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Tittel

Exploration Report: Hovde Concession, Aust-Agder, South Norway, Summary for 1998.

Forfatter	Dato År	Bedrift (Oppdragsgiver og/eller oppdragstaker)
Røsholt, Bernt	sept 1998	Mindex ASA, Nordic Minerals AS

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Vegårdshei Åmli	Aust-Agder		16123	Arendal

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geokjemi		Hovde Espelandmyr

Råstoffgruppe	Råstofftype
Malm/metall	Zn

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

The Hovde Consession wich includes the abandoned Espelandmyr Silver, Lead and Zinc deposit, strices over 11 km across the local communes of Vegårdshei and Åmli. Both remobilized and primary stratiform type of carbonate hosted ore is found at the Ood mine dumps with attractive Zn-content.

Mindex carried out a deep soil sampling program in 24 profiles across the marshes for each 500m with a total of 202 deep soil sample collected, in an effort to locate a possible "medium sized" carbonate hosted base metal deposit in the southwest extension of the rock unit.

No metal annomalies were revealed by the assays and no further exploration following work is recomended.

MINDEX ASA

Exploration Report:

Hovde Concession

Aust-Agder, South Norway
Summary for 1998

by
Bernt Røsholt

September, 1998

MINDEX ASA

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Exploration Report:
Hovde Concession
in Aust -Agder, Norway.

Summary for 1998

By
Bernt Røsholt

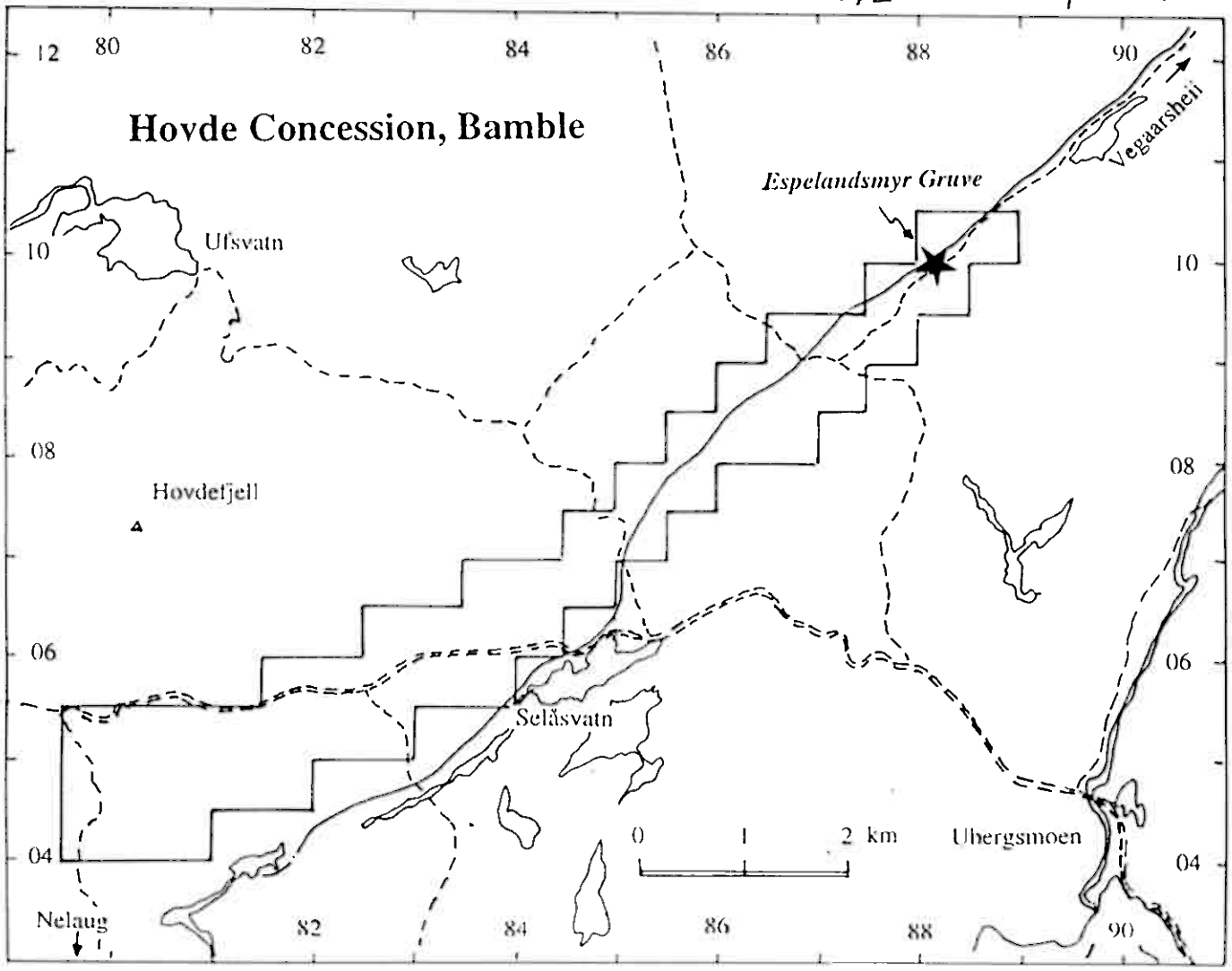
Summary and Conclusions.
The Hovde concession which includes the abandoned Espelandmyr Silver, Lead and Zinc deposit. It strikes over about 11km across the local communes of Vegårshei and Åmli. Both remobilized and primary stratiform type of carbonate hosted ore is found at the old mine dumps with attractive Zn-contents.
ARCO Norway Inc. carried out some detailed exploration work in the early to mid eighties in the area. This work included six core-drillings totalling 576m. The drilling was mainly restricted to the rock unit hosting the ore-bearing carbonates striking in a NE-SW direction in the immediate vicinity of the old mine (Up to 3km).
Mindex' idea was that the rock unit which hosted the ore-bearing carbonates was covered by extensive marsh-land towards the Southwest that could hide a «medium sized» carbonate hosted base metals deposit. To have an answer for this, a deep soil sampling program was carried out in 24 profiles across the marshes for each 500m with a sample of 5 to 20m.
The marshes turned out to be quite shallow with depths from 0,5 to 11,0m averaging 3,2m and the dominating rock seemed to be amphibolite rather than carbonate rocks. A total number of 202 deep soil samples were collected. No metal anomalies were revealed by the assays; Only a few elevated background metal contents were detected. No further exploration follow up work is recommended in the concession and the idea that stratiform zinc-mineralizations can be found in the elongated swampy area towards SW is considered unlikely.

Contents

Enclosures:

Fig 1.

NE corner of Mapsh. Nelaug 16/2 TIP



Summary report on follow up exploration work in the Hovde Concession 1998.

Background: Hovde Concession is located in the local communes Vegårshei and Åmli in the county of Aust-Agder. It is covered by 44 claim areas since 14/03-1997 covering an area in total 11km^2, (see fig 1, see also enclosed map fig 6 in scale 1:10,000 and fig no 2 map in scale 1:50,000).

The Espelandsmyr silver-zinc-lead deposit, located 2km SE of Ettevatn, was mined in the 18-century and closed down early in the 19-century. The Espelandmyr deposit was a very high grade silver deposit where especially lead and silver had been enriched in a remobilized part of a possible stratiform mineralization. In the area, where the stratiform mineralization is located, it contains a zinc carbonate-hosted ore-type with traces of lead and a high silver content compared to the base metal content.

Earlier geological mapping has shown that the stratiform mineralization has many similarities to exhalative mineral deposits including a characteristic sequence of sulphide-enriched tourmalinite, graphite- and alumina-schist in a series of increasing contents of carbonates ending up with a layer of chert. The banded zinc-mineralization occurs in carbonate-bearing rocks in the lower sections of the exhalite sequence above the tourmalinites. Outcrops of the fine-grained banded rock can be found over more than 14km along strike. Elongated swamp areas along the strike were believed to hide possible mineralizations due to erosion in the possible carbonate-rich sequence.

Geophysical surveying - A Dighem helicopter survey and VLF and MAG-follow up ground survey was carried out by Arco Norway INC. across the believed mineralised zone in a strikelength of about 600m 2,8 to 3,4km SW of the shaft of Espelandsmyr mine, see figs. No 3 and 4. The VLF response is quite strong over 6 profiles. These datas have not been reviewed during this study.
The geophysical response of the Arco ground survey is in general very weak.

A geochemical survey using deep soil sampling was also carried out by Arco over 11 profiles with spacing 100m from the mine and 1100m to the SW along the strike of the mineralization. See fig 5. In total Arco collected 78 deep soil samples at Espelandsmyr with depths from 0,4 to 16,1m averaging 3,0m. Unfortunately the Arco files left at the Survey are incomplete, and

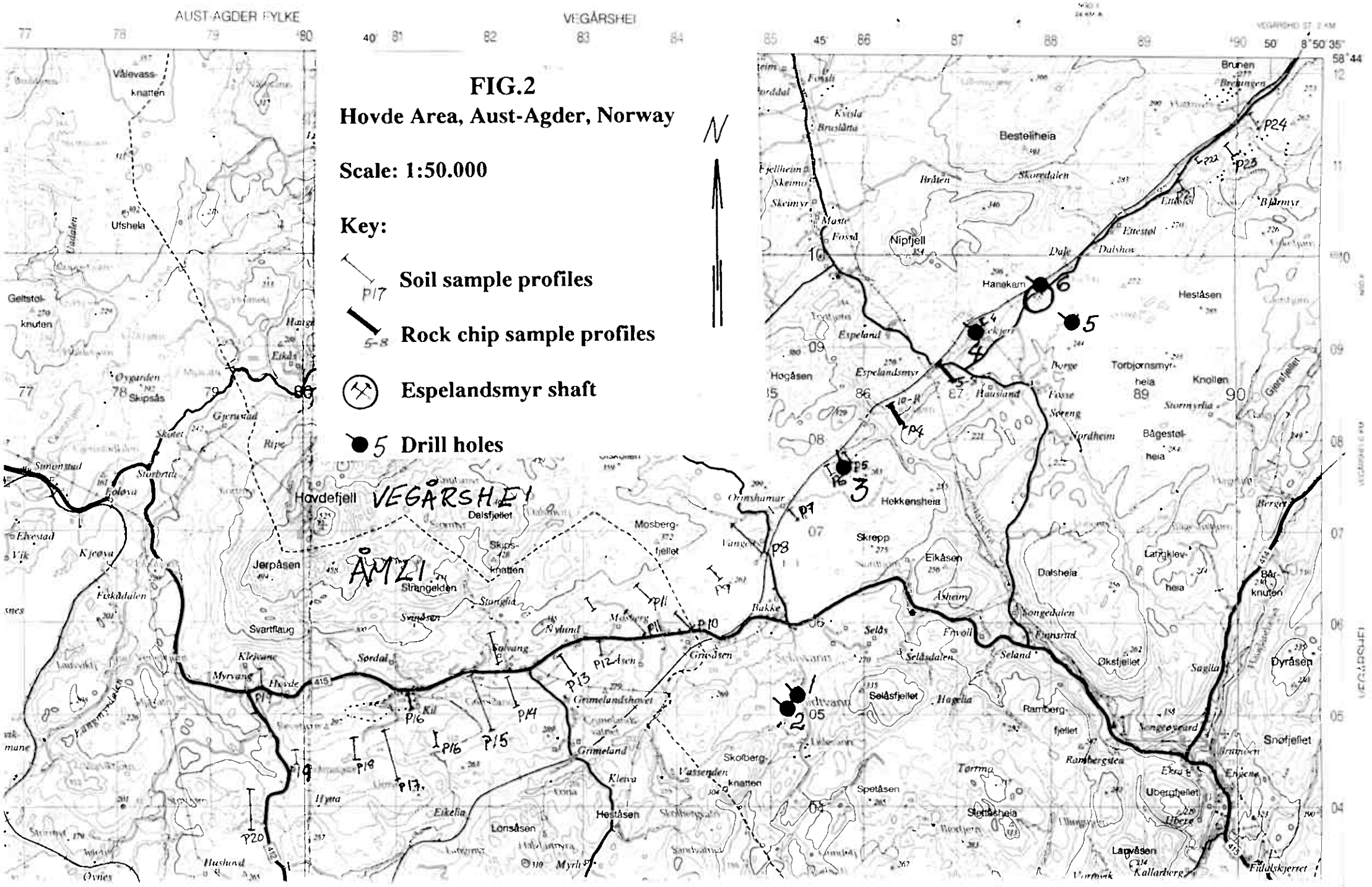


FIG.2

Hovde Area, Aust-Agder, Norway

Scale: 1:50.000

Key:

