Bergvesenet

Postboks 3021, N-7441 Trondheim

Rapportarkivet

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Sydvaranger AS Prospektering AS		Terra Control	Utmål	

Tittel

The Fen Projekt. Annual Report 1982

Forfatter	Dato År	Bedrift (Oppdragsgiver og/eller oppdragstaker)
Hultin, Ivar	jan 1982	Sydvaranger A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Nome	Telemark		17134	Skien

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geologi		Tuftehavna Søve Fen

Råstoffgruppe	Råstofftype
Malm/metall	Nb Niob Ta Tantal P Fosfor

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

The Fen Project is a Joint Venture Program between K/S A/S Fenko (S.D. Cappelen + Årdalk &SunndalVerk (ASV) + Elkem-Spikerverket (E-S) + Sydvaranger A/S (ASS) and Union Mineral Norge A/S

KS AS Fenco is the operator with A/S Sydvaranger as sub-operator. The project leader is Ivar Hultin, A/S Sydvaranger

T H E F E N P R O J E C T

ANNUAL REPORT

1982

JAN. 1983

IVAR HULTIN

IH/bs

INTRODUCTION.

The Fen Project is a Joint Venture Program between K/S A/S Fenco (S.D. Cappelen + ÅSV + Elkem-Spigerverket (E-S) + A/S Sydvaranger (ASS)) and Union Mineral Norge A/S.

K/S A/S Fenco is the operator with A/S Sydvaranger as sub-operator. The project leader is Ivar Hultin, A/S Sydvaranger.
Co-workers :

Geologist	Stephen D. Olmore	UM	Hard rock mapping
"	Viggo H. Wiik	ÅSV	Geochemistry + EDB + geology
Civ.ing.	Carl W. Carstens	E-S	Geophysics
"	Jan-Egil Wanvik	E-S	" + geology + environmental works
Geologist	Henning Qvale	ASS	Hard rock mapping + mineralogy
Geophysicist	Ørnulf Logn	ASS	Consultant services
Technician	Hans Lund-Andersen	ASS	Several geo-services
"	Gudmund Kompen	ASS	" "
"	Tord Anderson	ASS	" "
"	Leif Storeide	ASS	" "

H. Lund-Andersen left A/S Sydvaranger the 31st of March. His tasks were undertaken by G. Kompen.

S.D. Olmore was withdrawn from the Project the 31st of August, and went back to U.S. primo September. His workings were undertaken by Qvale, J.E. Wanvik and I. Hultin.

HARD ROCK MAPPING.

S.D. Olmore has together with V.H. Wiik completed the surface hard rock mapping in the Melteig - Vipeto sub-area. Their results are presented in two reports :

S.D. Olmore : Update on geological progress.
UM Fen report No. 03 April 1982.

V.H. Wiik : A geological survey of The Vipeto-Rullekoll Sub-Area, Sept. 1982.

H. Qvale and S.D. Olmore have completed the surface hard rock mapping in the Tuftehavna Sub-Area. The results are given in the report of H. Qvale :

The Tuftehavna Fen Complex, South Norway.
Geology, mineralogy and mineralizations.
Dec. 1982. Sydvaranger Report No. 1354.

S.D. Olmore and I. Hultin have remapped the inner part of Tuftestollen and Tufte Area.

The underground hard rock mapping of Tuftestollen is now completed. Report will be available during the first quarter of 1983.

GEOCHEMISTRY.

The analytical treatments of the collected surface samples from Bolladalen - Rullekoll - Vipeto sub-area are completed. The results are given in V.H. Wiik's report : A Geological Survey of The Vipeto - Rullekoll Sub-Area.

GEOPHYSICS/RADIOMETRY.

In connection with the diamond-drilling program in Tuftehavna sub-area it is carried out rather detailed surface measurements of magnetometry (susceptibility), radiometry and, in some places, VLF-resistivity.

This investigations were supervised by C.W. Carstens and J.E. Wanvik with assistance from G. Kompen, H. Lund-Andersen jr. and T. Anderson. Ø. Logn has been the consultant.

The results are presented in the report of C.W. Carstens :

A Geophysical survey of The Tufte Area.
Oct. 1982,

and Ø. Logn :

Some comments to the report of C.W. Carstens from Oct. -82.
Dec. 82

Within a selected area of Gruvåsen som surface radiometric investigations have been done. These investigations were ment to be an experimental test, and thought to be a "tool" in the further surface mapping after Th- and RE-mineralizations.

