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Vakkerlien Project. Report on 2004 Work Program: Airborne Geophysics & Ground Follow-up

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NGU rapport 2004.042, Data Acquisition and Processing - Helicopter Geophysical Survey, Kvikne 2006, er inkludert som apendixA

Falconbridge rapport: Ground follow-up of an Airborne EM survey Vakkerlien, er inkludert som apendix B

CD ligger vedlagt: Data Acquisition and Processing - Helicopter Geophysical Survey, Kvikne 2006

Vakkerlien Project
Report on 2004 Work Program:
Airborne Geophysics & Ground Follow-up

Hedemark County, Norway

P. Tirschmann
Falconbridge Limited

On behalf of
Sulfidmalm A/S

August 10, 2005

SUMMARY AND CONCLUSIONS

This report gives the details and results of work carried out on the Vakkerlien project in 2004. The project is located approximately 300km north of Oslo and 90km south of Trondheim in Hedemark fylke, central Norway. The project is an option and joint venture between Sulfidmalm A/S (Norway), a wholly-owned subsidiary of Falconbridge Limited, and Blackstone Ventures Inc. (Canada). Exploration programs are carried out by Falconbridge Limited on behalf of Sulfidmalm.

The Vakkerlien project is underlain by Gula group supracrustal and intrusive rocks within the central Norwegian Caledonides. This region hosts a number of deposits including the Vakkerlien nickel deposit (400,000 grading 1.0% Ni & 0.4% Cu) located approximately 6.5km south of the town of Kvikne.

In order to evaluate the nickel sulphide potential in the Vakkerlien area, a 3,750 line km helicopter-borne magnetic and frequency domain electromagnetic survey was contracted out to the NGU and flown in June of 2004. Shortly after completion, an in-house review of the preliminary data was completed and a ground follow-up program was carried out. Selected geophysical anomalies were field checked and prospected by a two-man crew using both VLF and Beep-mat. Traditional prospecting was also carried out over several areas thought to be prospective based on known showings, presence of ultramafic rocks and/or magnetic highs as well as stream sediment and VLF anomalies from past surveys.

The airborne survey identified numerous EM anomalies of which 43 were prioritized for ground follow-up. Most of these were explained and found to be correlated with metasedimentary-related sulphides and graphite. The most significant results from the ground follow-up program were the following:

- discovery of a new nickel showing associated with a strong EM anomaly in the immediate vicinity of the Olkar mine; in-situ sample returned values of **0.62% Ni, 0.53% Cu, 0.13% Co, 0.02 g/t Pt, 0.08 g/t Pd & 19.1% S**
- anomalous values of **0.23% Ni, 1.72% Cu, 0.09% Co,** <0.02 g/t Pt, 0.06 g/t Pd and 18% S obtained from a sample of granodiorite containing semi-massive pyrrhotite and pyrite as well as chalcopyrite veins and disseminations at the "Gardsjöen" magnetic anomaly.

Several other geophysical anomalies of interest occur in the general vicinity of the Vakkerlien deposit where follow-up prospecting efforts were hampered by thick overburden. These include the following:

- hook-shaped magnetic high with coincident weak EM anomaly off the SE end of the Vakkerlien deposit
- 1.5km x 2km magnetic high located 1km south of Vakkerlien with coincident boulders of altered ultramafic rock
- 0.7km x 1km magnetic high located 3km SE of Vakkerlien with coincident subtle EM response

All the above areas of interest as well as the known nickel occurrences (Vakkerlien,Kaltberget Olkar) lie within a distinctive geophysical domain occupying the northwestern portion of the 2004 airborne survey block. This domain is characterized by subtle EM conductors and discrete NW-SE and N-S striking magnetic highs superimposed on a rather featureless low to moderately magnetic background. In contrast, the geophysical signature in the central and eastern portions of the survey is characterized by numerous, strong, laterally continuous NE-SW and N-S striking EM conductors typically associated with magnetic highs.