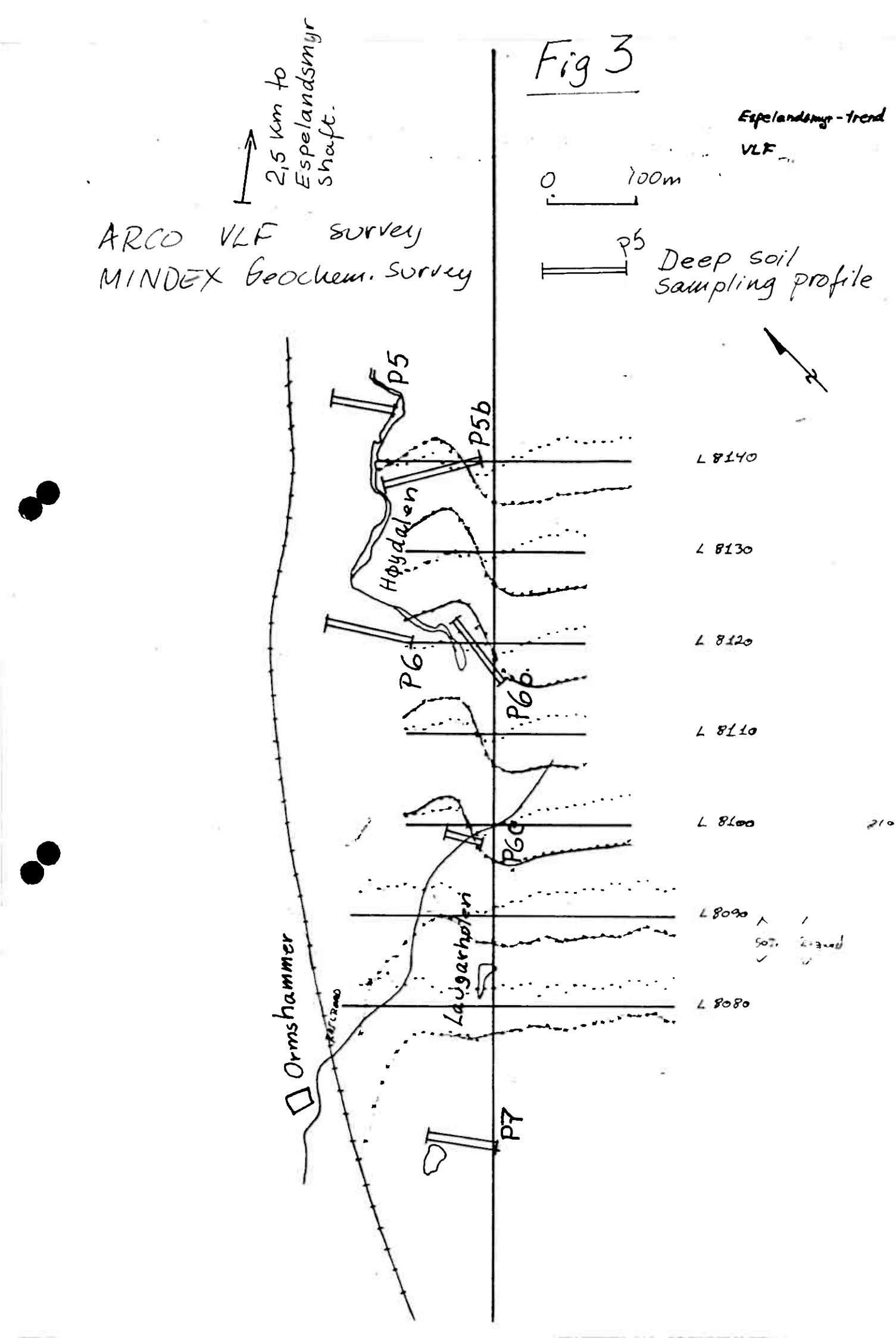
P17 **Soil sample profiles**

5-8 **Rock chip sample profiles**

Espelandsmyr shaft

5 **Drill holes**

Fig 3


2,5 km to Espelandsmyr shaft.
ARCO VLF survey
MINDEX Geochem. survey
Espelandsmyr - trend
VLF
0
100m
P5
Deep soil sampling profile
N
P5
P5b
Høydalen
P6
P6b
P6c
Ormshammer
Laugarhøyen
P7
L 8140
L 8130
L 8120
L 8110
L 8100
L 8090
L 8080

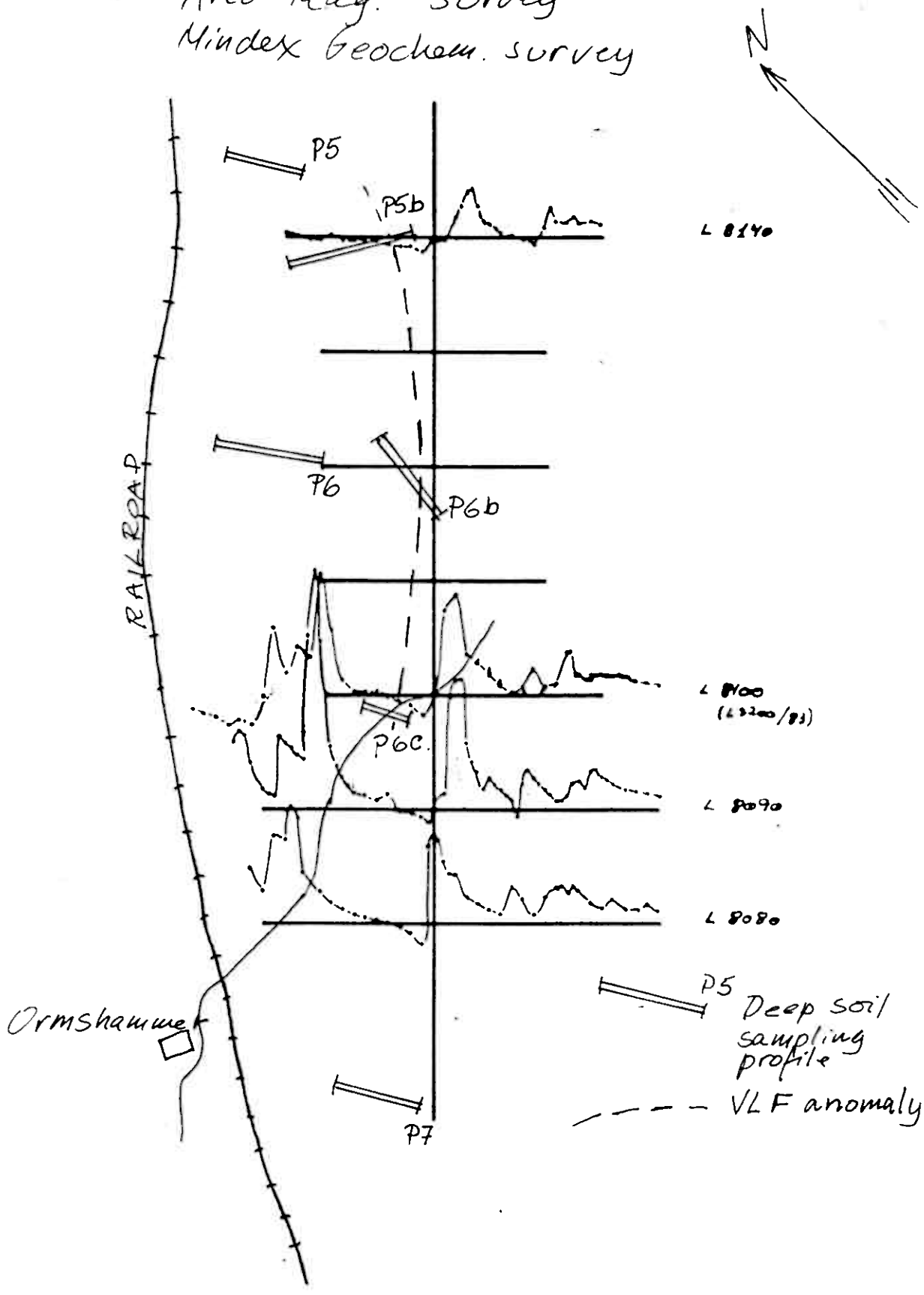
2.5 Km to
Espelandsmyr shaft.

Espelandsmyr - trend

Total Magnetic Field

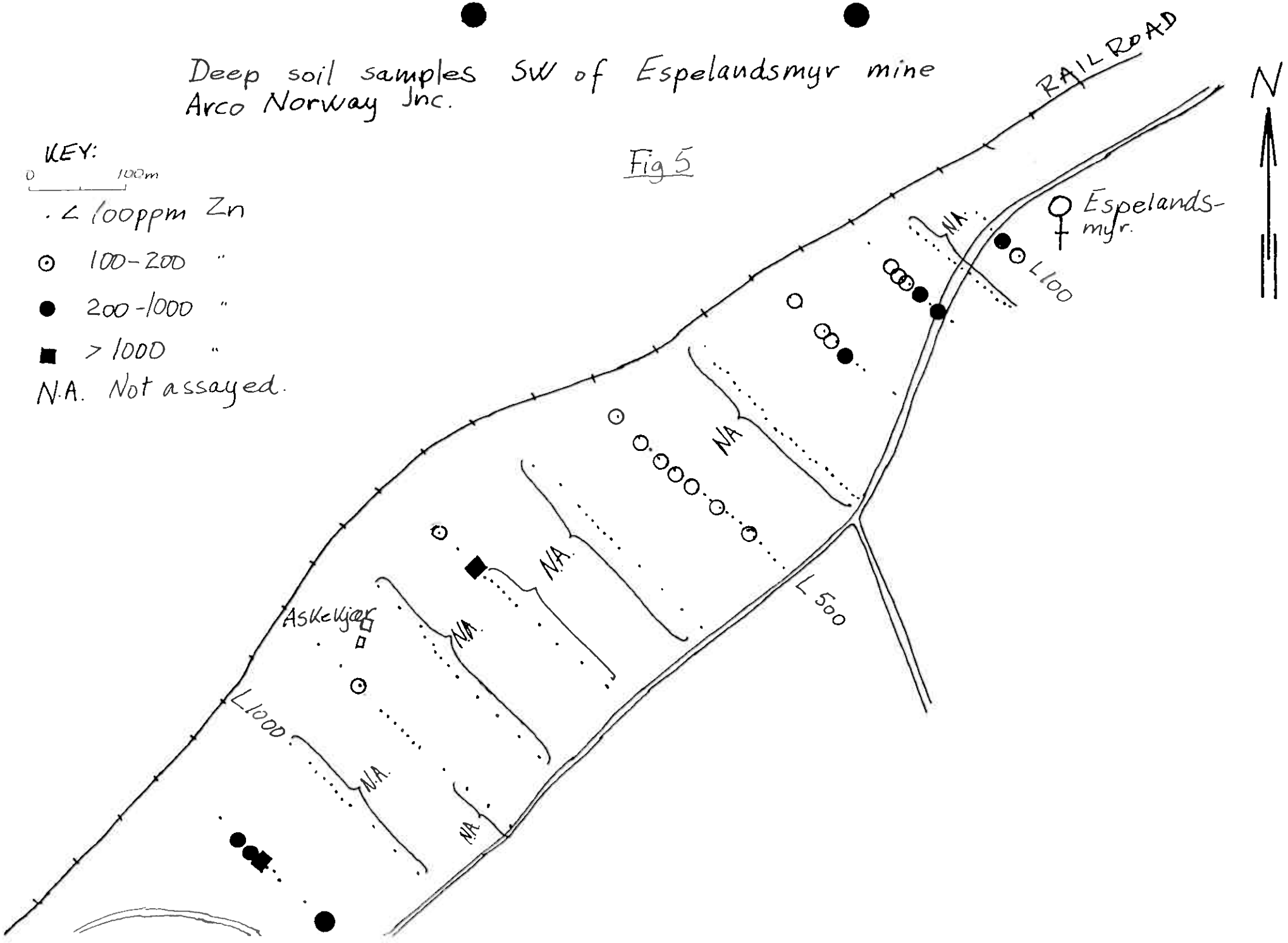
Fig 4

Arco Mag. survey
Mindex Geochem. survey



Deep soil samples SW of Espelandsmyr mine
Arco Norway Inc.

Fig 5



only about half of the assay results from the deep soil sampling can located. Some strong anomalies do occur in the sampled area, but due to the incomplete assay listings, it is not possible to make a proposal for follow up. (Ref. «Bergarkiv-Rapport» no 7970 NGU «Exploration in the Espelandsmyr-Gjerstad area, Aust-Agder» by Laila Grahl-Madsen and Lone Bech 1984 states at pp 19: «Not all soil sample assay-results have been available by this date 27/11/84»). See enclosure no1:

GEOCHEMISTRY:
Rock, Stream sediment and soil samples collected by Arco. Bergarkiv-rapport nr 7970 pp 15-19.
It was planned by Mindex to take some infill deep soil sampling profiles the 1998-season in this area, but the time the field work was carried out, the crops had not yet been harvested which restricted access to the area.

Arco carried out 6 core-holes in the area totalling 576m in 1984. The list below gives the location and some detailed information of the holes. (See also enclosure no2).

List of Arco drillholes

Location	UTM E	UTM W	Length	Az.	Inclin.
1 Skålberg	485265	6505245	100,0m	350°	-50°
2 Skålberg	485125	650507	70,0m	314°	-50°
3 Ormshammer	485820	6507745	71,9m	310°	-65°
4 Askekjerr, Espel.m.	487235	6509165	115,5m	313°	-60°
5 Hareholta, Espel.m.	488265	650925	120,0m	310°	-50°
6 Ettedal, Espelandsm.	487900	650968	98,5m	320°	-65°

The core size was 3,5cm.

The location of the 6 drillholes is plotted on the map fig 2 and drillhole 3 to 6 on the enclosed map.
Drillhole no 1,2 and 3 returned only traces and background values of the base metals.
Drillhole no 4, Askekjerr at Espelandsmyr, returned Zn contents up to 0,1% and Cu and Pb up to 0,05 and 0,01% respectively. Detailed results from drillholes no 5 and 6 was not found, but enclosure no 2 from Bergarkivrapport 7970 1984 pp25-28 summarises the drilling result.
Drillhole no5 intersected traces of galena at 96,15-97,20 and drillhole no 6 was aiming to test the ore-horizon in the mined area. It intersected mineralizations containing up to 2% galena, minor spalerite ±pyrrhotite as cm-thin bands in dolomite and cherty amphibolite at the footwall side of a 15m wide dolomite unit.

