this is probably related to the conversion pyroxene - amphibole which is practically complete.

The area around the shaft is also rich in a fine grained intrusive granite.

Small amounts of ultrabasic rocks were confined exclusively to shear zones and are highly sheared and weathered.

STRUCTURES

Around the shaft the rocks when not sheared or altered are quite massive and structures are generally absent. A dominant shear at the prospect strikes 62° and dips 50° E.

CHARACTERISTICS OF ORE

Massive pyrrhotite was in visible outcrop confined to the shear zone. Minor disseminations of pyrrhotite, chalcopyrite, and pyrite were noted. The best ore samples were seen on the dumps, where pyrrhotite rich ore and chalcopyrite rich ore were abundant.

FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

A polished section of massive pyrrhotite gave the following minerals:

	Est. % by Vol.
Pyrrhotite	68
Marcasite	12
Chalcopyrite	2
Pentlandite + Violarite	1
Pyrite	tr.
Magnetite + Ilmenite	1
Goethite	6
Gangue silicates	10

This sample in hand specimen shows massive pyrrhotite with coarse parting planes. In polished section chalcopyrite occurs as blebs often associated with grains of gangue, and altered pentlandite occurs in exsolution blades in the pyrrhotite. Magnetite and ilmenite occur in scattered rounded grains and pyrite seems to have developed in secondary patches with marcasite.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S
29.68 F6 <sup>x</sup>	1.64	0.086	0.12	44.0	32.0
29.68 F6b <sup>xx</sup>	0.11	0.011	0.12	13.0	1.9
29.68 F6c <sup>x</sup>	1.61	0.064	0.19	42.7	24.0

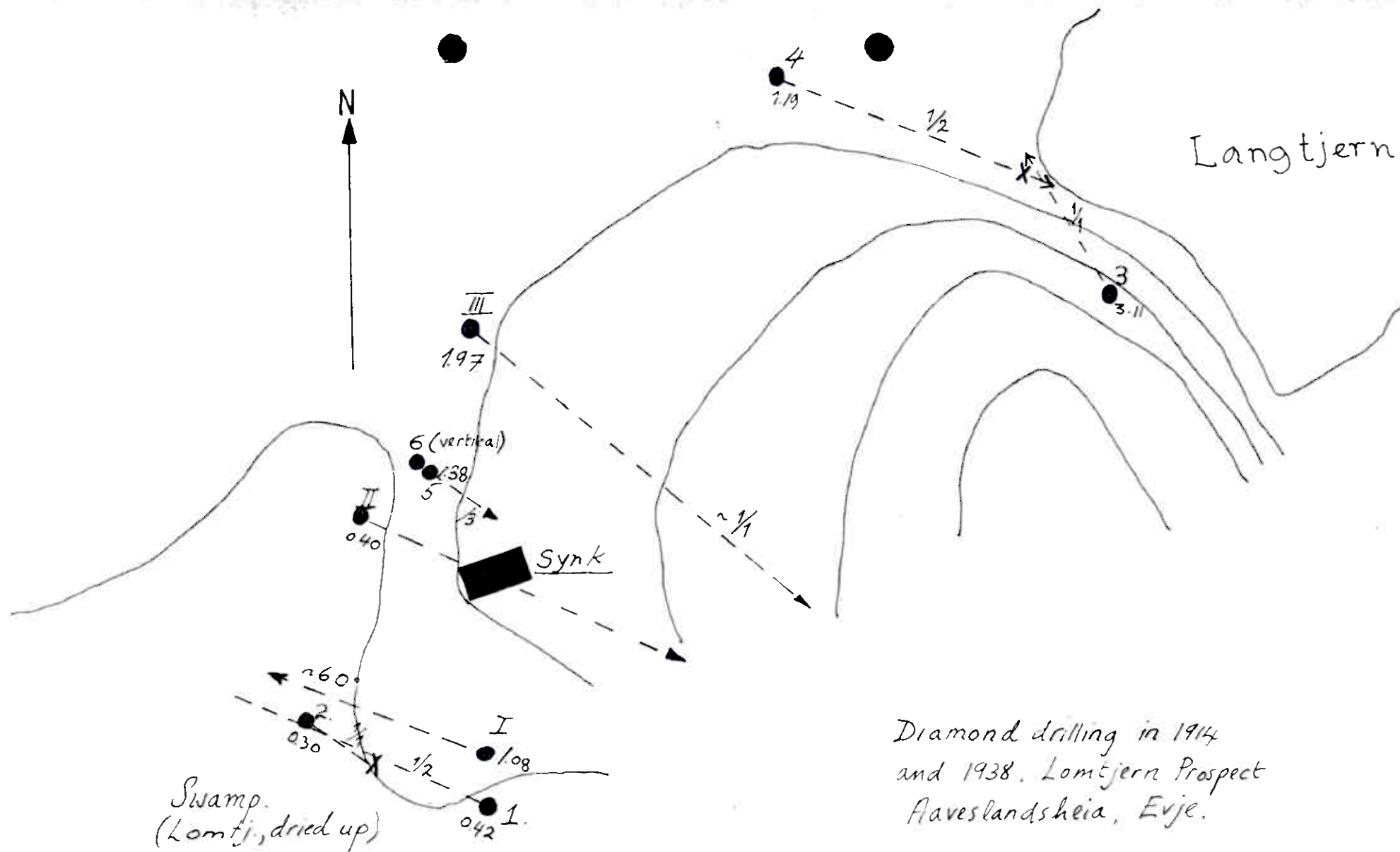
x - ore sample

xx - impregnated amphibolite/m. gabbro.

Analyses carried out at FN K'sand 28.9.1968.

Name of examiner: *Frank Kiron*

FN/hm Feb. 17, 1969.



Diamond drilling in 1914  
and 1938. Lomtjern Prospect  
Haveslandsheia, Evje.

Scale 1:500.

I II III from 1914  
1. 2. 3. 4. 5. 6. from 1938.

Fig. 2.