Ground geophysical UTEM surveys are proposed to cover the magnetic anomalies which lie south and east of the Vakkerlien deposit. These anomalies are interpreted to be ultramafic-sourced and may represent a continuation of the Vakkerlien magmatic system. The proposed UTEM block is transected by the northwestern boundary of the Knutshø Landskapsvenområde (landscape protected area). Preliminary talks with the Directorate of Nature Management in Trondheim indicate that permission can be obtained to carry out ground geophysics and drilling.

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Appendix B: Ground Follow-up of an Airborne EM survey, Vakkerlien Area Norway, J. Laforest, Falconbridge Limited.

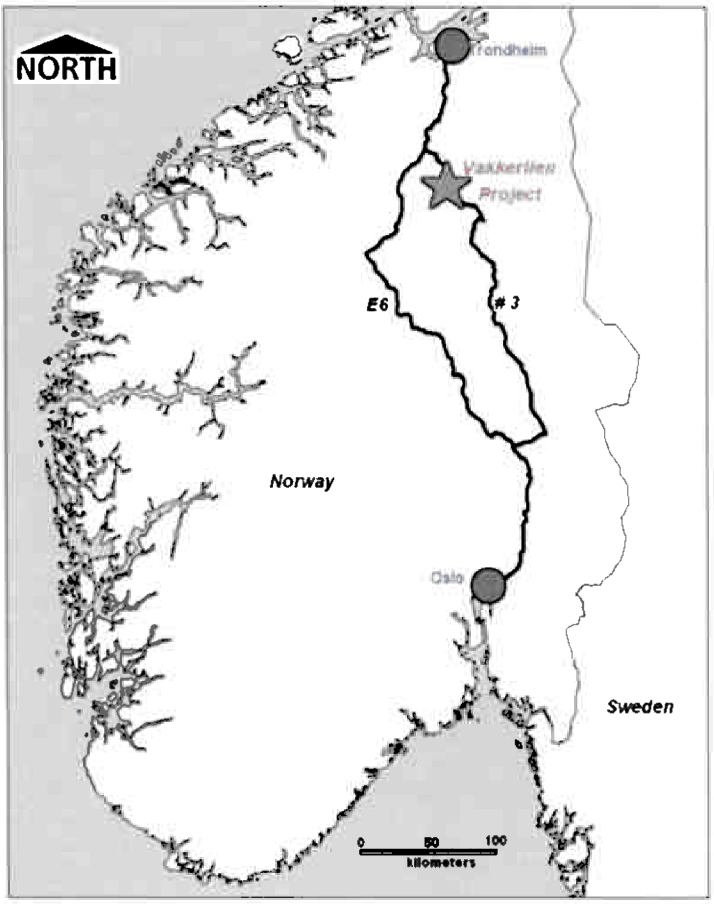
1.0 Location, Topography and Access

The Vakkerlien project area is located 300 km north of Oslo and 90km south of Trondheim in central Norway. The project is situated within the kommunes of Tynset, Tolga and Folldal in the Hedemark fylke and is easily accessible by car via the E6 and #3 highways north from Oslo or south from Trondheim (Figure 1).

The NNW trending Orkla River transects the center of the project area and represents a prominent topographic low (440-700m) in the region. The ground rises steeply to the east and west of the Orkla River with local mountain peaks up to 1400m in elevation. Much of the project area is above the tree line or has open deciduous forest. The Vakkerlien deposit is situated on a broad, relatively flat plateau just at the tree line with an average elevation of 900m.

Access to the field area is generally good via highway #3 along the Orkla river valley and a well-developed system of secondary gravel roads and hiking trails. Tolls must be paid for access along many of the secondary local roads.