Exploration work 1998.
On the basis of available data and the idea that stratiform mineralizations could exist in the swampy areas towards SW, it was decided in 1998 to sample the elongated swamp areas by deep soil sampling with a number of about 25 profiles. With a profile distance at about 500m and sample distances at 5 to 20m it was expected that zinc bearing zones of possible economic interest would be revealed.
Exploration work comprised of:

1. Information meetings with local authorities and telephone contacts with land-owners to inform about type of field work and the limited impact of the deep soil sampling.

2. Deep soil sampling of 202 soil samples from 24 profiles at around 50 grams each. The sample depths from 0,5m to 11,0m averaging 3,2m. See enclosed soil sample list (Enclosure no4) with profile no, m-distance from starting point, depth in m and sample description.
   A Pico drilling machine was applied to force one-m connected drill-rods with a sampling tip. The rods and sample tip with the sample was lifted up with a manual jack.

3. Rock chip sampling in a number of 7 from three profiles. The samples are collected as chip samples over 5m in central potential areas and up to more than 100m in areas of less interest. See enclosed list of rock samples. (Enclosure no5).

4. Rock sampling from dumps of the old mine, prospects of interest and rocks of possible interest. See enclosed list of rock samples as above.

Geology, Mineralization.
Enclosure no 3 pp 4,5, 8,10 and 11 from Bergarkivrapport nr. 7970 describes the general geology and mineralization in the area.
The Espelandsmyr Silver, Zinc and lead deposit is connected to a rock unit comprising of
Amphibolite/Metagabbro (Amphibole, feldspar, ±biotite, ±quartz, ±garnet).
Granitic Gneiss/ Intrusive Granite (Gneiss) (Quartz, alkalifeldspar, feldspar, ±biotite, ±amphibole).
Quartz Rock (Chert) (Quartz > 80 vol. %).
Thin Alternating Gneisses With Some Exhalative Features. (Felsic gneiss, amphibolite, Chert and carbonate rocks).
The strike of the rocks has a NE-SW trend.

Result of exploration work.

The enclosed map fig 6 in scale 1:10,000 and fig no 2 shows the location of the deep soil sampling profiles. It was expected that the depth to the bedrock in the swampy areas would be more than the average depth at 3,2m since the targeted hostrock would most likely be a carbonate rock. The bedrock under most of the sampled bogs is believed to be dominated by amphibolite because it dominates the area and is more resistant to erosion than carbonate rocks.

Only 8 samples returned Zn contents between 100 and 200 ppm and only two samples returned Pb contents between 100 and 200ppm. See enclosure no 6.

The 21 rock samples collected from rocks of interest related to possible mineralizations such as sulphidebearing rocks, tourmalinites, skarn-bearing rocks and thin banded carbonates returned few analysis of interest. Rock chip samples were taken in three profiles; sample loc. 87,20/ 09,20, P3 and P4 (samples HORCS 004, 005-008 and 010-011 respectively). The samples were taken in or near the presumed ore-bearing horizon. None of these samples returned any significant base metal contents. The SE part of profile no 3 returned, however, some elevated background values of Zn. In profile no 4, sample no HORGS 010, abundant tourmalinite was found. Sample no HORGS 001 and 002 contained also abundant tourmalinite. None of the tourmalinite samples returned any anomalous metal contents.

Only the two rock samples, HORGS 020 and 21, from the waste dumps of the mine returned some metal contents of interest. Both samples were carbonates with mm-narrow bands of Zn and Pb mineralizations. A more massive ore-type of this type was the typical target for the follow up exploration work the 1998 season. The analytical results of the two samples demonstrates that even the primary banded ore-type has a high content of silver.

Carbonate rocks HORGS 013, 018 and 019 returned only background metal contents. Even sample no HORGS 013 with disseminated sulphides had only background metal contents.

Conclusions and recommendations.

The rock unit where the ore horizon is located with its NE-SW strike direction is definitely partly covered by marshy land. It was clearly demonstrated in the deep soil sampling program, however, that the marshes were in general shallow and ridges of exposed rocks trending in a NW-SE direction were frequent. Amphibolite was the dominant rock in these ridges, and it is believed that the amount of carbonate horizons in the marshy areas could be limited.

Therefore it is limited space for a «medium sized» stratiform carbonate hosted Zinc-Lead-Silver deposit and no further follow up work is recommended.

The field work in 1998 has given some obvious geological and geochemical results that no further follow up work is recommended.

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Petersen J. S.,Koed J. And Sundblad K. 1995: Stratiform, sediment-hosted Zn-Pb mineralization at Espeland in the proterozoic Bamble Shear-Belt. In: Pasava, Kribec and Zak (eds): Mineral Deposits: from their origin to their environmental impacts. Balkema. P. 307-311.

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Enclosure no 1

5.0 GEOCHEMISTRY

5.1. Rock geochemistry

All rock samples have been analyzed for Au, Ag, As, Cu, Pb and Zn. Some were also analyzed for Fe, Mn, Ba, F, Bi, Co, Ni, Pt, Pd, W, Mo, Ti, Sb or Hg.

Au values above 2 ppm have been detected only in the epithermal vein deposit Vekselmyr. Au values in the range 0.5-2 ppm, have been detected in strata-bound mineralization. All but one (Espelandsmyr), however, are not associated with economic concentrations of other elements. Au values from 5-500 ppb tend to be concentrated in trends with exhalative features. High Au values are generally associated with elevated Cu values.

There is no correlation between As and Au, with the exception of the Vekselmyr As-Au occurrence.

Pb, Zn and Ag values are generally very low; the only values of economic interest have been found in the Espelandsmyr mineralization. Pb and Ag values here are closely correlated.

Analyzing for other elements indicated enhancement of Pd and Pt, see table 5.1.

The conclusion of the rock geochemistry in the Espelandsmyr-Gjerstad area is:

a) The Espelandsmyr-Gjerstad area still has Au potential, especially in the form of epithermal deposits.

b) Some of the trends are enriched in certain elements, and it is believed that it is inside these trends economic concentrations of the elements are to be found.
The trends with enriched values are:
I : The Espelandsmyr trend, in Pb and Zn.
II : The Takserås-Vekselmyr trend, in Au and As.
III: The Sletås trend, in Cu. The Sletås trend might be a northern continuation of the Skyttemyr trend.

c) The Bamble belt might have a Pt-Pd potential, especially in gabbro environments.

Table 5.1 Selected rock assays from '83 and '84

Sample No.	ppm Au	ppm Ag	ppm As	ppm Cu	ppm Pb	ppm Zn	ppm Others	
8401170	7.4	-	5.4%	781	-	55		Vekselmyr, qtz vein
8401046	0.734	3.0	10	0.5%	23	35		Espelandsmyr, gran.gns
8401329	0.389	-	16	137	13	90		Venäs, gar-bio gns
8403199	-	240	524	96	3.6%	15.9%	Fe 4.26%	Espelandsmyr, dump
Rb 17	1.85	641		0.62	8%	4.40%		"
8405753	0.015	16.1	-	108	0.4%	1.2%		Hengemyr, dump
8401333	0.53	-	-	62	-	44	Pt: 0.103	Takseräs, sericite schist
8401080	0.015	-	12	123	12	107	Pd: 1.354	Skälberg northeast amph w/calcs.
8401130	-	-	-	56	-	35	Pd: 0.326 Ba: 102, Mo:- Sb: 40	Chert, Skälberg W

5.2 Stream sediment samples

Elements analyzed for:
in 1983: ARCO - both screens +80 mesh (<0.18 mm) and +20-+80 mesh (0.18-0.85 mm) were assayed for Au, Ag, As, Cu, Pb, Zn, Fe, Mn
NGU - Ag, Cu, Pb, Zn, Mo, Ba, Fe, Mn, Co
in 1984: ARCO - +20 mesh was analyzed for Au, As, Cu, Pb, Zn.

Table 5.2 Statistics on stream sediments, ARCO 1983

Element	Coarse fraction +20-+80 mesh		Fine fraction, +80 mesh	
	mean ppm	90% fractile, ppm	mean ppm	90% fractile, ppm
Au	0.0035	>0.01	0.0058	>0.01
Ag	0.35	>0.1	0.619	>0.1
As	3.25	>2	4.83	>10
Cu	15.23	>24.9	50.5	>109.8
Pb	29.99	>36	62.73	>74
Zn	61.07	>76	96.61	>136.9
Fe	30506	>53779.9	41715.2	>68259.9
Mn	744.4	>1208.9	1012.88	>1473.4

(See compiled statistics 1983 and 1984, Jim Barron 1984).

The drainage areas with either Cu, Pb or Zn anomalies show a scattered pattern with few combined-element anomalies. Geological follow up of these anomalies did not lead to recognition of any important mineralization. The big Pb-Zn anomalies in the neighbourhood of Espelandsmyr mine can be explained by dump material used as road fillings.

The anomalous Au drainage areas also show a scattered pattern, but three larger anomalous areas are defined. These are:

a) Takserås-Vekselmyr

b) Grimelandsmyrene

c) The area south of Jommåsknuten

ad a) Au values in the range 0.007 ppm - 0.088 ppm. Mean value: 0,018 ppm Au. As has been detected in two samples.

ad b) Au values in the range 0.005 ppm - 0,021 ppm. Mean value: 0.009 ppm Au. Not associated with any other elements.

ad c) Au values in the range of 0.010 - 0.060 ppm. Mean value: 0.039 ppm Au. Not associated with any other elements.

Stream sediment assays seldom show any As or Ag. When these elements occur, it is seldom within larger Au stream sediment anomalous areas. Areas with rock As anomalies do not show up as As sediment anomalies.

The conclusion of the stream sediment program is:

- Stream sediment samples have been useful in pointing out anomalous areas on a regional scale. But they have been of limited use on detailed scale.

- Assays of As and Ag have been of no use in this area.

- Cu, Pb and Zn show that no big unknown deposits of these elements are exposed and drained in the sampled areas.

5.3 Soil samples

The soil sample technique was tested in selected areas and later used as a prospecting tool. A comprehensive description of the technique used is given in ARCO report no. 84-23-36.

The two largest test sampling areas are:

A: Vekselmyr, and
B: Espelandsmyr

ad A: the soil sample assays confirm the rock geochemistry and the geology. The method was mainly applied for Au and As. Large sample volumes were taken in connection with trenching.

ad B: the soil sample assays show a slightly scattered picture. But overall the anomalies are concentrated around the ore horizon and the geophysical anomalies. Important

elements in this test are Pb, Zn and Ag. The anomalies are defined by enhanced Pb and Zn values.

Due to a small sample collector, soil samples were so small that the detection limit was unacceptable high, up to 0.089 ppm Au. A high Au value (2.2 ppm Au) was found; the anomaly can not be explained simply by geology. This sample has been taken at the greatest depth in the area; furthermore, in an open joint in bedrock. The Au anomaly might therefore be explained by a local mechanical concentration of Au.

Not all soil sample assay-results have been available by this date (27/11/84).

The conclusion of the soil sample program is:

- In the test areas, the soil sampling technique did pick up anomalous Au, As, Pb and Zn concentrations,

- Soil sampling is a useful sample method in well defined areas.

Enclosure no 2

7.0 DRILLING PROGRAM

7.1 Drilling purpose and target

The aim of the drilling program was to test
A) EM-anomalies
B) the Espelandsmyr Pb-Zn mineralization

ad A): two EM-anomalies were drilled, these were:
I) Skålberg, because of an interesting geological environment (Fig. 7.1)
II) Ormshammer, because the EM-anomaly was detected in the Espelandsmyr trend.

ad B): Espelandsmyr mine was drilled because old reports indicate further reserves both downwards and along strike.

7.2 Work description

The drill company was Trøndelag Diamantboring. Two people from this company worked in the period 15th October to 6th November, 1984. Six holes totalling 575.90 m were drilled.

Table 7.2. BAMBLE 1984 Diamond drill holes.

DDH 1, Skålberg 1	100.00 m
DDH 2, Skålberg 2	70.00 m
DDH 3, Ormshammer 3	71.90 m
DDH 4, Askekjårr 4	115.50 m
DDH 5, Hareholten 5	120.00 m
DDH 6, Etterdal 6,	98.50 m

7.3 Working theories and results

EM-anomalies, Skålberg:
In Skålberg two closely situated medium-strong DIGHEM-anomalies were detected within the same geological trend. The anomalies were tested by two drill holes: The aim of Skålberg 1 was to test the northernmost stronger anomaly that was coincident with a magnetic high. The hope was to find a massive pyrrhotite-chalcopyrite-gold deposit. To the south this could have transition into a massive sphalerite ore body marked by the weaker anomaly. This was tested by drill hole 2.
Skålberg 1, results: The conductor is probably explained by 10 cm massive pyrrhotite underlain by 2 m graphite-pyrite mineralization in a marble host rock (see Diamond Drill Hole log, DDH 1, depth 37,60-40,50m).
Skålberg 2, results: The weak anomaly can be explained by low grade graphite and Fe-sulfide mineralization (see Diamond Drill Hole log, DDH 2, depth 47-50m and Drill hole correlation figure).

EM-anomaly, Ormshammer:
The DIGHEM anomaly was weak to medium and the I.P. anomaly medium to strong.
Ormshammer 3, result: Widespread graphite mineralization was found in the drill hole. The graphite occurs on sheared joints, explaining the good conductor. To the north of this disseminated graphite occurs.