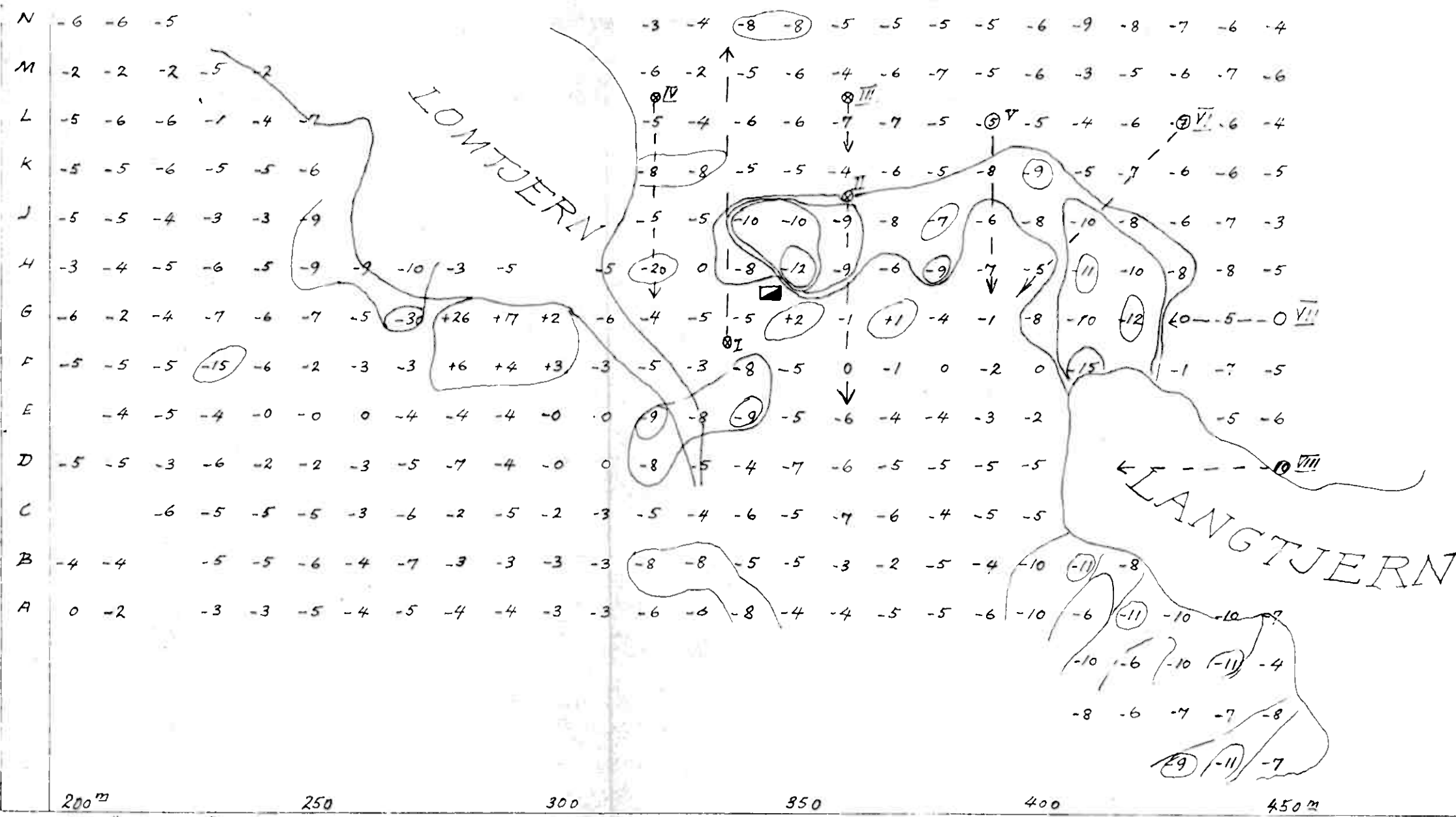
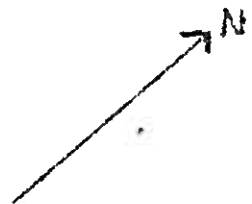
# MAGNETOMETER KART

from

## LOMTJERN SKJÆRP

Scale 1:1000

H. MO.



200m from "Guldregn" skjærp

⊙ ----- - proposed bore hole. vertical intensity is given in degrees

H. MØRCH-OLSEN 1914





Photo F.N.

29.7.1968

Lomtjern Exploration Shaft.

Photo taken looking in a NW direction.

All the visible outcrops consist of a fairly massive amphibolite. To the left of the picture (red line) there is a shear strike, 210, dip  $69^{\circ}$  NW. The amphibolite in this shear has been converted into a black lustrous hornblendite.



Photo F.N.

29.7.1968

Lomtjern Exploration Shaft.

Photo taken looking in an easterly direction.  
The red line indicates a shear zone, strike 60,  
dip 50 SE, which contains meta pyroxenite and  
massive pyrrhotite.

Plate 3



Photo F.N.

29.7.1968

General view of Lomtjern Exploration  
shaft. Photo taken looking west.  
The swamp in the background is the  
drained bed of Lomtjern lake.



## FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

LOCATION

Name, GULDREGN. Map unit F6. Air photograph 1 61 64-2927. The prospect lies about 300 m SW of Lomtjern skjerp, on the south side of a swamp. Can also be reached via Undeland.

STATUS

A government holding.

HISTORY

Mutet 27.3.1905. Originally was owned by A/S Evje Nikkelverk, taken over in 1925 by Raffineringsverket A/S. Mentioned in Mörch Olsens 1914 report on the pits in the Aaveslands area.

GEOLOGICAL SETTING

Outcrops in the vicinity of the pit are poor and granite pegmatites form the most frequent outcrops. Massive amphibolite outcrops to the north and east.

The pit measures 5 m x 5 m x 2 m deep and is sunk in medium grained amphibolites some of which are quartz rich. Outcrops are confined to the sides of the pit and no mineralization could be located here. On the east side a shear striking on 232 was observed.

CHARACTERISTICS OF ORE

No massive ore was seen either in outcrop or on the dumps. The dumps show mostly amphibolite some containing disseminated pyrrhotite and chalcopyrite, often enriched along cracks.

NAME of examiner: *Frank Nixon* .....



LOCATION.

Name, BYTTINGSMYR. Map unit F6. Air photograph 1-61 64-2927. Lies about 200 m south of Guldregn pit on top of a small hill. It can also be reached via Undeland farm.

STATUS

A government holding.

HISTORY

Mutet 24.10.1874. Original owners were A/S Evje Nikkelverk, later taken over by Raffineringsverket A/S. Mentioned in Mörch Olsen's 1914 report on the pits in the Aaveslands area.

GEOLOGICAL SETTING

The pit lies on top of a small hill. To the west are outcrops of a very dark massive amphibolite. The actual pit which measures 5 m x 3 m x 2 m deep is sunk in amphibolites some of which have a very meta gabbroic look about them. The outcrops are confined to the pit and a few patches around. A trace of a foliation (shearing?) was seen on the east side of the pit, this "shear" strikes on 200°.

CHARACTERISTICS OF ORE

Pyrrhotite and chalcopyrite are seen as disseminations in the amphibolite. No massive ore can be seen. From the outcrops or the dumps it is difficult to find any pattern for the disseminations.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S	
0/203 E6	0.15	0.023	0.29	13	4.6	dissem. amphibolite

Analysis carried out at FN, K'sand, September 1968.

NAME of examiner: *Frank Hoxin* .....

## FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

LOCATION

Name, HESTAASEN. Map unit F6. Air photograph I 61 64-2927. Access - with car along Evje-Gautestad road to big sand pit just beyond Aavitsland, from here on foot in a SSE direction for roughly 1 km. The prospect lies 20 m to the west of a new pegmatite mine and about 300 m north of the western end of Lomtjern.

STATUS

A government holding.

HISTORY

Mutet 27.5.1916. Original owners A/S Evje Nikkelverk, taken over in 1925 by Raffineringsverket A/S.

Little is known about the history of the Hestaasen prospect. It is mentioned by H. Mörch-Olsen in a report about the various prospects in the Aavitslandsheia area. The prospect has evidently been drilled as drill core is found near the dumps.

Unpublished records

Mörch-Olsen H. Rapport over Aavitslandsheiens skjærp. 1914?  
Sulfidmalm files. Iveland-Evje file 3.

GEOLOGICAL SETTING

The Hestaasen prospect consists of two smallish pits 8 - 9 m apart connected by a small trench (see Fig. 1). The prospect lies in an area of predominantly amphibolitic rocks. At the actual pits there is not much outcrop to see, but the mineralization seems to be connected to ultrabasic rocks (meta pyroxenites) and amphibolites.

The southernmost pit is approximately 4 m (N/S direction) x 3 m (E/W direction). The depth is difficult to estimate as the pit is filled with water, probably from the look of the dumps about 4 - 5 m.

On the eastern side of the pit there is a conspicuous shear zone on 70/20 which is in part occupied by a quartz vein 20 cm wide. Below this shear the rocktype is ultrabasic whilst above the shear are outcrops of massive amphibolite.

On the western side of the pit those rocks that were accessible proved to be basic amphibolites, some being quite sheared. A foliation 182/58 was obtained here.