Figure 1
Vakkerlien Project – Location

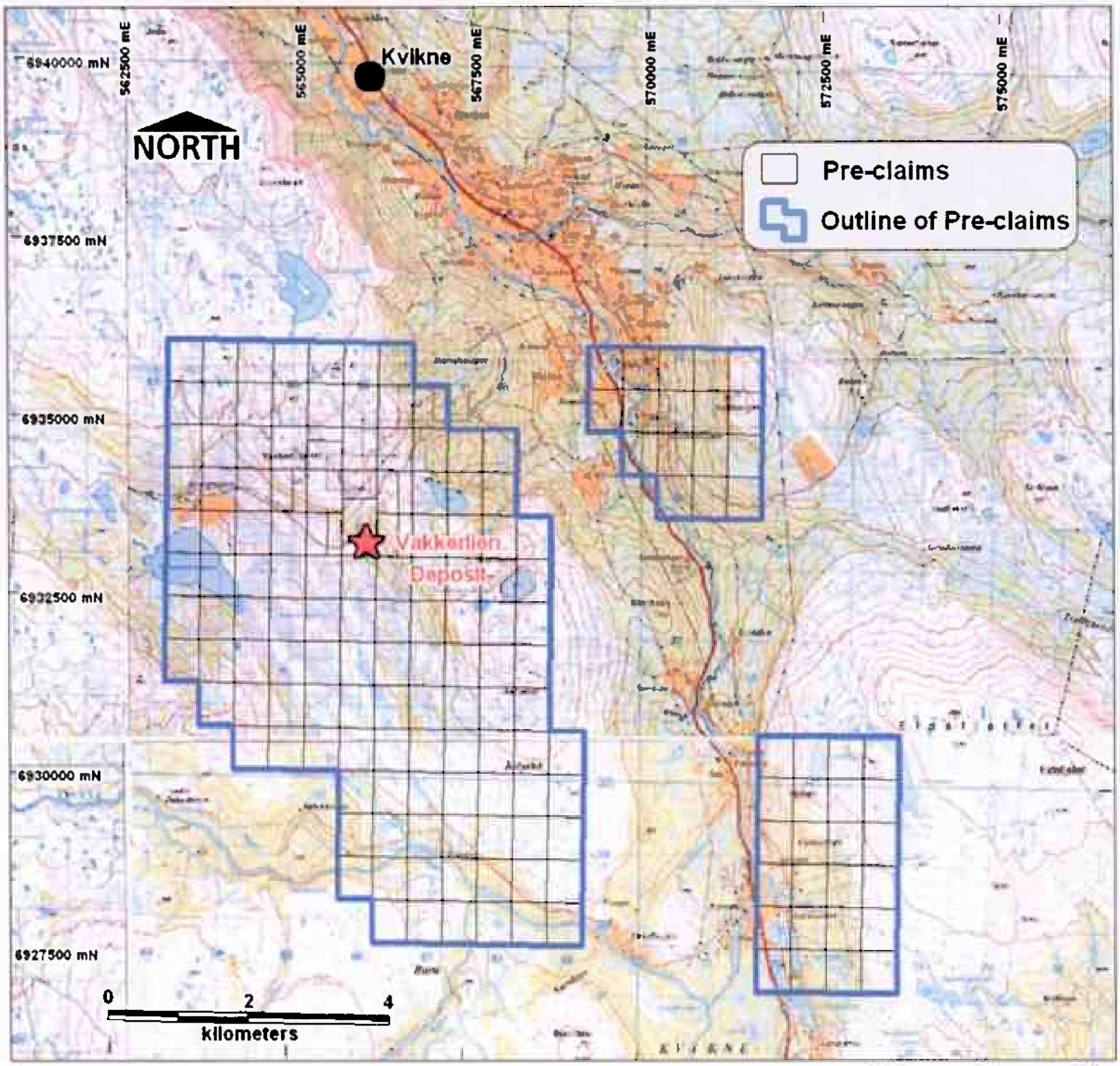


2.0 Property and Ownership

The Vakkerlien property consists of 173 pre-claims or "mutings" in three separate blocks collectively covering a total area of 50.1 sq km (Figure 2). The pre-claims are registered to Sulfidmalm A/S (Norway), a wholly owned subsidiary of Falconbridge Nikkleverk (Norway) which is owned by Falconbridge Limited (Canada). Exploration on the project is carried out under an option and joint venture agreement between Sulfidmalm A/S and Blackstone Ventures Inc. (Canada). Work programs are carried out by Falconbridge Limited on behalf of Sulfidmalm.