Espelandsmyr mine area:
Askekjerr 4: This hole was drilled to test the southern extension of the Espelandsmyr mineralization which was marked by a medium IP-anomaly.
Askekjerr 4, result: The geophysical anomaly can mainly be explained by low grade pyrrhotite-pyrite mineralization that occurs widespread in the drill hole. Only traces of galena and sphalerite were found situated in scattered carbonate units. (See Drill Hole Log, DDH 4, depth 64.20-89.00 m and Drill Hole correlation figure).
Hareholta 5: The aim was to test the northern extension of the Espelandsmyr mineralization marked by a medium IP-anomaly.
Hareholta 5, results: Only traces of galena and sphalerite(?) were found in a 1m wide carbonate unit. Widespread low grade pyrrhotite and pyrite mineralization can explain the IP anomaly. The pyrite-mineralized granitic-gneiss trend to the east of the Espelandsmyr ore horizon is probably included in the upper part of this hole. (See Drill Hole Log, DDH 5, galena: depth 96.15-97.20 m and Drill hole correlation figure).
Ettedal 6: The aim was to test the ore-horizon in the mined area.
Ettedal 6, results: Up to 2% galena, minor sphalerite ±pyrrhotite was found as cm-thin scattered bands in dolomite and cherty amphibolite at the footwall side of a 15m wide dolomite unit. (See Drill Hole Log, DDH 6, depth 52,50-65,30m and Drill hole correlation figure).

7.4 Conclusion

The drilling program did not succeed in showing massive sulfides. Disseminated sulfides and graphite caused the geophysical anomalies Skålberg 1 & 2: The drill holes support the surface geology in showing an active exhalative system mainly expressed by abundant thick cherts of limited lateral extension. The system did not succeed in concentrating metals to a massive sulfide deposit.

The DDH's 4, 5 & 6 in the Espelandsmyr area: The drill holes did not show the presence of any massive sulfides of ore grade. Both in drill hole and on

surface the galena and sphalerite is clearly stratabound. Stratabound mineralization, cherts and tourmalinites point strongly to an exhalative system. The drill hole correlation and the Drill Hole Log show that the highest concentrations of ore minerals are found where the mine sequence contains one thick dolomite horizon (hole no. 6). Where thinner dolomite horizons occur, only trace values of galena and sphalerite are found (hole no. 4 & 5). The surface geology supports the drill hole results, in showing that the Espelandsmyr mineralization and host-carbonate feathers out to the south of the main mine area and thins out to the north (very much like the Skyttemyr massive Fe-Cu-sulfide deposit, see report 84-230-20).

The Ormshammer 3: Surface geology and drill hole show abundant graphite mineralization. The graphite mineralization is a southern continuation of the Espelandsmyr mineralization. The graphite can thus be a distal mineralization south of the Pb-Zn mineralization in Espelandsmyr.

8.0 CONCLUSION

No economic deposits were found. This years work showed that the Bamble area contains:

- stratabound massive sulfides of exhalative origin (e.g. Espelandsmyr mine).
- epigenetic Au-vein deposit (Vekselmyr), and
- stratabound disseminated sulfides with anomalous Au values.

Correlation of geology, geophysics, rock chip assays and sediment geochemistry all show the exhalative-bearing trends to have the best potential for all three kinds of mineralization.

9.0 RECOMMENDATION

1) Deep soil samples in the Vekselmyr-Takserås area; the area is approximate 8km x 1.5km.

   The work is estimated to require 20 days, with two people. 200-300 samples are required. Remember to use a bigger sample-collector than used in 1984.

2) Follow up of the Skyttemyr trend, to the north, c. 15 km x 2-3 km. Estimated to require 20 days, 1 geologist.

3) With reference to the anomalous Pd-values, the area may have a Pt-Pd potential. Sampling of old Ni prospects is recommended. Estimated to require 1-2 weeks, 1 geologist.

4) Geological investigation of the discreet and high-Au stream sediment anomaloy south of Jommåsknuten. Estimated to require 3 days, 1 geologist.

Enclosure no 3

4.0 MINERALIZATION

4.1 Target types and exploration models

4.1.1 Target types

Three target types were looked for:

1) exhalative massive sulfide deposits with precious metal credits
2) stratabound disseminated Fe-sulfides-precious metal occurrences, and
3) epigenetic gold vein deposits.

For type 1 and 2 models, the characteristics of a metamorphosed exhalative system were used. For all three types indicator minerals were used, especially in the gold exploration.

4.1.2 Indications on exhalative processes

Indications of exhalative processes in the Bamble are combinations of the following index minerals and rock types:

Index mineral/rock type		Interpretation
sillimanite, kyanite,	:	Al-enrichment due to depletion of other elements (clay alteration). (Valliant et al. 1983)
garnet/"garnet sandstone" (photo 4.1.2/1)	:	Mn enrichment due to exhalative processes.
cordierite, anthophyllite	:	chlorite alteration (Stanton, 1984)
tourmaline/tourmalinites (photo 4.1.2/2 & 4.2.1/1)	:	B-enrichment, due to exhalative activity.
sulfides, graphite	:	exhalative brines, with metals and sulphur.
magnetite (in banded rocks)	:	BIF's.
carbonate, calc-silicates	:	exhalitive CO_2-bearing brines.
quartz-rock (chert)	:	silica gels

Other origins for these minerals and rocks, e.g. metamorphosed pelites or quartzites, can not always be excluded.

4.2.1 Mineral assemblages related with gold occurrences

The only ore mineral with some correlation to gold in the Bamble region is chalcopyrite. Arsenopyrite and tourmaline are often used as "gold indicators". In the Bamble area, however, these minerals indicate interesting trends, but can rarely be used as a direct guide to gold mineralization.

4.2 Stratabound sulfides in Bamble

4.2.1 Type examples

Skyttemyr:

Skyttemyr is an exhausted massive pyrrhotite-chalcopyrite deposit containing up to 2 ppm Au. The environment and the ore zone show stratabound exhalative features. The ore occurs in one horizon but as separate lenses. For further details see report 84-230-20.

Espelandsmyr:

Espelandsmyr is a mined massive galena-sphalerite deposit containing up to 641 ppm Ag. (Fig. 4.2.1).

The footwall sequence consists of thin alternating sillimanite and garnet-bearing gneisses, tourmaline-bearing rocks photo 4.2.1/1 and chert. The footwall sequence is in the west cut by a granitic intrusion.

The ore horizon is an approximately 20 m wide garnet-rich banded carbonate and calc-silicate horizon photo 4.2.1/2. The ore itself occurs on the footwall side of this horizon. It is typically 1.1-1.5 m wide, maximum 3 m (Vogt 1896, Foslie 1918). The main part of the mining was done in connection with the two northern most shafts (Vogt 1896, Foslie 1918). Dump material from these shafts showed the existence of massive "stratabound" galena and sphalerite. Four minor shafts are situated along trend 2 km south of the main shafts. Dump material from the four southern-most shafts show only minor amounts of galena and sphalerite. The drilling activity in the mined area did not show any ore grade mineralization. It is possible that the ore occurs in lenses.

The hangingwall sequence consists of approximately 50 m wide thin alternating gneisses including a thin graphite horizon, but with only minor exhalative features. Above this sequence is a thick granitic and felsic gneiss sequence interpreted as a mixture of sedimentary and tuffitic rocks.

Locally disseminated Fe-sulfide and Fe-Cu-sulfide mineralization occurs in this sequence near the ore horizon. The sulfides are closely associated with epidote, alkali feldspar and chlorite alteration. Anomalous Au value are detected in these rocks. The alteration and sulfides are thought to be related to lineaments (faults?).

For further stratigraphic details see: chapter 7.0; chapter 10.6; Espelandsmyr 1:5000 geological map; and drilling log Bamble 1984.

4.2.2 Results of exploration 1984

Of the seven biggest EM-anomalies two were drilled, DDH1 & DDH3. Ad DDH 1: the area shows the most prominent exhalative features of the seven. Ad DDH 2: the anomaly is along trend with the Espelandsmyr Pb-Zn ore. In both cases nothing of economic interest was found. Because of the negative results of the drilling program the existence of economic-sized massive sulfides is more or less excluded in the investigated area.

Although disseminated Fe-sulfides with gold in economic concentration have not been found, the area can still have a potential for this type of deposit. The most promising example is the above described lineament-related mineralization in the hanging wall section east of Espelandmsyr.

4.3 Epigenetic deposits

4.3.1 Vekselmyr:

A 14 meter long and maximum 0.5 m wide quartz-arsenopyrite-chalcopyrite vein with up to 7 ppm Au and 5% As was found 1.5 km south of the lake Gjerstadvatn (photo 4.3.1/1). The vein cross-cuts an amphibolite that locally shows intense alterations seen as silicification, sericitization and occurrence of sillimanite, garnet, tremolite and disseminated sulfides.

Trenching, blasting (photo 4.3.1/2), geophysics and geochemistry of the immediate surroundings has not resulted in detection of further extension of this vein nor in any similar veins (photo 4.3.1/3).

4.3.2 Results of exploration 1984

Epigenetic deposits of economic size have not been found in the area of interest. The existence of further veins cannot be excluded, because this type of deposit is difficult to detect.

Enclosure no 4.

Hovde Soil sample list

Spl.no.	depth	sample description
P4-0	7,20	rusty gravel
P4-05	5,40	grey gravel with frequent rock fragments (up to 1 cm), a.o. jasper
P4-15	0,50	mix of org. matr., grey and rusty silt, and bottom part matr. of fine gr. amphibolite with sulf. (Possible stop because of boulder.)
P5-0	5,00	light grey quartz sand mixed with minor silt
P5-15	2,00	light grey sand
P5-25	3,50	light grey sand
P5-35	0,70	red brown sand
P5-50	1,20	light grey to red brown sand
P5-60	1,50	light grey brown, fine gr. sand
P5b-0	2,00	brown and grey black sand + some rock fragm.
P5b-05	3,00	light grey sand + minor silt
P5b-10	4,40	brown grey sand
P5b-15	3,70	light grey silt + peat
P5b-20	4,00	brown grey sand and gravel
P5b-25	4,10	brown green grey sand
P5b-30	5,80	brown grey gravel
P5b-35	4,00	red brown and grey sand + some rock fragm.
P5b-40	3,00	light grey silt + peat
P5b-50	1,50	green black sand + peat
P5b-70	1,30	grey sand
P5b-90	0,60	black peat soil
P5b-110	5,20	grey gravel and sand
P6-0	6,00	light grey sand
P6-15	7,70	light grey silt mixed with sand
P6-30	10,70	light grey silt and minor peat
P6-45	10,20	light grey sand with some rock fragments
P6-60	7,60	light grey sand with light rock fragments
P6-75	2,30	light grey fine gr. sand. (Possible stop because of boulder☺)
P6-95	8,70	light grey silt
P6b-0	1,70	light brown ond light grey silt
P6b-25	1,20	brown and grey sand
P6b-80	0,80	dark brown sand
P6c-0	0,70	dark brown gravel
P6c-20	1,50	grey and brown sand + minor gravel
P6c-40	5,80	grey gravel
P7-0	1,60	light grey coarse gr. gravel
P7-65	1,80	light grey coarse gr. gravel. (10m SW of prof. 7)
P7-80	4,30	grey blue fine gr. sand
P8-0	1,80	light grey silt
P8-40	1,90	light grey silt + rock fragm.
P8-65	1,00	grey brown gravel with rock fragm.