These results are given in I. Hultin's report :

Gruvåsen, diamond-drilling of 1981 and γ-ray surface measurements.
Dec. 1982. Sydvaranger Report No. 1359.

DIAMOND DRILLING PROGRAM.

The results from the diamond-drilling program of 1981 are available in the following reports :

S.D. Olmore : Update on geological progress.
UM Fen Report No. 03, April 1982.

I. Hultin : The Tuftehavna Mineralization, April 1982.
Sydvaranger Report No. 1357.

Gruvåsen diamond-drilling 1981 and γ-ray surface measurements, Dec. 1982.
Sydvaranger Report No. 1359.

The diamond-drilling program of 1982 was a further control of Nb-and P-mineralizations in DDH1 (TH1-81) in Tuftehavna.
Concerning the results, see below.

Totally it was drilled 1020, 15 c.m., Ø 56 mm, divided on 10 holes.

A/S Grunnboring, Oslo, carried out the drillings which had a total cost to NOK 395.633,75 ex. 20 % taxes, with the following items of expenditure :

Installations	NOK	18.500,-
Drillings 1020, 15 c.m.	"	338.221,25
Internal transportations, waiting fees, s.o.	"	38.912,50
Sum 20 % taxes	NOK	395.633,75
Total costs per coremeter Ø 56 mm	NOK	338,-
Effective drilling-costs per coremeter Ø 56 mm	NOK	332,-
Installation - waiting fees - int. transp. per coremeter	NOK	56,-

The types of rocks, which have been drilled, is mainly homogenous søvite + rauhaugite and hollaite.

THE RESULTS.

The diamond-drilling of 1981 registrated a very fine Nb- and apatite (Ap)-mineralization in a phlogopite-rich rock - lamprophyre, which crops out very close to the TH1. The thickness is about 6,00 m containing 4,35 % Nb_2O_5 + 300 ppm Ta and 40-45 % vol. of apatite.

This Nb + Ap-type of mineralization is new for Fen, mainly because of the very high content of Ap together with Nb_2O_5, and that Nb_2O_5 is found in other oxides than pyrochlore, such as fersmite ? $CaO.Nb_2O_5$ with about 15 % CaO and 75 % Nb_2O_5 with some Ta_2O_5 and U_3O_8.

The drillings this year started with two another holes in an east-west striking profile with TH1, see appendix. These drillings indicates that the Nb + Ap-mineralization continues down to at least 40 m below surface level. At that

level it seems to be rather small veinlets of about 0,50 m thick. Its continuation at lower levels is not controlled.

Till this day we have registrated a cross-cut area of about 125 m^2 in profile 1. Containing 2,4 % Nb_2O_5 + 12 % P_2O_5 + 260 ppm. Ta_2O_5 with some U_3O_8.

Toward south the mineralization seems to change character, - a more typical low grade type.

In profile 2, 50 m south of profile 1 we have located 0,4 % Nb_2O_5 + 9,4 % over 7,0 m thickness.

Another 40 m south of profile 2 we have found a combination of lamprophyre with 1.1 % Nb_2O_5 over 1,4 m in the central part of a low grade mineralization containing 0.39 % Nb_2O_5 + 9.4 % P_2O_5 over 17.10 m.

The continuation of the mineralization further towards south is not known. This control ought to be our main task in 1983.

In profile 3, about 40 m north of profile 1, we have located a cross-cut area of 120 m^2 with 1,4 % Nb_2O_5 + 14,7 % P_2O_5.

In profile 4, another 40 m north of profile 3, we have no registrations of any typical lamprophyre, only a smaller mineralization containing 135 ppm Ta_2O_5, which according to the main structure of the host rock, seems to correspond to the lamprophyre in profile 2. In other words, it seems that the fine Nb- + Ap-mineralization dies out in the northern direction. Smaller and concordant veins of Ta_2O_5 + P_2O_5 + U_3O_8 are found in the very same host rock. These veinlets seem to be of non economic interest today.

There are a very few outcrops in Tuftehavna area. Therefore we have had to use detailed geophysical surface measurements in the mapping of the rock structure and in pointing out interesting drilling targets.

Several new interesting anomalies northwest of TH1 are already located, and these locations should be our very first drilling targets in the future. It is obvious that geophysical surface investigations are an absolutely necessity in our exploration works within the Søvite Rock Complex.

The diamond-drilling of 1981 in Gruvåsen gave very few additional informations about the Nb- and RE-mineralizations. It confirms the earlier low grade Nb-mineralization, (< 0,20 % Nb_2O_5), which seems to be normal for this rock

complex. Further on the Nb and REE seems to follow each other. The RE-contents seem to be a bit lower than earlier registrated.