NOTE: Pre-claims owned by a third party over part of the Vakkerlien deposit were recently allowed to lapse and, therefore, pre-claims registered to Sulfidmalm A/S now take precedence.

Figure 2
Vakkerlien Project - Pre-claims



UTM WGS84 Zone 32N

3.0 Geological Setting

The Vakkerlien project is underlain by Gula group lithologies of the central Norwegian Caledonides. The Gula group forms the oldest part of the Trondheim nappe and is thought to be Proterozoic in age. Main lithologies include metasediments in the form of psammitic, pelitic, calcareous and graphitic schists as well as iron formations, metavolcanics (amphibolites), trondjemitic intrusions and occasional gabbroic to ultramafic intrusions. The metamorphic grade is middle to upper amphibolite facies.

A number of deposits are hosted in the Gula group including the Vakkerlien nickel sulphide deposit (400,000 tonnes grading 1.0% Ni & 0.4% Cu) discovered by Sulfidmalm A/S in 1974. The deposit is hosted in the core of a differentiated gabbroic to ultramafic intrusion and forms a plunging rod-shaped (10m x 40m) zone which can be traced laterally for 1250m.

Other nickel occurrences in the area include the Kaltberget showing and the Olkar mine.

4.0 Previous Work

Past copper-zinc focused mining and exploration activity in the Kvikne-Tynset area is voluminous and a detailed summary is beyond the scope of this report. Abundance evidence of surface prospecting can be seen in the form of old pits and trenches.

Several older vintage airborne geophysical surveys flown at 200m line spacing covered portions of the current exploration area and include the following:
- 1974 helicopter-borne Sander EM-3 and mag survey
- 1979 helicopter-borne Sander EM-3, mag, radiometric and VLF survey
- 1981 helicopter-borne EM, mag and VLF survey

Sulfidmalm A/S initiated exploration in the area for Besshi-type VMS deposits in the early 1970's. This program included regional stream sediment sampling as well as prospecting and lithogeochemical sampling, the latter of which led to the discovery of the Vakkerlien deposit in 1974. During the course of sampling pits at the historical Vakkerlien showing for copper and zinc mineralization, Sulfidmalm obtained grab samples assaying up to 3.02% Ni. Subsequent work by Sulfidmalm concentrated on delineation of the Vakkerlien deposit and on exploration in the immediate vicinity as summarized in Table 1. A small amount of nickel-related exploration was also carried out concurrently at several other sites in the Kvikne area and included the following:

<u>Olkar (1975-1976):</u> grab samples from a dump pile related to Olkar mine taken, best sample assayed 1.5% Ni, 1.6% Cu & 23.6% S; VLF and magnetics survey; geological mapping and prospecting; six drillholes totaling 269.9m with best result of 1.78% Ni, 1.18% Cu and 22.5% S over 1.5m in DDH2 (all holes drilled south and west of the Orkla river).

<u>Kaltberget (1976-1977):</u> geological mapping (new showing "Grötberget" discovered with grabs up to 2.1% Ni & 1.12% Cu); ground mag and VLF survey; 13 drillholes totaling 609.95m completed in 1976 with best results in areas of new Grötberget showing:

DDH 6	1.09% Ni, 0.15% Cu & 4.4% S over 3m
DDH 8	1.18% Ni & 0.20% Cu over 5m
DDH12	1.60% Ni, 0.30% Cu & 7.5% S over 5.5m

Surface and downhole charge potential surveys; 4 additional drillholes totaling 324.1m completed in 1977 with best result of 1.55% Ni, 0.48% Cu & 11.2% S in DDH 17. The last four holes were situated grid east of the original drilling and included the deepest drilling on the property (up to 107m vertical depth).

Kletten (1977): surface chip sampling (no significant values) and a VLF survey

In 1979, Sulfidmalm commissioned the NGU to fly a regional helicopter EM and magnetic survey. Magnetic and single frequency (1000Hz) Sander EM data was collected along 200m spaced lines. No further work was done, largely due to extraneous reasons, and the claims were allowed to lapse.