P8-95	0,70	brown sand
P8-130	0,50	brownish gravel and silt with minor peat
P8-190	0,40	brown sand with minor peat
P8-240	6,80	light blue grey silt
P8-260	9,90	light grey fine gr. sand
P8-280	7,70	light grey fine gr. sand
P8-290	5,60	light grey fine gr. sand
P9-10	0,80	peat
P9-20	2,40	peat in upper part, blue grey gravel in lower
P9-40	1,30	lower half greenish silty matr. with 1cm fragm. of fine gr. amphibolite, upper half peat rich
P9-70	1,20	fine gr. green weathering matr. of fine gr. amphibolite
P9-90	2,00	upper part light grey gravel (incr. in grain size downwards), weathering matr. of amphibolite in the lower. Rock fragm. of amph. in the bottom
P9-110	2,40	light grey silt
P9-125	0,60	grey green gravel, probably weathering matr. from amph.
P10-0	2,70	silt
P10-30	4,60	silt+peat
P10-60	3,00	silt+peat
P10-90	2,20	peat
P10-120	1,80	peat
P10-150	2,10	upper part brown sand, lower part grey and slightly coarser grained sand
P11-0	1,20	peat with minor gravel
P11-20	2,10	light grey green silt
P11-40	2,60	light grey silt
P11-70	2,80	light grey silt and minor peat
P11-100	3,00	light grey silt and peat
P11-130	1,50	peat + minor grey silt
P11-160	1,10	fine gr. gravel + minor silt and peat
P11-190	3,60	grey silt
P11-220	3,60	peat + grey silt
P11-250	3,60	grey green silt
P11-280	4,00	grey silt + fine gr. sand
P11b-0	5,60	light grey silt
P11b-30	7,80	grey silt with 0,5 cm white sand at the bottom
P11b-60	3,40	grey and brown fine gr. sand
P11b-90	1,20	grey and brown fine gr. sand
P11b-120	1,00	brown sand + minor peat
P11b-150	5,40	rel. coarse gr. light grey sand
P11b-180	1,00	50% grey silt and 50% peat
P12-0	0,60	brown soil and minor gravel
P12-20	0,60	brown soil and grey gravel
P12-40	0,80	brown soil and grey gravel
P12-60	0,50	brown soil and grey gravel
P12-80	0,70	grey brown sand + minor peat
P12-100	0,40	grey brown sand + minor soil
P12b-0	1,10	grey brown sand + silt

P12b-20	7,70	grey brown sand (fine gr.) with some rock fragm.
P12b-40	2,80	grey silt and gravel with some rock fragm.
P12b-60	7,80	light grey sand
P12b-80	5,40	light coarse gr. gravel
P13-0	0,60	peat with 1 cm light gravel at the bottom + rock plug of fine gr. amph.
P13-30	1,80	peat
P13-60	2,50	peat + minor grey black sand
P13-90	0,80	peat
P13-120	0,80	peat
P13-170	1,80	brown sand + grå sand + minor peat
P13-190	3,20	brown sand + grå sand + minor peat
P13-210	1,70	peat + 1-2 cm grå sand
P13-230	1,70	brown sand and gravel + some rock fragm. + minor peat
P14-0	3,20	grey and brown sand + minor silt
P14-30	1,00	brown sand
P14-60	1,50	brown sand and gravel + peat
P14-120	2,10	brown grey sand
P14-150	3,60	light grey silt
P14-170	1,00	peat + minor brown sand
P14-190	1,90	brown and grey green sand
P14-220	1,50	peat
P14-250	1,80	peat + minor silt
P14-280	3,00	light grey silt
P14-310	1,30	peat
P14-330	0,50	peat
P14-360	2,10	peat
P14-380	2,10	light grey silt
P14b-0	1,80	brown gravel + light grey silt + peat
P14b-30	11,00	light grey silt + minor sand
P14b-60	1,60	peat
P14b- 90	2,10	peat + minor brown sand
P14b-120	0,60	peat + minor grey black sand
P14b-150	1,10	peat
P14b-180	1,90	grey brown sand
P14b-215	3,60	grey sand + some light grey silt
P14b-240	5,50	grey sand + some gravel
P14b-270	1,90	peat + some light grey silt
P14b-300	4,40	light grey silt + some sand
P15-0	1,30	peat
P15-30	4,00	light grey silt + some sand
P15-60	1,50	peat + minor lightgrey silt
P15-90	2,50	peat
P15-110	?	?
P15-140	2,50	peat + silt
P15-170	0,60	sand + minor peat
P15-200	1,10	peat
P15-230	1,60	peat + some sand
P15-260	1,70	peat

P15-290	0,40	peat + sand
P15-320	1,30	peat + sand
P15-350	2,90	grey brown sand
P15-370	2,70	peat + minor grey sand
P15-390	0,70	peat + red brown soil
P15-430	5,80	grey gravel + some rock fragm.
P15-450	6,00	light grey sand
P15-520	0,90	peat + brown gravel
P15-540	2,90	light grey sand + some rock fragm.
P15-580	2,60	light grey gravel
P15-610	3,60	grey gravel + small rock fragm.
P16-0	3,70	light grey sand
P16-10	3,60	light grey sand
P16-50	4,60	grey sand
P16-100	3,60	grey sand
P16-150	2,10	dark grey sand
P16b-0	2,90	light grey sand
P16b-50	8,60	light grey sand
P16b-65	9,50	light grey sand + some rock fragm.
P16b-80	3,00	light grey sand
P16b-110	3,60	light grey sand
P17-0	3,10	light grey sand
P17-30	1,50	grey black sand
P17-80	4,00	peat + wood + minor grey sand
P17-120	3,00	peat + brown sand
P17-160	3,50	peat + minor brown sand + one rock fragm.
P17-210	5,00	grey sand and gravel
P17-245	2,10	peat + grey black sand
P17-370	1,70	brown and grey fine gr. sand
P18-0	4,70	light grey sand and silt
P18-40	1,60	light grey sand and silt
P18-120	1,70	brown sand
P18-150	3,00	brown and grey sand
P19-0	2,20	brown sand
P19-50	2,40	grey gravel + some peat
P19-90	4,80	grey gravel and sand
P19b-0	2,70	light grey silt + minor peat
P19b-40	9,00	grey green sand
P19b-80	7,20	grey sand and light gravel
P19b-100	7,20	light grey silt + minor peat
P20-0	2,50	brown grey sand + some rock fragm.
P20-50	1,20	brown grey black sand + peat
P20-200	3,10	peat + some grey sand
P20-230	7,00	light grey silt
P20-270	10,30	light grey silt + sand
P20-310	6,10	light grey sand + peat
P20-340	3,10	dark grey brown sand
P21-0	1,60	grey to grey blue silt

P21-20	8,70	light grey fine gr. sand
P21-40	7,60	light grey fine gr. sand
P21-60	7,90	brown fine gr. sand + peat
P21-80	11,50	grey brown sand with fragm. of fine gr. light gneiss
P21-100	6,00	light grey fine gr. sand, with coarse gravel and fragm. of qtz. rich gneiss at the bottom
P21-120	1,90	light and dark grey sand with fragm. of light gneiss
P22-0	2,30	light grey and grey black fine gr. sand
P22-20	4,10	light grey fine gr. sand
P23-0	3,30	brown soil + peat + minor light grey silt
P23-30	4,10	light grey fine gr. sand + gravel
P23-60	2,30	light grey silt
P23-80	2,50	light brown silt + dark brown peat
P23-100	2,20	peat
P24-0	2,20	light grey and minor dark grey silt
P24-30	3,20	light grey silt + minor sand in the lower part
P24-60	1,40	light grey silt
P24-80	2,80	light grey silt
P24-110	4,90	light grey silt
P24-130	3,80	light grey silt + minor sand
P24-150	2,80	peat + minor brown silt

Enclosure no 5

Hovde rock sample list

spl.no.	UTM	sample description
HORGS001	84.30 06.40	tourmalinite
HORGS002	84.30 06.40	tourmalinite, finegr., with sparse py-diss.
HORFS003	85.30 07.05	po-diss. gneiss, P7-minus 50 m
HORCS004	87.20 09.20	profile 40 m, dir. 136 g
HORCS005	86.95 08.65	P3: 0-85 m
HORCS006		P3: 85-175 m
HORCS007		P3: 175-180 m
HORCS008		P3: 180-215 m
HORGS009	86.35 08.35	po, py
HORCS010		P4: 15-126 m. Tourmalinite at 25 m
HORCS011		P4: 126-200 m
HORGS012	79.57 03.95	interm., med. gr. amph.-qtz.-fldsp. gneiss with mt-py-diss.
HORGS013	79.80 04.20	carb. rich gneiss with sulf. (py?)-diss
HORGS014	89.65 11.10	rusty dark gneiss with diss py and traces of cpy
HORFS015	82.05 06.50	two kg float sample of dark gneiss with diss. cpy and py
HORGS016	82.20 05.80	dark finegr. gneiss with diss py and po
HORGS017	79.50 05.00	dark med. gr. pyroxenite with diss. py
HORGS018	84.30 06.40	carbonate
HORGS019	84.30 06.40	carbonate with mt.-impr.
HORGS020	87.85 09.50	carbonate with ga(-sl?)-bands (mm-scale)
HORGS021	87.85 09.50	carbonate with ga-sl-bands (mm-scale)

ITS Intertek Testing Services
Bondar Clegg

Lancots Lane, St. Helens,
Merseyside WA9 3ES
United Kingdom
Tel: (44) 1744 611553
Fax: (44) 1744 28723

Enclosure no 6

LABORATORY REPORT

To: Mindex ASA
O.H. Bangsvei 54-59
N-1322 Hovik
Norway

Attention: Mr B Rosholt

Date: 17th July 1998

Your Ref: -

Our Ref: 98F18101.xls

SAMPLE DETAILS: SOILS.

SOURCE REF: -

ANALYTICAL RESULTS:

Notes: Results above our normal stated URL (upper reporting limit) should be treated with caution.

Reported By: L Carlan

Approved By:

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P4-0	< 0.2	19	4	92	3	< 0.2	< 5	< 5	< 5	2.18	204	26	31	< 20	0.39	0.02	0.12	< 1	< 5
P4-05	< 0.2	55	4	126	1	< 0.2	< 5	< 5	< 5	2.56	284	29	43	< 20	0.52	0.03	0.09	< 1	< 5
P4-15	< 0.2	6	16	103	2	< 0.2	< 5	6	< 5	4.68	284	89	68	< 20	0.27	0.03	0.61	4	< 5
P5-0	< 0.2	6	3	93	1	< 0.2	< 5	< 5	< 5	3.47	309	135	59	< 20	0.45	0.02	0.67	< 1	8
P5-15	< 0.2	6	7	27	2	< 0.2	< 5	< 5	< 5	0.86	114	24	14	< 20	0.24	0.05	0.13	1	< 5
P5-25	< 0.2	6	5	26	2	< 0.2	< 5	< 5	< 5	1.37	113	20	29	< 20	0.46	0.04	0.10	1	< 5
P5-35	< 0.2	11	4	19	2	< 0.2	< 5	< 5	< 5	1.43	113	18	22	< 20	0.23	0.04	0.09	3	< 5
P5-50	< 0.2	10	6	23	3	< 0.2	< 5	< 5	< 5	1.64	154	27	27	< 20	0.26	0.04	0.12	3	< 5
P5-60	< 0.2	5	5	17	2	< 0.2	< 5	< 5	< 5	0.94	121	17	15	< 20	0.28	0.04	0.09	2	< 5
P5B-0	< 0.2	11	4	51	3	< 0.2	< 5	< 5	< 5	2.65	221	17	25	< 20	0.31	0.03	0.13	7	6
P5B-05	< 0.2	8	4	21	2	< 0.2	< 5	< 5	< 5	1.21	135	14	21	< 20	0.34	0.04	0.08	1	< 5
P5B-10	< 0.2	8	< 2	47	1	< 0.2	< 5	< 5	< 5	3.91	244	10	54	< 20	0.42	0.03	0.08	< 1	7
P5B-15	< 0.2	14	5	24	3	< 0.2	< 5	< 5	< 5	1.31	127	16	20	< 20	0.45	0.05	0.08	3	< 5
P5B-20	< 0.2	16	7	52	2	< 0.2	< 5	< 5	< 5	3.36	307	17	39	< 20	0.47	0.04	0.08	< 1	< 5
P5B-25	< 0.2	12	4	53	1	< 0.2	< 5	< 5	< 5	3.34	263	14	44	< 20	0.56	0.04	0.06	< 1	< 5
P5B-30	< 0.2	17	4	36	1	< 0.2	< 5	< 5	< 5	1.95	172	19	28	< 20	0.42	0.05	0.11	1	< 5
P5B-35	< 0.2	19	5	39	3	< 0.2	< 5	< 5	< 5	2.60	270	22	46	< 20	0.55	0.05	0.17	< 1	< 5
P5B-40	< 0.2	58	4	16	4	< 0.2	< 5	< 5	< 5	0.96	124	17	23	< 20	0.63	0.04	0.06	3	< 5
P5B-50	< 0.2	48	< 2	38	2	< 0.2	< 5	< 5	< 5	3.43	310	18	79	< 20	1.51	0.15	0.09	< 1	9
P5B-70	< 0.2	4	3	22	1	< 0.2	< 5	< 5	< 5	1.79	134	244	45	< 20	0.83	0.04	0.12	< 1	< 5
P5B-90	< 0.2	72	10	13	3	< 0.2	< 5	< 5	< 5	0.44	33	47	15	< 20	0.47	0.02	0.02	1	< 5
P5B-110	< 0.2	20	4	48	2	< 0.2	< 5	< 5	< 5	3.06	226	40	55	< 20	0.36	0.04	0.18	1	6
P6-0	< 0.2	11	4	25	1	< 0.2	< 5	< 5	< 5	1.69	155	15	24	< 20	0.27	0.03	0.08	1	< 5
P6-15	< 0.2	11	3	73	1	< 0.2	< 5	< 5	< 5	5.26	411	18	74	< 20	0.56	0.03	0.09	< 1	6
P6-30	< 0.2	14	6	32	4	< 0.2	< 5	< 5	< 5	1.44	136	20	28	< 20	0.37	0.05	0.08	4	< 5
P6-45	< 0.2	7	5	19	2	< 0.2	< 5	< 5	< 5	1.25	150	25	16	< 20	0.29	0.05	0.11	2	< 5
P6-60	< 0.2	8	5	23	3	< 0.2	< 5	< 5	< 5	1.70	193	23	21	< 20	0.38	0.05	0.12	1	< 5
P6-75	< 0.2	7	5	19	2	< 0.2	< 5	< 5	< 5	1.57	139	20	22	< 20	0.37	0.06	0.11	2	< 5
P6-95	< 0.2	15	4	25	1	< 0.2	< 5	< 5	< 5	2.12	215	37	34	< 20	0.57	0.07	0.16	2	< 5
P6B-0	< 0.2	7	4	20	2	< 0.2	< 5	< 5	< 5	1.45	137	20	25	< 20	0.39	0.05	0.09	2	< 5