Outcrops were both visible and accessible in the trench, amphibolites and ultrabasics occurring. In the outcrops marked sample A in Fig. 1 disseminated sulphides occur in the ultrabasic. On the west side of the trench disseminated specks of pyrite and pyrrhotite occur in amphibolite. A shear is also present on the west side of the trench, this running 220/80 (see Fig. 2).

The most northerly prospect pit is 3 m x 2½ m x 2 - 3 m deep. The outcrops around the pit are poor but on the western side there seems to be a shear running on 215 and falling east, probably being related to the shear in the trench.

STRUCTURE

Shearing is dominant and shearing and foliation intersections may be important as an ore control.

CHARACTERISTICS OF ORE

Massive pyrrhotite and clumps of pyrrhotite/pyrite are found on the dumps but none are found in outcrop. The ore seen in outcrop is disseminated impregnations of pyrrhotite and pyrite in both ultrabasic and amphibolite.

ANALYSES

A. Merry (1897)

2.353% Ni      0.054% Cu

In Mörch Olsen's 1914 report assays are quoted as follows:

Ni	Cu
2.50	0.19
2.12	0.16
2.26	0.18

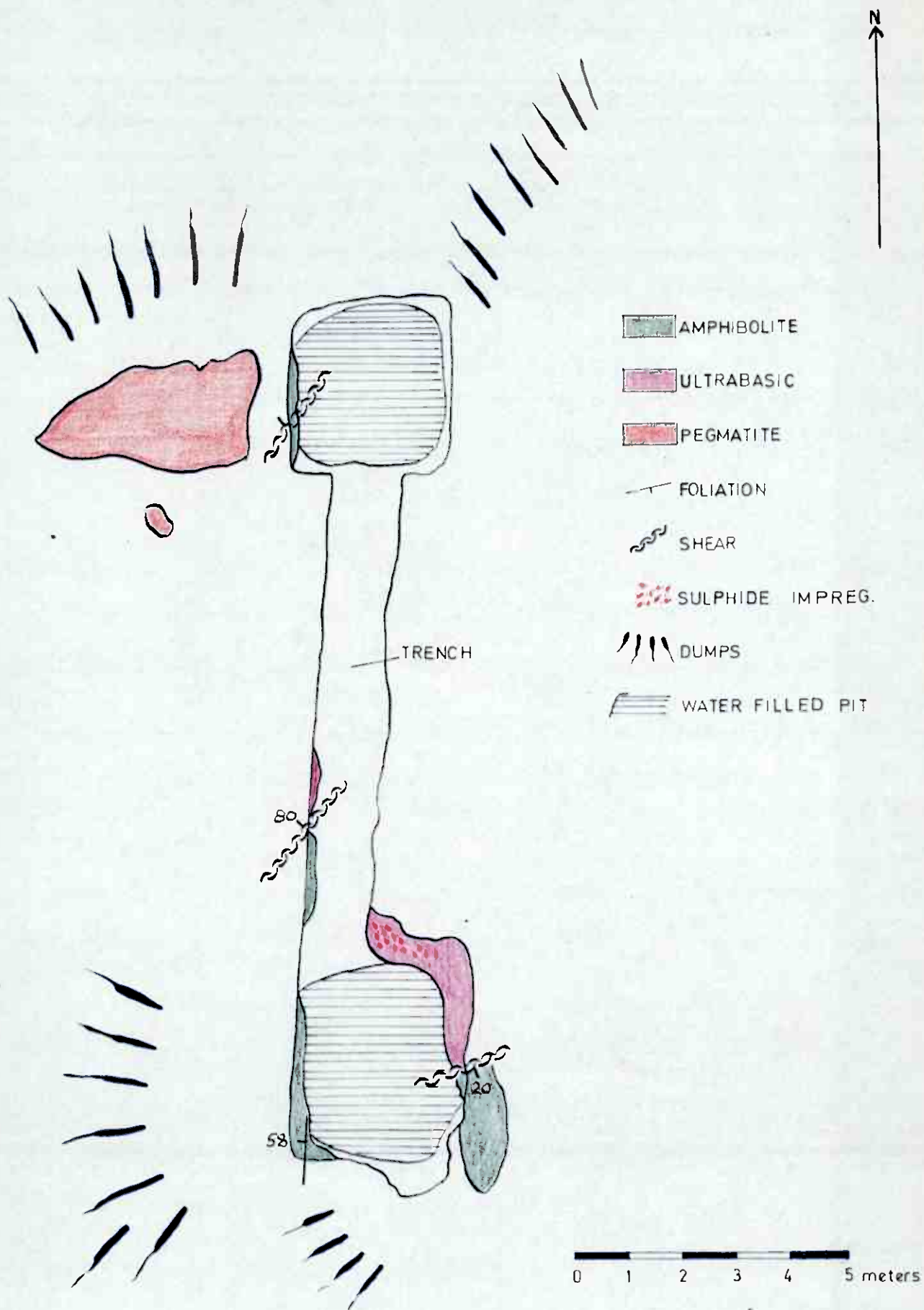
Analyses carried out at FN K'sand in September 1968 gave the following results:

Specimen No.	Ni	Co	Cu	Fe	S	
2868F6a	0.93	0.068	0.2	31	19.8	Pyrrhotite in ultrabasic
2868F6	0.40	0.031	0.46	20.4	8.7	Dissem. m. pyroxenite

4 hours spent examining the prospect.  
Detailed mapping carried out in the  
general area.

NAME of examiner: *Frank Nixon*

FN/hm Feb. 18, 1969.



HESTAASEN PROSPECT



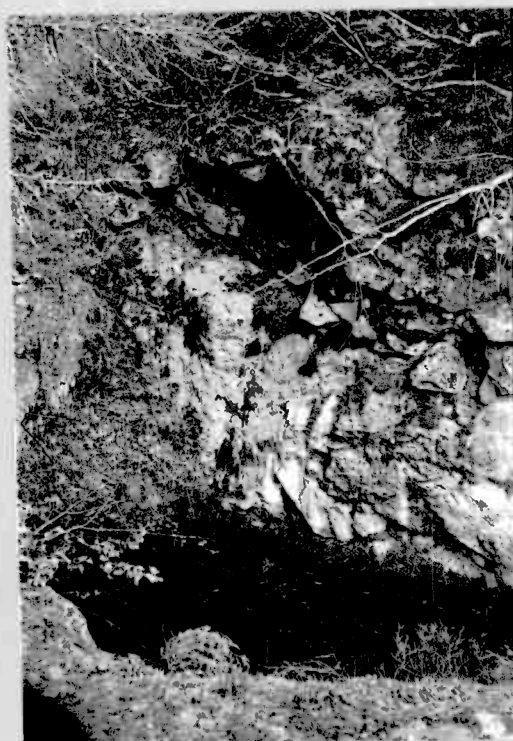


Photo F.N.

1.8.1968

The southerly prospect pit at Hestaasen. Red line marks a shear zone strike  $71^{\circ}$ , dip  $20^{\circ}$ E in the eastern wall of the pit. The shear is partly occupied by a quartz vein 20 cms wide. The rocks below the shear are meta pyroxenites impregnated with pyrrhotite. Above the shear are massive amphibolites.

Plate 2



Photo F.N.

1.8.1968

Close up of shear on western wall of the southern pit. U indicates the meta ultrabasics, Q the quartz vein and A massive amphibolites.



Photo F.N.

1.8.1968

The northern prospect pit at Hestaasen.  
The picture gives a good impression of  
the lack of outcrop at this prospect pit.



LOCATION

Name, LANGTJERN SKJERP. Map unit F6. Air photograph I-61 64-2927. Access, - with car along the Evje-Gautestad road to the big sand pit just beyond Aavesland, from here on foot in a SSE direction for approximately 1.4 km. The pit lies near the northern tip of Langtjern, and about 170 m NE of the Lomtjern prospect.