Older, well known and relatively REE-rich locations are tried to be mapped by radiometric surface measurements. The recent results seem to be so positively that this method should be used in the further exploration investigations. The preliminary assays indicate that the REE are following a structure with a pitch and swell pattern, which seems to be more or less parallel to the Bolladalen Fault Zone.

Further on, the radiometric investigations must be carried out in a very close grid in overburdened area.

In the Vipeto area several interesting Nb-mineralizations are located on the contact/border of søvite and hollaite. These locations will be controlled as soon as the groundowners give the permissions.

At Glory Hole (Tuftestollen - open pit) the earlier Nb-registration (3 % Nb_2O_5) of geologist S. Svinndal is controlled and confirmed. This year's preliminary investigation has located fine Nb-(up to 2,7 % Nb_2O_5)content within Ap-rich søvites, which crops out very close to the "wall" of Glory Hole. This area is also covered with overburden and therefore it will be necessary to follow up the further exploration works with geophysical investigations.

GENERAL INFORMATIONS.

The Environmental Group has carried out some investigations concerning possible pollutions within the drilled area in Tuftehavna. Report is available. This concludes that there is no or very little pollution from the drilling water and mud.

The very first security works within the Fengruva was not accepted by Bergmester and Arbeidstilsynet. Because of economical reasons Bergmester and Arbeidstilsynet recommended to close the most dangerous part of the mine at the Main Shaft, and to secure the best part of the Main Adit from Main Shaft and out to the Entrance. This was done by a crew from A/S Sydvaranger in Jan.-Febr. The security works were controlled and accepted in February by Arbeidstilsynet.

Two Management Meetings have been held - 06.05 and 28.10 - with good representation from Union Mineral, U.S.' and Union Oil, Sandnes. Minutes are available.

Stabekk, 27.01.1983

Ivar Hultin

ECONOMY.

Budget for 1982 was NOK 2 614 000,-.

Total costs for 1982 were NOK 2 534 416,66 with following items of expenditure :

416.20	Union adm. Transp. meet. Taxes, etc.	NOK	269 946,63
416.21	Map Envir.men.work	NOK	72 891,52
416.22	Geology	NOK	166 734,66
416.23	Geochemistry	NOK	320 910,69
416.24	Geophysics	NOK	167 960,03
416.25	A/S Sydvaranger Sub-Operator	NOK	946 000,-
416.29	Diamond drilling	NOK	589 973,13
TOTAL	416.2 - FEN	NOK	2 534 416,66

FEN AREA
Scale 1:5000

NORSJÖ

Tufte - Søve area
S.D. Olmore
I. Hultin

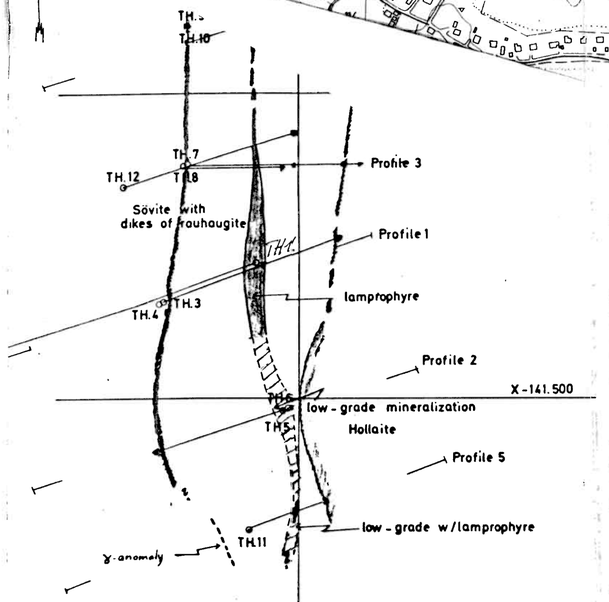
Glory Hole
S.D. Olmore
H. Gvale
I. Hultin

Tuftehavna
C.W. Carstens
J.E. Walvik

Vipeto - Rullekall area
V.H. Wiik 1980-81

K. Mørk
T. Andersen
G. Foslie
S.D. Olmore
1981

Gruvevegen



EXPLANATION:

- Sövite w/rauhaugite
- Hollaite
- Nb + Ap - dike (lamprophyre)
- Nb - dike
- Ap - dike
- Ta + U - dike

Y - 51.000

A/S Fenco
Tuftehavna mineralization
Bekkedal
Plate 1
Scale 1:1000
Bilag 2