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P6B-25	< 0.2	11	3	21	10	< 0.2	< 5	< 5	< 5	1.78	144	14	29	< 20	0.30	0.04	0.07	3	< 5
P6B-80	< 0.2	12	6	41	3	< 0.2	< 5	< 5	< 5	3.00	210	27	53	< 20	0.27	0.04	0.09	3	< 5
P6C-0	< 0.2	7	4	31	3	< 0.2	< 5	< 5	< 5	1.89	124	20	24	< 20	0.22	0.04	0.10	3	< 5
P6C-20	< 0.2	9	5	25	2	< 0.2	< 5	< 5	< 5	1.26	156	21	25	< 20	0.27	0.04	0.11	4	< 5
P6C-40	< 0.2	7	5	26	1	< 0.2	< 5	< 5	< 5	1.31	179	25	20	< 20	0.43	0.06	0.16	2	< 5
P7-0	< 0.2	12	3	32	2	< 0.2	< 5	< 5	< 5	1.69	173	30	25	< 20	0.27	0.04	0.22	< 1	< 5
P7-65	< 0.2	18	3	32	2	< 0.2	< 5	< 5	< 5	1.72	213	37	26	< 20	0.32	0.05	0.25	1	< 5
P7-80	< 0.2	6	5	17	1	< 0.2	< 5	< 5	< 5	1.65	147	24	26	< 20	0.48	0.07	0.12	1	< 5
P8-0	< 0.2	8	3	24	1	< 0.2	< 5	< 5	< 5	1.07	196	23	25	< 20	0.47	0.06	0.10	2	< 5
P8-40	< 0.2	10	4	27	1	< 0.2	< 5	< 5	< 5	1.21	193	48	25	< 20	0.48	0.06	0.19	2	< 5
P8-65	< 0.2	6	4	16	2	< 0.2	< 5	< 5	< 5	0.92	97	18	20	< 20	0.19	0.04	0.08	2	< 5
P8-95	< 0.2	6	6	18	2	< 0.2	< 5	< 5	< 5	0.93	83	13	21	< 20	0.20	0.03	0.06	3	< 5
P8-130	< 0.2	3	14	10	3	< 0.2	< 5	< 5	< 5	0.87	86	14	21	< 20	0.15	0.03	0.07	3	< 5
P8-190	< 0.2	7	< 2	48	1	< 0.2	< 5	< 5	< 5	2.56	109	36	74	< 20	0.14	0.04	0.12	1	< 5
P8-240	< 0.2	7	3	19	< 1	< 0.2	< 5	< 5	< 5	1.54	131	18	23	< 20	0.42	0.04	0.08	1	< 5
P8-260	< 0.2	6	3	16	1	< 0.2	< 5	< 5	< 5	1.23	117	21	17	< 20	0.28	0.05	0.10	2	< 5
P8-280	< 0.2	5	< 2	12	< 1	< 0.2	< 5	< 5	< 5	0.97	67	10	15	< 20	0.23	0.02	0.04	2	< 5
P8-290	< 0.2	8	< 2	20	< 1	< 0.2	< 5	< 5	< 5	2.11	164	18	32	< 20	0.58	0.05	0.09	2	< 5
P9-10	< 0.2	10	12	14	2	< 0.2	< 5	< 5	< 5	1.23	104	18	31	< 20	0.29	0.03	0.07	4	< 5
P9-20	< 0.2	11	4	71	2	< 0.2	< 5	< 5	< 5	2.17	236	37	44	< 20	0.35	0.05	0.15	4	< 5
P9-40	< 0.2	33	< 2	138	3	< 0.2	< 5	< 5	< 5	6.18	728	16	105	< 20	0.89	0.04	0.06	< 1	11
P9-70	< 0.2	5	< 2	100	3	< 0.2	< 5	< 5	< 5	4.76	534	33	156	< 20	1.71	0.18	0.16	< 1	12
P9-90	< 0.2	8	3	29	1	< 0.2	< 5	< 5	< 5	1.30	203	34	36	< 20	0.46	0.06	0.10	2	< 5
P9-110	< 0.2	15	3	26	1	< 0.2	< 5	< 5	< 5	1.51	194	52	26	< 20	0.57	0.07	0.17	1	< 5
P9-125	< 0.2	2	2	94	1	< 0.2	< 5	< 5	< 5	3.80	686	135	100	< 20	0.27	0.06	1.12	< 1	5
P10-0	< 0.2	30	26	24	7	0.4	< 5	< 5	< 5	0.48	66	17	10	< 20	0.47	0.02	0.05	< 1	< 5
P10-30	< 0.2	43	5	39	12	< 0.2	< 5	< 5	< 5	1.54	174	26	37	< 20	0.63	0.06	0.12	4	< 5
P10-60	< 0.2	27	12	37	5	< 0.2	< 5	< 5	< 5	2.86	341	14	46	< 20	2.92	0.02	0.03	< 1	< 5
P10-90	< 0.2	47	11	13	2	< 0.2	< 5	< 5	< 5	0.48	38	15	7	< 20	0.54	0.01	0.01	< 1	< 5
P10-120	< 0.2	45	6	15	4	< 0.2	< 5	< 5	< 5	0.56	63	34	17	< 20	0.78	0.02	0.08	< 1	< 5

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P10-150	< 0.2	11	2	24	1	< 0.2	< 5	< 5	< 5	1.74	194	19	38	< 20	0.43	0.05	0.15	2	< 5
P11-0	< 0.2	69	21	36	5	0.2	< 5	< 5	< 5	1.35	177	33	26	< 20	0.47	0.05	0.09	1	< 5
P11-20	< 0.2	24	2	27	4	< 0.2	< 5	< 5	< 5	2.84	326	20	63	< 20	1.16	0.11	0.19	< 1	5
P11-40	< 0.2	6	3	17	3	< 0.2	< 5	< 5	< 5	1.78	139	22	26	< 20	0.48	0.06	0.11	4	< 5
P11-70	< 0.2	22	8	38	3	< 0.2	< 5	< 5	< 5	1.67	123	28	28	< 20	0.43	0.03	0.06	5	< 5
P11-100	< 0.2	10	5	20	2	< 0.2	< 5	< 5	< 5	0.92	133	24	26	< 20	0.47	0.05	0.09	5	< 5
P11-130	< 0.2	12	5	16	1	< 0.2	< 5	< 5	< 5	1.23	192	10	43	< 20	0.70	0.08	0.05	< 1	< 5
P11-160	< 0.2	13	3	47	3	< 0.2	< 5	< 5	< 5	2.29	293	25	58	< 20	0.49	0.05	0.14	3	< 5
P11-190	< 0.2	9	3	31	2	< 0.2	< 5	< 5	< 5	1.53	224	25	31	< 20	0.56	0.07	0.12	1	< 5
P11-220	< 0.2	11	10	34	2	< 0.2	< 5	< 5	< 5	1.45	229	34	43	< 20	0.50	0.05	0.10	3	< 5
P11-250	< 0.2	2	< 2	42	1	< 0.2	< 5	< 5	< 5	2.33	249	58	68	< 20	0.28	0.07	0.20	1	< 5
P11-280	< 0.2	21	< 2	38	1	< 0.2	< 5	< 5	< 5	2.12	317	22	62	< 20	0.52	0.06	0.11	< 1	< 5
P11B-0	< 0.2	8	4	19	2	< 0.2	< 5	< 5	< 5	0.92	148	27	19	< 20	0.46	0.06	0.13	3	< 5
P11B-30	< 0.2	12	3	22	1	< 0.2	< 5	< 5	< 5	1.72	453	20	28	< 20	4.44	0.04	0.11	< 1	< 5
P11B-60	< 0.2	9	4	24	2	< 0.2	< 5	< 5	< 5	1.09	181	34	23	< 20	0.41	0.06	0.17	2	< 5
P11B-90	< 0.2	8	3	15	2	< 0.2	< 5	< 5	< 5	0.79	112	20	13	< 20	0.23	0.05	0.10	2	< 5
P11B-120	< 0.2	7	5	23	2	< 0.2	< 5	< 5	< 5	1.33	135	17	22	< 20	0.24	0.04	0.08	3	< 5
P11B-150	< 0.2	10	3	22	2	< 0.2	< 5	< 5	< 5	1.08	151	24	22	< 20	0.40	0.05	0.12	2	< 5
P11B-180	< 0.2	62	3	105	4	< 0.2	< 5	< 5	< 5	4.39	256	336	139	< 20	0.53	0.10	1.12	6	8
P12-0	< 0.2	10	7	44	1	< 0.2	< 5	< 5	< 5	2.84	402	22	131	< 20	0.63	0.08	0.12	< 1	7
P12-20	< 0.2	27	4	29	2	< 0.2	< 5	< 5	< 5	2.23	251	11	62	< 20	0.85	0.11	0.08	< 1	6
P12-40	< 0.2	10	4	26	2	< 0.2	< 5	< 5	< 5	1.82	157	24	46	< 20	0.42	0.06	0.10	3	< 5
P12-60	< 0.2	29	10	36	2	< 0.2	< 5	< 5	< 5	1.56	192	42	47	< 20	0.40	0.06	0.06	2	< 5
P12-80	< 0.2	39	5	25	2	< 0.2	< 5	< 5	< 5	1.26	162	24	34	< 20	0.41	0.05	0.06	5	< 5
P12-100	< 0.2	41	5	45	1	< 0.2	< 5	< 5	< 5	2.80	341	75	88	< 20	0.61	0.08	0.23	< 1	6
P12B-0	< 0.2	9	3	25	1	< 0.2	< 5	< 5	< 5	2.23	172	52	44	< 20	0.48	0.07	0.20	2	< 5
P12B-20	< 0.2	21	< 2	54	3	< 0.2	< 5	5	< 5	3.13	482	58	55	< 20	0.48	0.08	0.24	< 1	< 5
P12B-40	< 0.2	10	3	29	1	< 0.2	< 5	< 5	< 5	0.99	148	35	20	< 20	0.24	0.04	0.19	1	< 5
P12B-60	< 0.2	11	3	31	1	< 0.2	< 5	< 5	< 5	1.97	198	54	29	< 20	0.44	0.06	0.22	1	< 5
P12B-80	< 0.2	9	3	19	2	< 0.2	< 5	< 5	< 5	1.20	141	20	20	< 20	0.25	0.05	0.10	3	< 5

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P13-0	< 0.2	19	17	22	2	< 0.2	< 5	< 5	< 5	1.11	143	23	17	< 20	0.39	0.05	0.06	1	< 5
P13-30	< 0.2	47	9	14	4	< 0.2	< 5	< 5	< 5	0.82	103	20	16	< 20	0.55	0.02	0.02	< 1	< 5

ITS Intertek Testing Services
Bondar Clegg

Lancots Lane, St. Helens,
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United Kingdom
Tel: (44) 1744 611553
Fax: (44) 1744 28723

LABORATORY REPORT

To: Mindex ASA
O.H. Bangsvei 54-59
N-1322 Hovik
Norway

Attention: Mr B Rosholt

Date: 17th July 1998

Your Ref: -

Our Ref: 98F18201.xls

SAMPLE DETAILS: SOILS.

SOURCE REF: -

ANALYTICAL RESULTS:

Notes: Results above our normal stated URL (upper reporting limit) should be treated with caution.

Reported By: L. Carlson

Approved By:

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P13-60	< 0.2	31	7	53	12	0.2	< 5	< 5	< 5	1.55	286	15	41	< 20	0.69	0.06	0.07	2	< 5
P13-90	< 0.2	15	52	31	2	0.6	< 5	< 5	< 5	0.77	107	22	15	< 20	0.60	0.03	0.04	< 1	< 5
P13-120	< 0.2	14	26	32	2	0.3	< 5	< 5	< 5	0.42	46	29	8	< 20	0.42	0.01	0.03	1	< 5
P13-170	< 0.2	13	7	34	2	< 0.2	< 5	< 5	< 5	1.48	135	26	41	< 20	0.22	0.05	0.08	4	< 5
P13-190	< 0.2	11	7	28	2	< 0.2	< 5	< 5	< 5	1.13	155	25	19	< 20	0.30	0.05	0.12	3	< 5
P13-210	< 0.2	46	9	67	1	< 0.2	< 5	< 5	< 5	2.12	434	84	64	< 20	0.63	0.07	0.39	2	5
P13-230	< 0.2	26	5	29	3	< 0.2	< 5	< 5	< 5	1.56	243	37	43	< 20	0.32	0.07	0.16	3	< 5
P14-0	< 0.2	10	6	46	2	< 0.2	< 5	< 5	< 5	2.74	325	47	50	< 20	0.49	0.06	0.23	1	< 5
P14-30	< 0.2	6	5	15	2	< 0.2	< 5	< 5	< 5	1.11	98	17	26	< 20	0.22	0.04	0.08	5	< 5
P14-60	< 0.2	7	5	21	2	< 0.2	< 5	< 5	< 5	1.67	203	21	42	< 20	0.55	0.07	0.13	4	5
P14-120	< 0.2	6	4	15	4	< 0.2	< 5	< 5	< 5	0.96	117	18	22	< 20	0.28	0.05	0.08	3	< 5
P14-150	< 0.2	6	5	20	1	< 0.2	< 5	< 5	< 5	0.78	154	28	26	< 20	0.45	0.06	0.12	4	< 5
P14-170	< 0.2	8	18	17	2	< 0.2	< 5	< 5	< 5	0.57	62	19	16	< 20	0.18	0.03	0.06	3	< 5
P14-190	< 0.2	23	5	85	2	< 0.2	< 5	< 5	< 5	3.29	420	32	82	< 20	0.41	0.05	0.22	2	10
P14-220	< 0.2	42	12	12	2	< 0.2	< 5	< 5	< 5	0.53	32	16	9	< 20	0.38	0.02	0.02	1	< 5
P14-250	< 0.2	30	5	32	4	< 0.2	< 5	< 5	< 5	0.93	61	25	39	< 20	0.43	0.02	0.02	1	< 5
P14-280	< 0.2	9	7	24	4	< 0.2	< 5	< 5	< 5	1.40	172	33	29	< 20	0.48	0.06	0.15	6	< 5
P14-310	< 0.2	31	8	28	3	< 0.2	< 5	< 5	< 5	0.92	86	29	22	< 20	0.60	0.02	0.04	1	< 5
P14-330	< 0.2	14	8	8	2	< 0.2	< 5	< 5	< 5	0.55	38	29	16	< 20	0.20	0.02	0.03	2	< 5
P14-360	< 0.2	19	5	38	3	0.5	< 5	< 5	< 5	1.05	117	29	23	< 20	0.82	0.03	0.03	1	< 5
P14-380	< 0.2	9	6	27	2	< 0.2	< 5	< 5	< 5	1.55	199	41	34	< 20	0.55	0.07	0.16	4	< 5
P14B-0	< 0.2	6	18	30	4	< 0.2	< 5	< 5	< 5	1.34	126	30	18	< 20	0.21	0.04	0.18	4	< 5
P14B-30	< 0.2	12	5	44	2	< 0.2	< 5	< 5	< 5	2.29	234	84	37	< 20	0.49	0.08	0.33	2	< 5
P14B-60	< 0.2	9	9	14	2	< 0.2	< 5	< 5	< 5	0.47	34	21	10	< 20	0.23	0.02	0.03	1	< 5
P14B-90	< 0.2	8	14	25	2	< 0.2	< 5	< 5	< 5	0.45	57	12	15	< 20	0.16	0.02	0.03	4	< 5
P14B-12	< 0.2	8	19	97	2	0.2	< 5	< 5	< 5	0.57	81	14	27	< 20	0.22	0.03	0.05	2	< 5
P14B-15	< 0.2	11	7	12	2	< 0.2	< 5	< 5	< 5	0.52	66	14	11	< 20	0.16	0.04	0.06	4	< 5
P14B-18	< 0.2	5	3	13	2	< 0.2	< 5	< 5	< 5	0.69	104	18	12	< 20	0.29	0.06	0.09	3	< 5
P14B-21	< 0.2	6	4	18	2	< 0.2	< 5	< 5	< 5	0.77	119	20	13	< 20	0.28	0.05	0.11	3	< 5
P14B-24	< 0.2	8	4	25	2	< 0.2	< 5	< 5	< 5	0.79	115	18	15	< 20	0.24	0.05	0.10	3	< 5