STATUS

A government holding.

HISTORY

Mutet 12.5.1906. Originally owned by A/S Evje Nikkelverk. Mentioned in Mörch Olsen's 1914 report on the pits in this area. Olsen writes - "Small diggings in a very weak impregnation zone. Magnetometer readings are small and uneven. No further work is justified here at the present time."

GEOLOGICAL SETTING

The pit lies in fairly massive amphibolites which outcrop quite extensively to the immediate south and to the south west and west. To the east and south east are ridges of fine grained granite. The prospect pit measures 6 m x 1 m and is about 1 m deep. Outcrops in the actual pit are poor but a shear in amphibolites is visible on the western wall of the pit (shear 30/69 E).

STRUCTURES

As mentioned above a shear is in the western wall of the pit. Foliation in the amphibolites to the immediate south is 205/90. Joints in the pit ran in two directions, these being 285/85 and 19/76.

CHARACTERISTICS OF ORE

No ore was visible in the pit so samples were taken from the dumps. A few lumps of massive pyrrhotite plus some pyrite were seen, along with disseminated pyrrhotite, chalcopyrite, and pyrite in amphibolite.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S
19.68F6	0.16	0.02	0.61	12.7	3.9

impreg. amphib.

Analysis carried out at FN K'sand, September 1968.

NAME of examiner: *Frank Nørn* .....



## FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

LOCATION

Prospect pit on west side of swamp between Langtjern and Store Øygårdsvn. Map unit F6. Air photograph I 61 64-2927. Access - with car along Evje-Gautestad road to big sand pit just beyond Aavesland, from here on foot in a SSE direction for approximately 1.4 km to the south end of Langtjern, over pegmatite ridge to the east and down into NW/SE running swamp. The prospect lies about 40 m SE of small lake in this swamp.

STATUS

Nothing known. Sulfidmaln have been calling this prospect Vikstøl. It now seems certain that this name is not correct. It is possible that this prospect is called Tellismyr or Rusåsen in which case it is a government holding.

HISTORY

Nothing known.

GEOLOGICAL SETTING

A small prospect pit in amphibolite in a predominantly acid area. The pit measures approximately 5 m x 3 m x 2 m deep. The outcrops in the actual pit are of a medium grained amphibolite, in part sheared and in part slightly granitized. To the north of the pit are outcrops of fine grained granitized amphibolite which is intruded by fine grained granite which forms a ridge running in a NNW/SSE direction. Quite a lot of material on the dumps is pegmatitic and outcrops of pegmatite occur to the west.

STRUCTURES

The general trend of the granitic rocks in this area is NW/SE. Foliation in the amphibolite at the pit is 54/50E. There is also a small shear zone in the pit that trends 360/10E.

CHARACTERISTICS OF ORE

The amount of sulphides seen in actual outcrop was very limited. In the accessible outcrops sulphides were noted at one place only, these being disseminated chalcopyrite and pyrite in a very rusty sheared amphibolite. One piece of massive pyrrhotite was found on the dumps.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S	
2468F6	1.58	0.07	0.35	49	32.5	massive ore from dump

Analysis carried out at FN K'sand, Sept. 1968.

NAME of examiner: *Frank Nixon*

FN/hm Feb. 15, 1969.

## THE LOMTJERN AREA (F.N.)

The Lomtjern area lies to the east of Evje on fairly high ground (500 m a.s.l.). The area has been heavily prospected and no less than six nickel prospects have been worked on; these being Lomtjern, Hestaasen, Langtjern, Guldregn, Byttingemyr and Vikstøl. (Ref. Geological map from Aaneslandsheia Evje, Norway). The topography of the area is more or less that of a dissected plateau, the low lying ground being occupied by swamps.

The dominant rock type in the area is amphibolite this being part of a NE/SW striking amphibolite body that is sandwiched between the Høvringsvann granite basin to the north and the Gunnheim granitic dome to the south. This amphibolite is invariably a small to medium grained, granular to granoblastic rock often with a slight linear structure, in the hand specimen hornblende and plagioclase are the major minerals. In certain localities, local conditions (proximity of pegmatites, structural features) have rendered the amphibolite into more gneissic varieties. The dominant type of amphibolite, however, is fairly massive and these massive types represent metamorphic rests of gabbroic intrusions.

One such massive amphibolite was examined under the microscope. The texture was xenomorphic granular. Equidimensional grains of fresh, well twinned plagioclase (Albite, Carlsbad, Pericline twins) separate irregular aggregates of hornblende in a state of polygonization and partial recrystallization. Orthopyroxene and clinopyroxene are present as minor constituents. The plagioclase is fresh, the hornblende in a state of recrystallization, this is probably related to the conversion pyroxene - amphibole which is practically complete.

Small patches and lenses of ultrabasic rocks are found associated with the amphibolite, most of these are essentially hornblenditic in character and are regarded as products of metamorphic differentiation. However, larger bodies have been observed, some of these in association with some of the prospects. These ultrabasics are also essentially hornblenditic in character with a coarse xenomorphic aggregate of hornblende grains plus some minor anthophyllite. These ultrabasics which in some localities carry minor sulphides are considered to be meta pyroxenites.

Locally hornblende gneiss and dioritic gneiss occur in the area.

A variety of granitic rocks occur in the area, from "Prestvandite" through finegrained, sugary granitic rocks with or without gneiss structure to medium-coarse grained magmatic granite. Much work remains if the inter-relationships among the granitic rocks are to be sorted out. What is clear at present is that the granitic rocks came into the area at a relatively late stage and that there are several stages in the emplacement history of the granitic rocks.

"Prestvandite" occurs as small dyke like bodies in many parts of the area. A local name has been given to this rock in order to distinguish it as a rock type. The prestvandite is a finegrained, light brownish to greenish grey rock. The fresh variety is structureless; but a planar structure is easily developed and it sometimes gets a characteristic appearance with streaks of biotite in a massive grey groundmass. Under the microscope the rock has a granoblastic texture, the major constituents being plagioclase, quartz, microcline and biotite. In places the "prestvandite" is brecciated by granite and granite pegmatite and it presumably represents an early phase of the granitic intrusive activity.



Granite pegmatites are fairly common forming long low ridges and small hillocks, they occur as vertical dikes and as flat lying cake like bodies often with a gentle northerly dip. In the east of the area are very high ridges of a fine/medium grained sugary granite with included pegmatitic patches.

Although six prospects have been worked in the area only two; Lomtjern and Hestaasen seem to have found noteworthy sulphides. At Lomtjern the host rock is a massive amphibolite with small hornblenditic ultrabasics - the latter confined to shear zones. From the present day outcrop pattern the massive ore seems to be intimately associated with shearing and subsequently is structurally controlled.

At Hestaasen the rock types are again amphibolite and ultrabasic and shearing is dominant. On the dumps massive pyrrhotite can be seen but in visible outcrop the mineralization occurs as disseminated impregnations of pyrrhotite and pyrite in both ultrabasic and amphibolite.

Foliation in the area is generally NE/SW the dip being variable both in direction and degree. Observed fractures and folds usually fall into the regional picture.

March 12, 1970  
FN/nm

LOCATION

Name, HESTAASEN. Map unit 76. Air photograph I 61 64-2927. Access - with car along Evje-Gautestad road to big sand pit just beyond Aavitsland, from here on foot in a SSE direction for roughly 1 km. The prospect lies 20 m to the west of a new pegmatite mine and about 300 m north of the western end of Lomtjern.

STATUS

A government holding.

HISTORY

Mutet 27.5.1916. Original owners A/S Evje Nikkelverk, taken over in 1925 by Raffineringsverket A/S.