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P14B-27	< 0.2	11	26	56	4	< 0.2	< 5	< 5	< 5	0.86	92	23	14	< 20	0.28	0.04	0.08	2	< 5
P14B-30	< 0.2	8	5	22	2	< 0.2	< 5	< 5	< 5	1.95	165	25	29	< 20	0.42	0.06	0.13	3	< 5
P15-0	< 0.2	59	18	46	3	0.4	< 5	< 5	< 5	0.46	57	18	10	< 20	0.24	0.02	0.03	2	< 5
P15-30	< 0.2	16	6	30	1	< 0.2	< 5	< 5	< 5	1.16	203	40	31	< 20	0.49	0.07	0.19	2	< 5
P15-60	< 0.2	21	17	58	4	< 0.2	< 5	< 5	< 5	0.78	380	31	9	< 20	0.33	0.03	0.11	4	< 5
P15-90	< 0.2	8	12	44	2	< 0.2	< 5	< 5	< 5	1.54	209	14	48	< 20	0.55	0.07	0.05	5	6
P15-110	< 0.2	11	30	22	2	0.8	< 5	< 5	< 5	0.57	41	44	5	< 20	0.36	0.02	0.03	< 1	< 5
P15-140	< 0.2	5	23	34	2	0.2	< 5	< 5	< 5	0.88	180	16	28	< 20	0.22	0.05	0.06	1	6
P15-170	< 0.2	6	9	12	2	< 0.2	< 5	< 5	< 5	0.74	85	14	23	< 20	0.14	0.03	0.05	4	< 5
P15-200	< 0.2	9	13	13	2	< 0.2	< 5	< 5	< 5	0.62	79	14	22	< 20	0.20	0.03	0.05	3	< 5
P15-230	< 0.2	5	17	25	2	< 0.2	< 5	< 5	< 5	0.81	80	71	10	< 20	0.15	0.04	0.15	3	< 5
P15-260	< 0.2	10	29	30	2	0.4	< 5	< 5	< 5	0.32	49	25	5	< 20	0.17	0.02	0.03	< 1	< 5
P15-290	< 0.2	14	7	63	1	< 0.2	< 5	5	< 5	3.78	372	164	113	< 20	0.83	0.09	0.71	3	8
P15-320	< 0.2	12	9	14	3	< 0.2	< 5	< 5	< 5	1.36	118	21	38	< 20	0.22	0.05	0.09	4	< 5
P15-350	< 0.2	10	4	26	2	< 0.2	< 5	< 5	< 5	1.73	171	47	26	< 20	0.43	0.06	0.19	2	< 5
P15-370	< 0.2	10	8	23	4	< 0.2	< 5	< 5	< 5	0.93	94	33	16	< 20	0.27	0.05	0.12	1	< 5
P15-390	< 0.2	4	23	26	2	< 0.2	< 5	< 5	< 5	2.94	97	18	34	< 20	0.20	0.03	0.05	3	< 5
P15-430	< 0.2	10	5	28	2	< 0.2	< 5	< 5	< 5	1.27	164	25	28	< 20	0.38	0.05	0.12	2	< 5
P15-450	< 0.2	6	4	18	2	< 0.2	< 5	< 5	< 5	0.72	120	24	19	< 20	0.32	0.05	0.11	3	< 5
P15-520	< 0.2	4	13	8	2	< 0.2	< 5	< 5	< 5	0.53	58	17	15	< 20	0.12	0.03	0.06	3	< 5
P15-540	< 0.2	9	6	25	1	< 0.2	< 5	< 5	< 5	1.35	161	29	25	< 20	0.37	0.06	0.16	3	< 5
P15-580	< 0.2	6	4	17	2	< 0.2	< 5	< 5	< 5	1.16	121	22	20	< 20	0.30	0.05	0.10	3	< 5
P15-610	< 0.2	8	5	19	2	< 0.2	< 5	< 5	< 5	0.90	119	32	15	< 20	0.26	0.05	0.15	2	< 5
P16-0	< 0.2	6	3	53	2	< 0.2	< 5	< 5	< 5	1.36	317	33	32	< 20	0.44	0.05	0.27	2	< 5
P16-10	< 0.2	7	3	17	2	< 0.2	< 5	< 5	< 5	0.80	126	21	17	< 20	0.33	0.06	0.10	3	< 5
P16-50	< 0.2	6	4	19	3	< 0.2	< 5	< 5	< 5	0.80	135	25	18	< 20	0.33	0.04	0.10	2	< 5
P16-100	< 0.2	11	4	44	3	< 0.2	< 5	< 5	< 5	1.80	355	21	34	< 20	0.55	0.04	0.10	4	< 5
P16-150	< 0.2	1	2	158	< 1	< 0.2	< 5	5	< 5	6.73	853	252	220	< 20	0.28	0.02	0.96	1	9
P16B-0	< 0.2	9	6	29	1	< 0.2	< 5	< 5	< 5	1.20	169	55	26	< 20	0.41	0.07	0.21	2	< 5
P16B-50	< 0.2	9	5	37	1	< 0.2	< 5	< 5	< 5	1.94	156	39	26	< 20	0.29	0.04	0.22	1	< 5

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P16B-65	< 0.2	8	4	36	2	< 0.2	< 5	< 5	< 5	2.47	176	98	38	< 20	0.30	0.05	0.64	1	< 5
P16B-80	< 0.2	7	4	16	2	< 0.2	< 5	< 5	< 5	0.73	116	35	12	< 20	0.29	0.08	0.16	3	< 5
P16B-11	< 0.2	7	4	17	2	< 0.2	< 5	< 5	< 5	0.74	116	22	14	< 20	0.27	0.04	0.11	2	< 5
P17-0	< 0.2	7	6	29	2	< 0.2	< 5	< 5	< 5	0.99	166	29	16	< 20	0.31	0.05	0.17	3	< 5
P17-30	< 0.2	54	5	85	3	< 0.2	< 5	< 5	< 5	3.82	543	31	77	< 20	1.29	0.10	0.23	1	7
P17-80	< 0.2	13	22	43	2	0.3	< 5	< 5	< 5	1.03	171	19	22	< 20	0.47	0.04	0.07	2	< 5
P17-120	< 0.2	3	9	22	2	< 0.2	< 5	< 5	< 5	0.70	105	15	13	< 20	0.19	0.03	0.07	5	< 5
P17-160	< 0.2	7	10	32	3	< 0.2	< 5	< 5	< 5	1.08	150	44	19	< 20	0.24	0.05	0.15	3	< 5
P17-210	< 0.2	12	5	33	2	< 0.2	< 5	< 5	< 5	1.49	221	39	33	< 20	0.57	0.09	0.19	1	< 5
P17-245	< 0.2	13	3	77	1	< 0.2	< 5	< 5	< 5	2.91	403	30	103	< 20	1.36	0.11	0.29	2	10
P17-370	< 0.2	8	5	23	1	< 0.2	< 5	< 5	< 5	1.07	131	26	25	< 20	0.34	0.04	0.11	3	< 5
P18-0	< 0.2	16	5	37	1	< 0.2	< 5	< 5	< 5	2.25	201	61	36	< 20	0.37	0.04	0.39	2	< 5
P18-40	< 0.2	6	5	20	1	< 0.2	< 5	< 5	< 5	0.78	127	40	24	< 20	0.32	0.06	0.15	2	< 5
P18-120	< 0.2	6	4	19	2	< 0.2	< 5	< 5	< 5	0.94	115	32	20	< 20	0.21	0.05	0.14	3	< 5
P18-150	< 0.2	9	6	44	2	< 0.2	< 5	< 5	< 5	1.52	201	101	37	< 20	0.41	0.07	0.38	3	< 5
P19-0	< 0.2	5	3	16	1	< 0.2	< 5	< 5	< 5	0.83	89	31	22	< 20	0.24	0.03	0.10	3	< 5
P19-50	< 0.2	12	7	33	2	< 0.2	< 5	< 5	< 5	1.59	195	28	30	< 20	0.42	0.07	0.11	3	< 5
P19-90	< 0.2	8	5	22	2	< 0.2	< 5	< 5	< 5	1.25	171	32	28	< 20	0.47	0.07	0.15	3	< 5
P19B-0	< 0.2	9	7	32	2	< 0.2	< 5	< 5	< 5	1.33	200	51	32	< 20	0.54	0.06	0.17	5	< 5
P19B-40	< 0.2	6	5	33	2	< 0.2	< 5	< 5	< 5	4.24	255	36	37	< 20	0.55	0.03	0.16	2	7
P19B-80	< 0.2	7	5	25	1	< 0.2	< 5	< 5	< 5	1.92	167	34	28	< 20	0.45	0.05	0.11	3	< 5
P19B-10	< 0.2	10	6	32	1	< 0.2	< 5	< 5	< 5	2.33	227	38	36	< 20	0.58	0.07	0.16	5	< 5
P20-0	< 0.2	7	5	30	1	< 0.2	< 5	< 5	< 5	1.41	203	24	26	< 20	0.31	0.04	0.12	3	< 5
P20-50	< 0.2	5	4	32	2	< 0.2	< 5	< 5	< 5	2.45	286	15	89	< 20	0.79	0.13	0.09	1	< 5
P20-200	< 0.2	7	14	35	3	< 0.2	< 5	< 5	< 5	1.01	167	49	21	< 20	0.19	0.05	0.26	6	< 5
P20-230	< 0.2	6	7	24	< 1	< 0.2	< 5	< 5	< 5	1.66	144	27	24	< 20	0.41	0.05	0.14	3	< 5
P20-270	< 0.2	10	5	40	1	< 0.2	< 5	< 5	< 5	1.96	216	50	27	< 20	0.39	0.06	0.34	2	< 5
P20-310	< 0.2	7	14	50	2	< 0.2	< 5	< 5	< 5	1.26	194	49	22	< 20	0.30	0.05	0.27	4	< 5
P20-340	< 0.2	12	4	51	2	< 0.2	< 5	< 5	< 5	1.77	199	75	39	< 20	0.30	0.04	0.34	3	< 5
P21-0	< 0.2	10	4	32	3	< 0.2	< 5	9	< 5	1.81	233	33	28	< 20	0.51	0.08	0.23	2	< 5