Little is known about the history of the Hestaasen prospect. It is mentioned by H. Mörch-Olsen in a report about the various prospects in the Aavitslandsheia area. The prospect has evidently been drilled as a drill core is found near the dumps.

Unpublished records

Mörch-Olsen H. Rapport over Aavitslandsheiens skjærp. 1914?  
Sulfidmalm files. Iveland-Evje file 3.

GEOLOGICAL SETTING

The Hestaasen prospect consists of two smallish pits 8 - 9 m apart connected by a small trench (see Fig. 1). The prospect lies in an area of predominantly amphibolitic rocks. At the actual pits there is not much outcrop to see, but the mineralization seems to be connected to ultrabasic rocks (meta pyroxenites) and amphibolites.

The southernmost pit is approximately 4 m (N/S direction) x 3 m (E/W direction). The depth is difficult to estimate as the pit is filled with water, probably from the look of the dumps about 4 - 5 m.

On the eastern side of the pit there is a conspicuous shear zone on 70/20 which is in part occupied by a quartz vein 20 cm wide. Below this shear the rock type is ultrabasic whilst above the shear are outcrops of massive amphibolite.

On the western side of the pit those rocks that were accessible proved to be basic amphibolites, some being quite sheared. A foliation 182/58 was obtained here.

Outcrops were both visible and accessible in the trench, amphibolites and ultrabasics occurring. In the outcrops marked sample A in Fig. 1 disseminated sulphides occur in the ultrabasic. On the west side of the trench disseminated specks of pyrite and pyrrhotite occur in amphibolite. A shear is also present on the west side of the trench, this running 220/80 (see Fig. 2).

The most northerly prospect pit is 3 m x 2½ m x 2 - 3 m deep. The outcrops around the pit are poor but on the western side there seems to be a shear running on 215 and falling east, probably being related to the shear in the trench.



STRUCTURE

Shearing is dominant and shearing and foliation intersections may be important as an ore control.

CHARACTERISTICS OF ORE

Massive pyrrhotite and clumps of pyrrhotite/pyrite are found on the dumps but none are found in outcrop. The ore seen in outcrop is disseminated impregnations of pyrrhotite and pyrite in both ultrabasic and amphibolite.

ANALYSES

A. Merry (1897)

2.353% Ni      0.054% Cu

In Mörch Olsen's 1914 report assays are quoted as follows:

Ni	Cu
2.50	0.19
2.12	0.16
2.26	0.18

Analyses carried out at FN K'sand in September 1968 gave the following results:

Specimen No.	Ni	Co	Cu	Fe	S	
2868F6a	0.93	0.068	0.2	31	19.8	Pyrrhotite in ultrabasic
2868F6	0.40	0.031	0.46	20.4	8.7	Dissem. m. pyroxenite

4 hours spent examining the prospect.  
Detailed mapping carried out in the  
general area.

NAME of examiner: *Frank Hixon*

FN/hm Feb. 18, 1969.

*Aavitsland*  
THE LOMTJERN AREA (F.N.)

The Lomtjern area lies to the east of Evje on fairly high ground (500 m a.s.l.). The area has been heavily prospected and no less than six nickel prospects have been worked on; these being Lomtjern, Hestaasen, Langtjern, Guldregn, Byttingsmyr and Vikstøl. (Ref. Geological map from Aaneslandsheia Evje, Norway). The topography of the area is more or less that of a dissected plateau, the low lying ground being occupied by swamps.

The dominant rock type in the area is amphibolite this being part of a NE/SW striking amphibolite body that is sandwiched between the Høvringsvann granite basin to the north and the Gunnheim granitic dome to the south. This amphibolite is invariably a small to medium grained, granular to granoblastic rock often with a slight linear structure, in the hand specimen hornblende and plagioclase are the major minerals. In certain localities, local conditions (proximity of pegmatites, structural features) have rendered the amphibolite into more gneissic varieties. The dominant type of amphibolite, however, is fairly massive and these massive types represent metamorphic rests of gabbroic intrusions.

One such massive amphibolite was examined under the microscope. The texture was xenomorphic granular. Equidimensional grains of fresh, well twinned plagioclase (Albite, Carlsbad, Pericline twins) separate irregular aggregates of hornblende in a state of polygonization and partial recrystallization. Orthopyroxene and clinopyroxene are present as minor constituents. The plagioclase is fresh, the hornblende in a state of recrystallization, this is probably related to the conversion pyroxene - amphibole which is practically complete.

Small patches and lenses of ultrabasic rocks are found associated with the amphibolite, most of these are essentially hornblenditic in character and are regarded as products of metamorphic differentiation. However, larger bodies have been observed, some of these in association with some of the prospects. These ultrabasics are also essentially hornblenditic in character with a coarse xenomorphic aggregate of hornblende grains plus some minor anthophyllite. These ultrabasics which in some localities carry minor sulphides are considered to be meta pyroxenites.

Locally hornblende gneiss and dioritic gneiss occur in the area.

A variety of granitic rocks occur in the area, from "Prestvandite" through finegrained, sugary granitic rocks with or without gneiss structure to medium-coarse grained magmatic granite. Much work remains if the inter-relationships among the granitic rocks are to be sorted out. What is clear at present is that the granitic rocks came into the area at a relatively late stage and that there are several stages in the emplacement history of the granitic rocks.

"Prestvandite" occurs as small dyke like bodies in many parts of the area. A local name has been given to this rock in order to distinguish it as a rock type. The prestvandite is a finegrained, light brownish to greenish grey rock. The fresh variety is structureless; but a planar structure is easily developed and it sometimes gets a characteristic appearance with streaks of biotite in a massive grey groundmass. Under the microscope the rock has a granoblastic texture, the major constituents being plagioclase, quartz, microcline and biotite. In places the "prestvandite" is brecciated by granite and granite pegmatite and it presumably represents an early phase of the granitic intrusive activity.

Granite pegmatites are fairly common forming long low ridges and small hillocks, they occur as vertical dikes and as flat lying cake like bodies often with a gentle northerly dip. In the east of the area are very high ridges of a fine/medium grained sugary granite with included pegmatitic patches.

Although six prospects have been worked in the area only two; Lomtjern and Hestaasen seem to have found noteworthy sulphides. At Lomtjern the host rock is a massive amphibolite with small hornblenditic ultrabasics - the latter confined to shear zones. From the present day outcrop pattern the massive ore seems to be intimately associated with shearing and subsequently is structurally controlled.

At Hestaasen the rock types are again amphibolite and ultrabasic and shearing is dominant. On the dumps massive pyrrhotite can be seen but in visible outcrop the mineralization occurs as disseminated impregnations of pyrrhotite and pyrite in both ultrabasic and amphibolite.

Foliation in the area is generally NE/SW the dip being variable both in direction and degree. Observed fractures and folds usually fall into the regional picture.

March 12, 1970

FN/hm

LOCATION

Name. LOMTJERN exploration shaft. Map unit F6. Air photograph 1-61 64-2927. Access: - with car along the Evje-Gautestad road to the big sand pit just beyond Aavesland, from here on foot in a SSE direction for approx. 1.4 km. The shaft lies at the eastern end of Lomtjern (dried up).

STATUS

A government holding.

HISTORY

Mentioned in "Beretning om Evje Nikkelverk 1872-1897". The first owners were A/S Evje Nikkelverk, taken over by Raffineringsverket A/S in 1925. Both magnetometer work (see Fig. 1) and drilling (Fig. 2) were carried out in 1914. Four holes were bored. Hole No. 1 found impregnation but no ore. Hole No. 2 found ore at 12 m, 1.5 m of pure ore and aplite holding 2% Ni. Holes 3 and 4 proved to be barren.

Drilling was taken up again in 1938 when 6 holes were put down. (See Fig. 2 and below)

HOLE No. 1

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
15 m	0	0.05	2.20	impregnated gabbro
17 m	0.18	0.05	5.51	" "
21 m	0.15	0.05	5.5	" "

HOLE No. 2

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
7 m	0.13	0.20	1.61	impregnated gabbro
10 m	0.63	0.44	13.10	ore

HOLE No. 3

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
14 m	0.10	0.18	1.77	impregnated gabbro
15 m	0.13	0.16	1.92	" "

HOLE No. 4

Barren.

HOLE No. 5

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
5 m	0.00	0.04	1.68	mica rich rock
7 m	0.05	0.08	5.51	" " "

HOLE No. 6

<u>Depth</u>	<u>Ni</u>	<u>Cu</u>	<u>S</u>	
6 m	0.03	0.08	3.30	compressed gabbro



FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

Geophysical work was carried out by A/S SULFIDMALM in Aug. 1967 and further work was done on frozen lakes in March 1968. The results are combined on "Electromagnetic map of Lomtjern in Aaveslandsheia, Evje, Norway" scale 1:1'000.

The area was mapped by Wiik in 1967 on a scale of 1:15'000. Mapping on a scale of 1:5'000 was carried out by Nixon in 1968.

Unpublished records

Mørch Olsen, H. Rapport over Aavitslandsheiens skjærp.  
Sulfidmalm files. Evje-Iveland file 3.

GEOLOGICAL SETTING

The Lomtjern exploration shaft measures roughly 2 m x 5 m. It is water filled and its depth is estimated at being about 8 m.

Generally speaking the shaft is situated in an area of predominantly amphibolitic rocks. The dominant rock type is a massive amphibolite. This is invariably a small to medium grained granular to granoblastic rock, often with a slight linear structure. In the hand specimen hornblende and plagioclase seem to be the major minerals.

A thin section of the rock outcropping at the actual pit shows the texture to be xenomorphic granular. Equant grains of fresh well twinned plagioclase (Albite, Carlsbad, Pericline twins) separate irregular aggregates of hornblende in a state of polygonization and recrystallization. Orthopyroxene and clinopyroxene are present as minor constituents. The plagioclase is fresh, the hornblende in a state of recrystallization, this is probably related to the conversion pyroxene - amphibole which is practically complete.

The area around the shaft is also rich in a fine grained intrusive granite.

Small amounts of ultrabasic rocks were confined exclusively to shear zones and are highly sheared and weathered.

STRUCTURES

Around the shaft the rocks when not sheared or altered are quite massive and structures are generally absent. A dominant shear at the prospect strikes 62° and dips 50° E.

CHARACTERISTICS OF ORE

Massive pyrrhotite was in visible outcrop confined to the shear zone. Minor disseminations of pyrrhotite, chalcopyrite, and pyrite were noted. The best ore samples were seen on the dumps, where pyrrhotite rich ore and chalcopyrite rich ore were abundant.

FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

A polished section of massive pyrrhotite gave the following minerals:

	Est. % by Vol.
Pyrrhotite	68
Marcasite	12
Chalcopyrite	2
Pentlandite + Violarite	1
Pyrite	tr.
Magnetite + Ilmenite	1
Goethite	6
Gangue silicates	10

This sample in hand specimen shows massive pyrrhotite with coarse parting planes. In polished section chalcopyrite occurs as blebs often associated with grains of gangue, and altered pentlandite occurs in exsolution blades in the pyrrhotite. Magnetite and ilmenite occur in scattered rounded grains and pyrite seems to have developed in secondary patches with marcasite.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S
29.68 F6 <sup>x</sup>	1.64	0.086	0.12	44.0	32.0
29.68 F6b <sup>xx</sup>	0.11	0.011	0.12	13.0	1.9
29.68 F6c <sup>x</sup>	1.61	0.064	0.19	42.7	24.0

x - ore sample

xx - impregnated amphibolite/m. laboro.

Analyses carried out at FN K'sand 28.9.1968.

Name of examiner: *Frank Nixon*

FN/hm Feb. 17, 1969.