Element	Ag	Cu	Pb	Zn	Mo	Cd	Bi	As	Sb	Fe	Mn	Ba	V	W	Ca	Na	K	Nb	Sc
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm
L.R.L.	0.2	1	2	1	1	0.2	5	5	5	0.01	1	1	1	20	0.01	0.01	0.01	1	5
U.R.L.	200	10000	10000	10000	10000	2000	2000	10000	2000	10	20000	2000	20000	2000	10	10	10	10000	2000
P21-20	< 0.2	10	3	27	2	< 0.2	< 5	< 5	< 5	1.58	180	21	19	< 20	0.29	0.04	0.16	2	< 5
P21-40	< 0.2	10	4	26	1	< 0.2	< 5	< 5	< 5	1.79	169	41	26	< 20	0.41	0.05	0.15	3	< 5
P21-60	< 0.2	25	14	49	12	< 0.2	< 5	< 5	< 5	1.29	134	47	36	< 20	0.39	0.05	0.08	4	< 5
P21-80	< 0.2	22	4	50	2	< 0.2	< 5	5	< 5	2.52	271	34	45	< 20	0.63	0.06	0.24	< 1	< 5
P21-100	< 0.2	9	3	21	2	< 0.2	< 5	< 5	< 5	1.38	165	26	21	< 20	0.33	0.06	0.14	2	< 5
P21-120	< 0.2	14	3	40	5	< 0.2	< 5	< 5	< 5	2.46	211	66	42	< 20	0.36	0.08	0.40	2	6
P22-0	< 0.2	44	6	31	1	< 0.2	< 5	< 5	< 5	2.11	316	28	81	< 20	0.98	0.13	0.10	2	7
P22-20	< 0.2	7	4	20	1	< 0.2	< 5	< 5	< 5	0.94	136	30	19	< 20	0.34	0.05	0.14	3	< 5
P23-0	< 0.2	60	15	174	618	0.3	< 5	8	< 5	4.72	183	38	47	< 20	0.41	0.05	0.10	4	8
P23-30	< 0.2	14	5	19	4	< 0.2	< 5	< 5	< 5	1.21	168	23	21	< 20	0.49	0.07	0.14	1	< 5
P23-60	< 0.2	10	7	31	1	< 0.2	< 5	< 5	< 5	1.32	215	30	28	< 20	0.57	0.07	0.13	4	< 5
P23-80	< 0.2	44	56	63	10	< 0.2	< 5	< 5	< 5	0.85	70	116	26	< 20	0.28	0.02	0.02	2	5
P23-100	< 0.2	22	17	43	5	< 0.2	< 5	< 5	< 5	0.80	58	49	14	< 20	0.28	0.02	0.02	2	< 5
P24-0	< 0.2	35	5	25	3	< 0.2	< 5	< 5	< 5	1.42	214	20	30	< 20	0.59	0.07	0.17	< 1	< 5
P24-30	< 0.2	9	6	23	1	< 0.2	< 5	< 5	< 5	1.11	172	31	24	< 20	0.49	0.06	0.14	2	< 5
P24-60	< 0.2	7	5	20	< 1	< 0.2	< 5	< 5	< 5	1.03	167	26	21	< 20	0.36	0.04	0.09	2	< 5
P24-80	< 0.2	25	7	26	2	< 0.2	< 5	< 5	< 5	1.36	170	27	23	< 20	0.47	0.05	0.13	2	< 5
P24-110	< 0.2	37	164	63	8	< 0.2	< 5	5	8	1.73	169	35	27	< 20	0.52	0.04	0.07	3	< 5
P24-130	< 0.2	6	10	175	1	< 0.2	< 5	< 5	< 5	2.61	509	158	34	< 20	0.45	0.04	0.78	2	6
P24-150	< 0.2	11	41	15	2	< 0.2	< 5	< 5	< 5	0.50	67	28	65	< 20	0.28	0.02	0.04	3	< 5

ITS Intertek Testing Services
Bondar Clegg

Lancots Lane, St. Helens,
Merseyside WA9 3ES
United Kingdom
Tel: (44) 1744 611553
Fax: (44) 1744 28723

Enclosure no 7

LABORATORY REPORT

RECEIVED
11 AUG. 1998
MINDEX ASA

To: Mindex ASA
O.H. Bangsvei 54-59
N-1322 Hovik
Norway

Attention: Mr B Rosholt

Date: 17th July 1998

Your Ref: -

Our Ref: 98F18001.xls

SAMPLE DETAILS: ROCKS.

SOURCE REF: -

ANALYTICAL RESULTS:

Notes: Results above our normal stated URL (upper reporting limit) should be treated with caution.

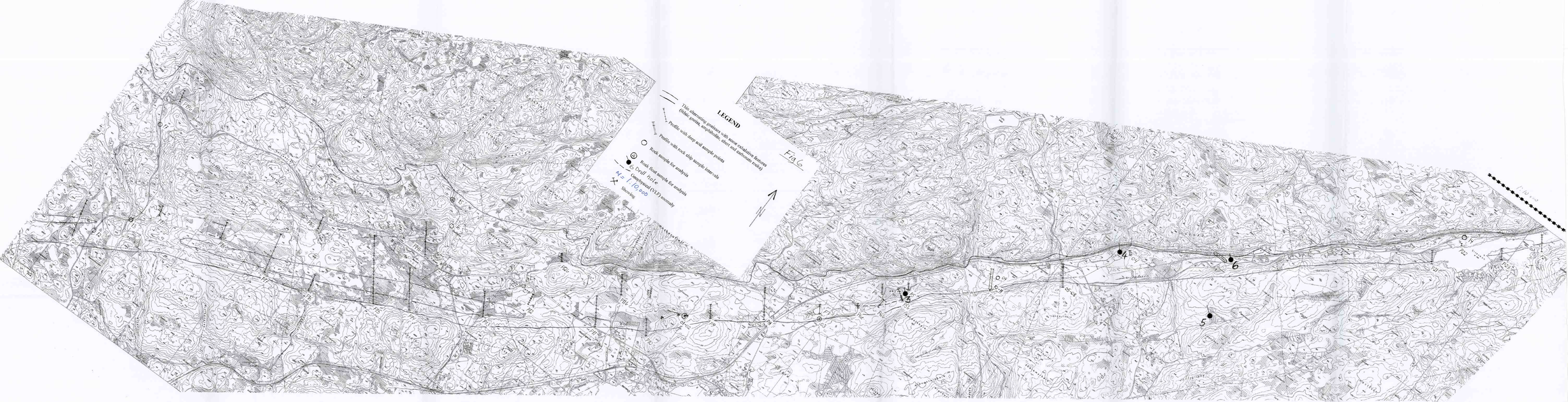
Reported By: L. Carlan

Approved By: Dr Cruse

Element	Au30	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	Bi	As	Sb	Fe	Mn	Te	Ba	Cr
Units	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm
L.R.L.	5	0.2	1	2	1	1	1	1	0.2	5	5	5	0.01	1	10	1	1
U.R.L.	10000	200	10000	10000	10000	10000	20000	20000	2000	2000	10000	2000	10	20000	2000	2000	20000
HORGS001	< 5	< 0.2	17	2	14	1	6	3	< 0.2	< 5	< 5	< 5	0.87	686	< 10	10	124
HORGS002	< 5	< 0.2	56	4	85	< 1	29	23	< 0.2	< 5	< 5	< 5	4.78	732	< 10	69	59
HORGS003	< 5	< 0.2	378	6	22	6	46	35	< 0.2	< 5	33	< 5	4.48	86	< 10	56	94
HORGS004	< 5	< 0.2	13	4	41	< 1	29	19	< 0.2	< 5	< 5	< 5	3.17	322	< 10	28	34
HORGS005	< 5	< 0.2	18	7	85	< 1	39	20	< 0.2	< 5	< 5	< 5	4.02	646	< 10	12	117
HORGS006	< 5	< 0.2	27	7	112	2	23	17	< 0.2	< 5	< 5	< 5	3.90	481	< 10	36	74
HORGS007	< 5	< 0.2	26	6	108	1	39	24	< 0.2	< 5	< 5	< 5	5.63	302	< 10	335	78
HORGS008	< 5	< 0.2	13	6	37	< 1	25	15	< 0.2	< 5	< 5	< 5	2.69	247	< 10	34	72
HORGS009	6	2.9	229	87	398	5	64	49	< 0.2	< 5	6	< 5	8.59	783	< 10	46	88
HORGS010	< 5	< 0.2	22	3	35	1	9	9	< 0.2	< 5	< 5	< 5	2.67	276	< 10	76	62
HORGS011	< 5	< 0.2	22	6	45	1	17	11	< 0.2	< 5	< 5	< 5	2.39	203	< 10	84	90
HORGS012	< 5	< 0.2	315	7	117	< 1	4	16	< 0.2	< 5	6	< 5	5.90	1046	< 10	34	22
HORGS013	< 5	< 0.2	87	7	31	2	24	13	< 0.2	< 5	< 5	< 5	1.45	114	< 10	22	59
HORGS014	< 5	< 0.2	78	5	86	8	12	14	< 0.2	< 5	< 5	< 5	5.14	482	< 10	244	204
HORGS015	< 5	< 0.2	448	3	13	< 1	36	19	< 0.2	< 5	6	< 5	1.97	65	< 10	51	33
HORGS016	< 5	< 0.2	161	< 2	123	< 1	18	24	< 0.2	< 5	< 5	< 5	3.27	136	< 10	41	30
HORGS017	< 5	< 0.2	52	3	67	< 1	27	27	< 0.2	< 5	< 5	< 5	4.63	451	< 10	36	41
HORGS018	< 5	< 0.2	1	3	36	< 1	6	9	< 0.2	< 5	< 5	< 5	3.04	629	< 10	10	31
HORGS019	< 5	< 0.2	2	2	20	1	3	4	< 0.2	< 5	< 5	< 5	2.75	647	< 10	15	33
HORGS020	6	10.3	69	1658	3058	< 1	20	12	13.8	6	8	8	0.49	2093	< 10	3	9
HORGS021	10	24.4	59	2914	6120	< 1	18	14	28.0	15	22	10	1.13	1078	< 10	37	84

ITS Intertek Testing Services
Bondar Clegg

Element	V	Sn	W	La	Al	Mg	Ca	Na	K	Sr	Y	Ga	Li	Nb	Sc	Ta	Ti	Z
Units	ppm	ppm	ppm	ppm	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
L.R.L.	1	20	20	1	0.01	0.01	0.01	0.01	0.01	1	1	2	1	1	5	10	0.01	
U.R.L.	20000	2000	2000	2000	10	10	10	10	10	2000	2000	10000	20000	10000	2000	1000	5	5000
HORGS001	12	< 20	< 20	9	0.43	0.25	1.58	0.03	0.06	9	18	< 2	3	< 1	< 5	< 10	0.03	
HORGS002	110	< 20	< 20	5	1.75	1.40	1.74	0.07	0.77	11	7	< 2	12	< 1	7	< 10	0.23	<
HORGS003	143	< 20	< 20	12	1.23	0.91	0.52	0.07	0.52	8	9	< 2	7	< 1	12	< 10	0.13	
HORGS004	74	< 20	< 20	9	1.71	1.13	1.74	0.22	0.12	21	11	< 2	4	< 1	7	< 10	0.13	
HORGS005	60	< 20	< 20	12	2.27	1.75	0.91	0.06	0.09	57	10	2	8	1	< 5	< 10	0.22	6
HORGS006	50	< 20	< 20	20	1.86	1.04	1.31	0.10	0.11	28	17	< 2	7	1	6	< 10	0.22	4
HORGS007	100	< 20	< 20	34	2.03	1.71	1.56	0.04	0.78	30	16	6	19	< 1	9	< 10	0.11	< 1
HORGS008	55	< 20	< 20	10	2.09	0.99	1.23	0.14	0.28	26	7	< 2	12	< 1	5	< 10	0.15	< 1
HORGS009	127	< 20	< 20	17	1.60	0.99	0.61	0.07	1.05	6	13	< 2	8	1	12	< 10	0.26	3
HORGS010	30	< 20	< 20	7	1.27	0.68	0.64	0.08	0.46	10	7	< 2	6	1	< 5	< 10	0.14	2
HORGS011	43	< 20	< 20	16	1.28	0.73	0.44	0.06	0.39	8	9	< 2	8	1	< 5	< 10	0.14	2
HORGS012	112	< 20	< 20	15	1.44	0.79	0.61	0.05	0.85	5	23	4	20	1	15	< 10	0.27	2
HORGS013	27	< 20	< 20	19	2.25	0.24	1.99	0.25	0.16	31	15	< 2	6	1	< 5	< 10	0.17	5
HORGS014	33	< 20	< 20	24	2.17	1.11	0.30	0.09	1.46	8	27	< 2	15	2	13	< 10	0.30	5
HORGS015	69	< 20	< 20	18	0.97	0.75	0.15	0.11	0.28	12	5	3	7	< 1	< 5	< 10	0.06	1
HORGS016	220	< 20	< 20	6	3.86	0.24	2.85	0.49	0.08	70	18	8	1	< 1	< 5	< 10	0.08	< 1
HORGS017	128	< 20	< 20	6	1.55	1.16	1.90	0.24	0.18	16	16	< 2	4	< 1	13	< 10	0.18	2
HORGS018	37	< 20	< 20	9	1.04	0.50	1.33	0.04	0.05	22	11	3	10	< 1	6	< 10	< 0.01	4
HORGS019	18	< 20	< 20	3	0.49	0.26	1.80	0.06	0.05	15	9	< 2	3	< 1	6	< 10	< 0.01	3
HORGS020	8	< 20	< 20	3	0.76	0.07	> 10.00	0.05	0.05	30	3	< 2	< 1	< 1	< 5	< 10	0.04	< 1
HORGS021	46	< 20	< 20	7	1.88	0.33	5.94	0.07	0.28	23	10	< 2	7	< 1	< 5	< 10	0.12	2


LEGEND
Thin alternating gneisses with some exfoliation fractures (felsic gneiss, amphibolite, chert and carbonate rocks)
Profile with deep soil sample points
Profile with rock chip sample intervals
Rock sample for analysis
Rock float sample for analysis
Drill hole
Conductor(s) (VLF) anomaly
Shoreline
Fig 6
1
2
3
4
5
6