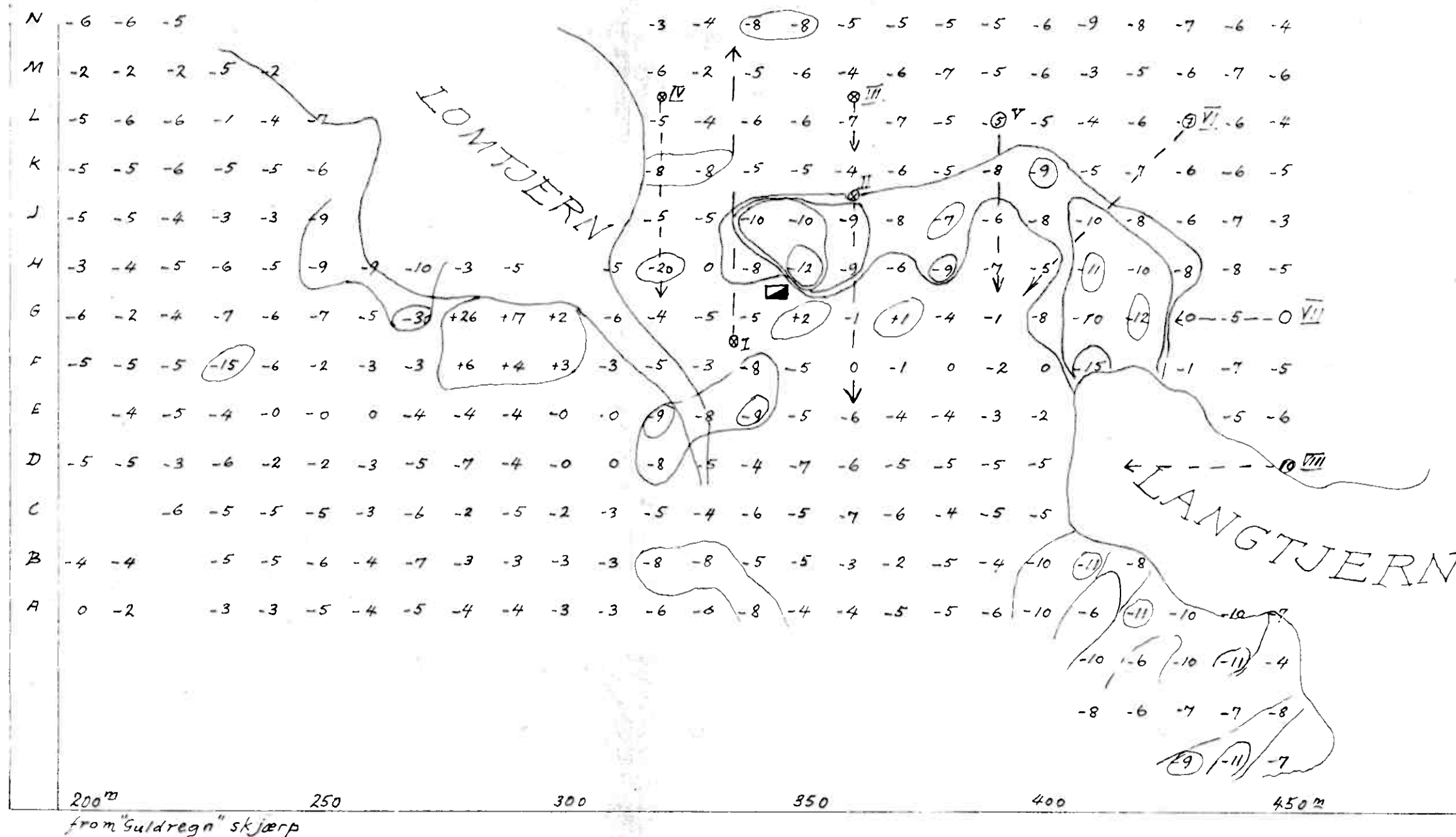
# MAGNETOMETER KART

from

## LOMTJERN SKJÆRP

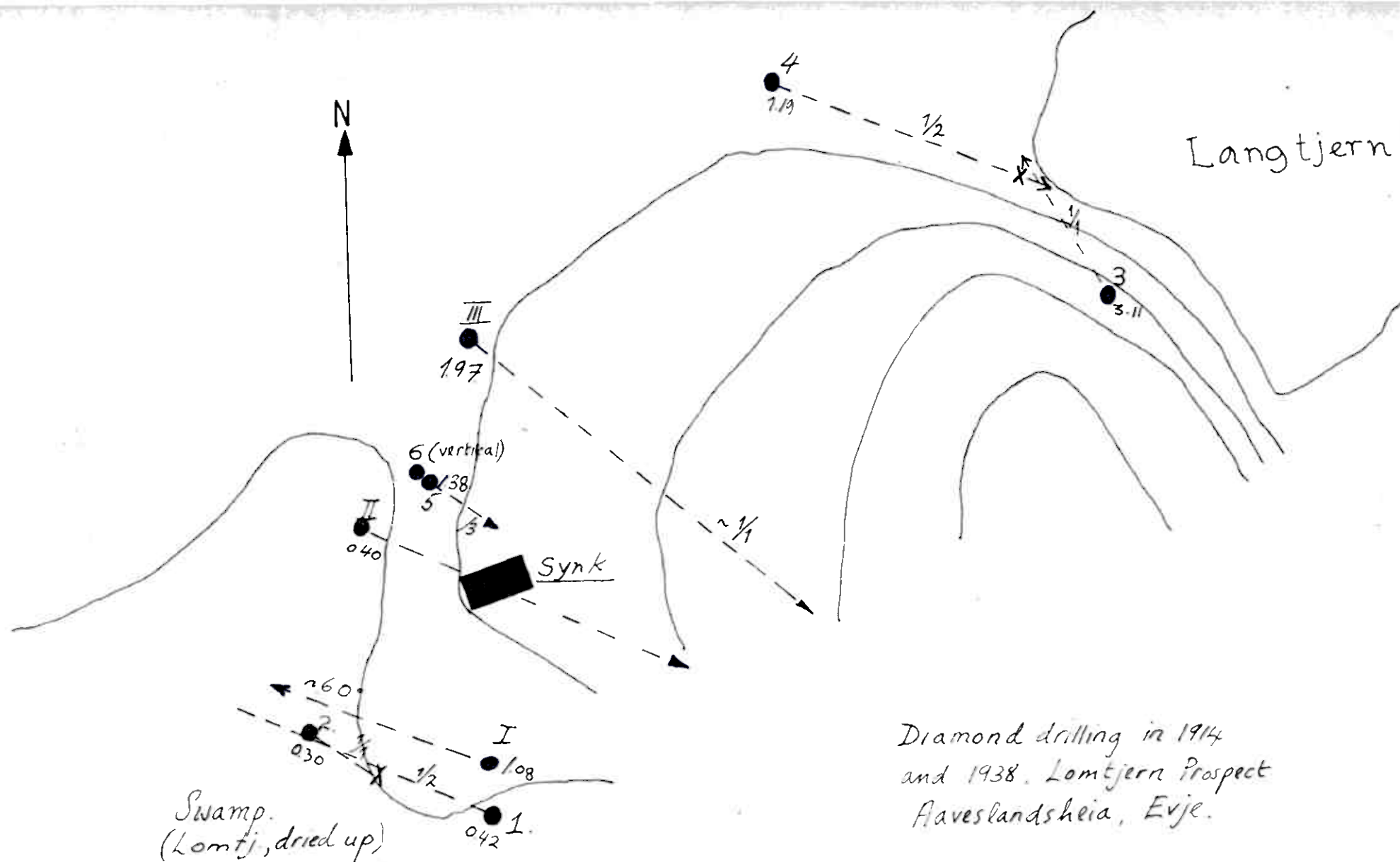
Scale 1:1000

H. MÖ.



⊙-----→ - proposed bore hole. vertical intensity is given in degrees





Diamond drilling in 1914  
and 1938. Lomtjern Prospect  
Flaveslandsheia, Evje.

Scale 1:500.

I II III from 1914  
1. 2. 3. 4. 5. 6. from 1938.

Fig. 2.



LOCATION

Name, LANGTJERN SKJERP. Map unit F6. Air photograph I-61 64-2927. Access, - with car along the Evje-Gautestad road to the big sand pit just beyond Aavesland, from here on foot in a SSE direction for approximately 1.4 km. The pit lies near the northern tip of Langtjern, and about 170 m NE of the Lomtjern prospect.

STATUS

A government holding.

HISTORY

Mutet 12.5.1906. Originally owned by A/S Evje Nikkelverk. Mentioned in Mørch Olsen's 1914 report on the pits in this area. Olsen writes - "Small diggings in a very weak impregnation zone. Magnetometer readings are small and uneven. No further work is justified here at the present time."

GEOLOGICAL SETTING

The pit lies in fairly massive amphibolites which outcrop quite extensively to the immediate south and to the south west and west. To the east and south east are ridges of fine grained granite. The prospect pit measures 6 m x 1 m and is about 1 m deep. Outcrops in the actual pit are poor but a shear in amphibolites is visible on the western wall of the pit (shear 30/69 E).

STRUCTURES

As mentioned above a shear is in the western wall of the pit. Foliation in the amphibolites to the immediate south is 205/90. Joints in the pit ran in two directions, these being 285/85 and 19/76.

CHARACTERISTICS OF ORE

No ore was visible in the pit so samples were taken from the dumps. A few lumps of massive pyrrhotite plus some pyrite were seen, along with disseminated pyrrhotite, chalcopryite, and pyrite in amphibolite.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S	
19.68F6	0.16	0.02	0.61	12.7	3.9	impreg. amphib.

Analysis carried out at FN K'sand, September 1968.

NAME of examiner: *Frank Nixon* .....

LOCATION.

Name, BYTTINGSMYR. Map unit F6. Air photograph 1-61 64-2927.  
Lies about 200 m south of Guldregn pit on top of a small hill. It can also be reached via Undeland farm.

STATUS

A government holding.

HISTORY

Mutet 24.10.1874. Original owners were A/S Evje Nikkelverk, later taken over by Raffineringsverket A/S. Mentioned in Mørch Olsen's 1914 report on the pits in the Aaveslands area.

GEOLOGICAL SETTING

The pit lies on top of a small hill. To the west are outcrops of a very dark massive amphibolite. The actual pit which measures 5 m x 3 m x 2 m deep is sunk in amphibolites some of which have a very meta gabbroic look about them. The outcrops are confined to the pit and a few patches around. A trace of a foliation (shearing?) was seen on the east side of the pit, this "shear" strikes on 200°.

CHARACTERISTICS OF ORE

Pyrrhotite and chalcopyrite are seen as disseminations in the amphibolite. No massive ore can be seen. From the outcrops or the dumps it is difficult to find any pattern for the disseminations.

ANALYSES

Specimen No.	Ni	Co	Cu	Fe	S	
0/203 E6	0.15	0.023	0.29	13	4.6	dissem. amphibolite

Analysis carried out at FN, K'sand, September 1968.

NAME of examiner: *Frank Nixon* .....

## FALCONBRIDGE NIKKELVERK, AKTIESELSKAP

LOCATION

Name, GULDREGN. Map unit F6. Air photograph 1 61 64-2927. The prospect lies about 300 m SW of Lomtjern skjerp, on the south side of a swamp. Can also be reached via Undeland.

STATUS

A government holding.

HISTORY

Mutet 27.3.1905. Originally was owned by A/S Evje Nikkelverk, taken over in 1925 by Raffineringsverket A/S. Mentioned in Mörch Olsens 1914 report on the pits in the Aaveslands area.

GEOLOGICAL SETTING

Outcrops in the vicinity of the pit are poor and granite pegmatites form the most frequent outcrops. Massive amphibolite outcrops to the north and east.

The pit measures 5 m x 5 m x 2 m deep and is sunk in medium grained amphibolites some of which are quartz rich. Outcrops are confined to the sides of the pit and no mineralization could be located here. On the east side a shear striking on 232 was observed.

CHARACTERISTICS OF ORE

No massive ore was seen either in outcrop or on the dumps. The dumps show mostly amphibolite some containing disseminated pyrrhotite and chalcopryite, often enriched along cracks.

NAME of examiner: .....

Frank Nixon





Photo F.W.

29.7.1968

Lomtjern Exploration Shaft.

Photo taken looking in a NW direction.

All the visible outcrops consist of a fairly massive amphibolite. To the left of the picture (red line) there is a shear strike, 210, dip  $69^{\circ}$  NW. The amphibolite in this shear has been converted into a black lustrous hornblende.



Photo F.X.

29.7.1968

Lomtjern Exploration Shaft.

Photo taken looking in an easterly direction.  
The red line indicates a shear zone, strike 60,  
dip 50 SE, which contains meta pyroxenite and  
massive pyrrhotite.

Plate 3

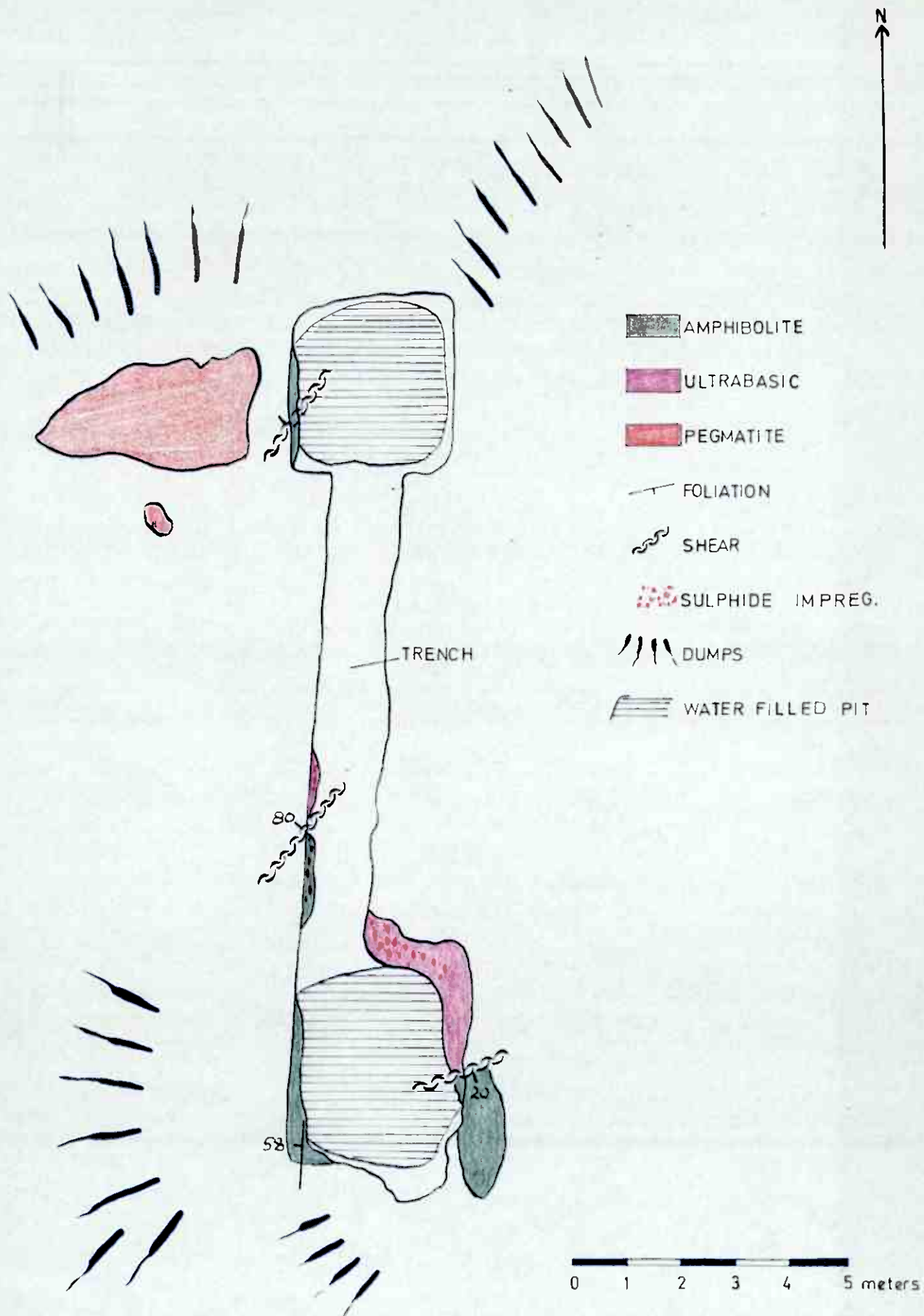


Photo F.N.

29.7.1968

General view of Lontjern Exploration  
shaft. Photo taken looking west.  
The swamp in the background is the  
drained bed of Lontjern lake.





HESTAASEN PROSPECT

Plate 1

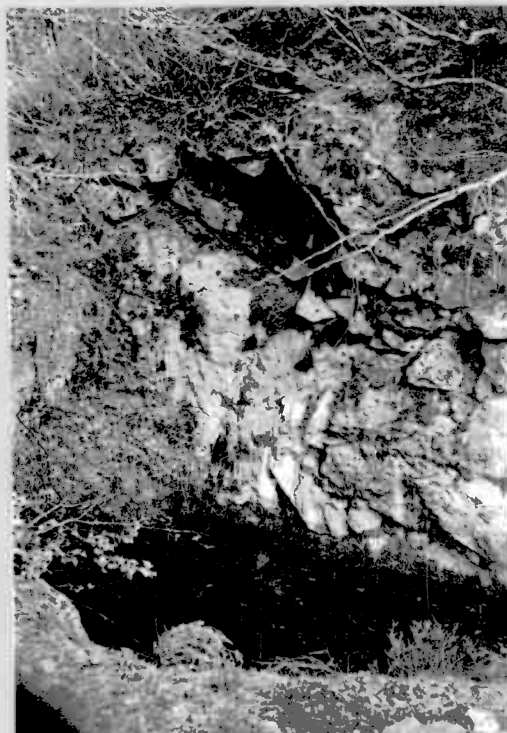


Photo F.N.

1.8.1968

The southerly prospect pit at Hestaasen. Red line marks a shear zone strike  $71^{\circ}$ , dip  $20^{\circ}$ E in the eastern wall of the pit. The shear is partly occupied by a quartz vein 20 cms wide. The rocks below the shear are meta pyroxenites impregnated with pyrrhotite. Above the shear are massive amphibolites.

Plate 2



Photo F.W.

1.8.1968

Close up of shear on western wall of the southern pit. U indicates the meta ultrabasics, Q the quartz vein and A massive amphibolites.



Plate 3



Photo F.N.

1.8.1968

The northern prospect pit at Hestaaen.  
The picture gives a good impression of  
the lack of outcrop at this prospect pit.