Between 1991 and 1992, a joint venture between Folldal Verk A/S and Outokumpu (Norsulfid A/S) carried out drilling on the Vakkerlien deposit to confirm the resource (see Table 1). No further work was completed by the joint venture and the claims were allowed to lapse. In total, 7,769m of drilling in 209 holes have been completed in the immediate area of the Vakkerlien deposit.

Falconbridge geologists made a reconnaissance visit to the Vakkerlien area in late 2002. In early 2003, Sulfidmalm acquired new pre-claims in the area and initiated nickel sulphide exploration signing an option and joint venture arrangement with Blackstone Ventures Inc. in August 2003.

Table 1
Summary of Work Completed over the Vakkerlien Deposit and Immediate Area

Period	Company	Description of Work
1975-1977	Sulfidmalm	• 109 holes drilled and a **resource of 400,000 tonnes grading 1.0% Ni & 0.4% Cu** delineated using a 0.4% Ni cut-off • Metallurgical testing yielding a **concentrate grading 15.5% Ni @ 80% recovery and 7.0% Cu @ 92% recovery**
1975	Sulfidmalm	• Surface geophysical surveys including magnetics, VLF, Slingram, Mise-la-Masse, resistivity sounding and Turam to try and trace deposit along strike and downplunge to SE
1979	Sulfidmalm	• Max-Min and Crone PEM test surveys
1991-1992	Folldall Verk A/S & Outokumpu (Norsulfid A/S) Joint Venture	• 100 holes drilled on deposit on sections between Sulfidmalm holes to confirm resource • **Resource estimated to be 104,516 tonnes grading 1.73% Ni, &0.55% Cu using a 0.5% Ni cut-off** ***or*** **52,132 tonnes grading 2.55% Ni & 0.80% Cu using a 1.0% Ni cut-off**

5.0 2004 Work Program

The nickel sulphide potential in the Kvikne region is exemplified by the Vakkerlien, Olkar and Kaltberget nickel occurrences. The goal of the 2004 exploration program was to obtain comprehensive airborne EM and magnetic coverage across the project area and to carry out ground-based follow-up of anomalous results in order to identify targets for ground geophysics and drilling.

5.1 Helicopter Geophysical Survey Appendix A

A 3,750 line km helicopter-borne magnetics and EM survey was commissioned by Sulfidmalm and flown by the Geological Survey of Norway (NGU) in June 2004 (Figure 3). The base of operations was the Kvikne Fjellhotell. Data was acquired on east-west oriented flight lines spaced 150m apart with a nominal flying height of 60m above ground level. The EM system used was the 5-frequency Geotech Ltd. Hummingbird system. Appendix A contains a detailed survey report with a complete set of map products as well as digital data on CD.

The new airborne survey detected only weak EM anomalies in the vicinity of the Vakkerlien deposit. However, several interesting magnetic anomalies were identified in this part of the survey block including the following:

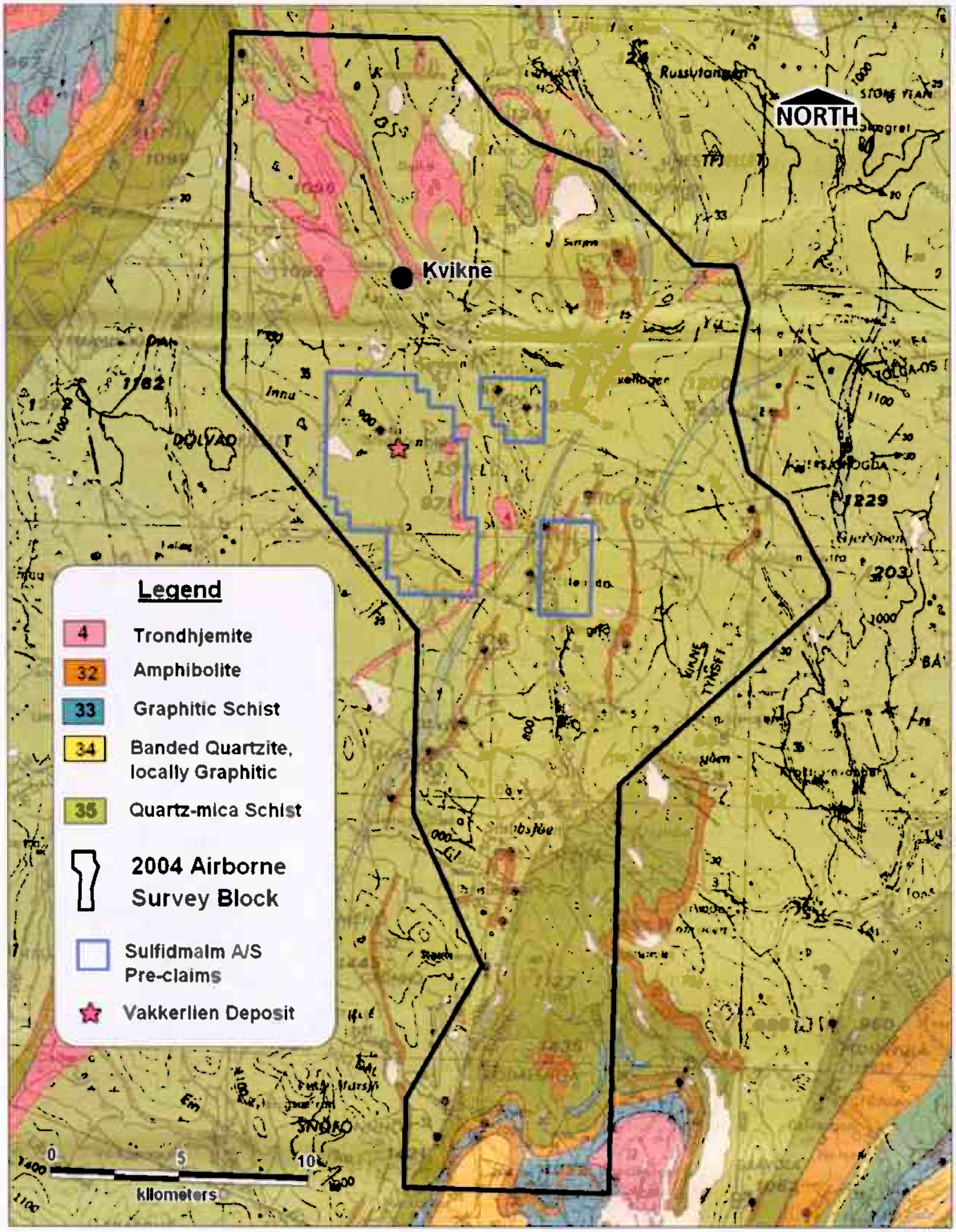
- abrupt NW trending hook to the magnetic anomaly associated with the Vakkerlien deposit suggesting a possible folded extension of the host intrusion
- 1 large (1.5km x 2km) magnetic high located 1km south of the Vakkerlien mineralization
- 2nd large (0.7km x 1km) magnetic high located 3km SE of the Vakkerlien mineralization with coincident subtle EM response

The two large magnetic highs are interpreted to represent ultramafic intrusions and may be part of the same magmatic system which formed the Vakkerlien deposit.

The airborne data indicates the presence of two distinct geophysical domains within the 2004 survey block (Figure 4). The first domain is located in the central and eastern portions of the survey and is characterized by numerous, strong, laterally continuous NE-SW and N-S striking EM conductors typically associated with magnetic highs. The second domain occupies the northwestern portion of the survey block and is characterized by subtle EM conductors and more discrete NW-SE and N-S striking magnetic highs superimposed on a rather featureless low to moderately magnetic background. Several of the subtle airborne EM conductors correlate with ground VLF conductors identified by past surveys in the vicinity of the Vakkerlien deposit.

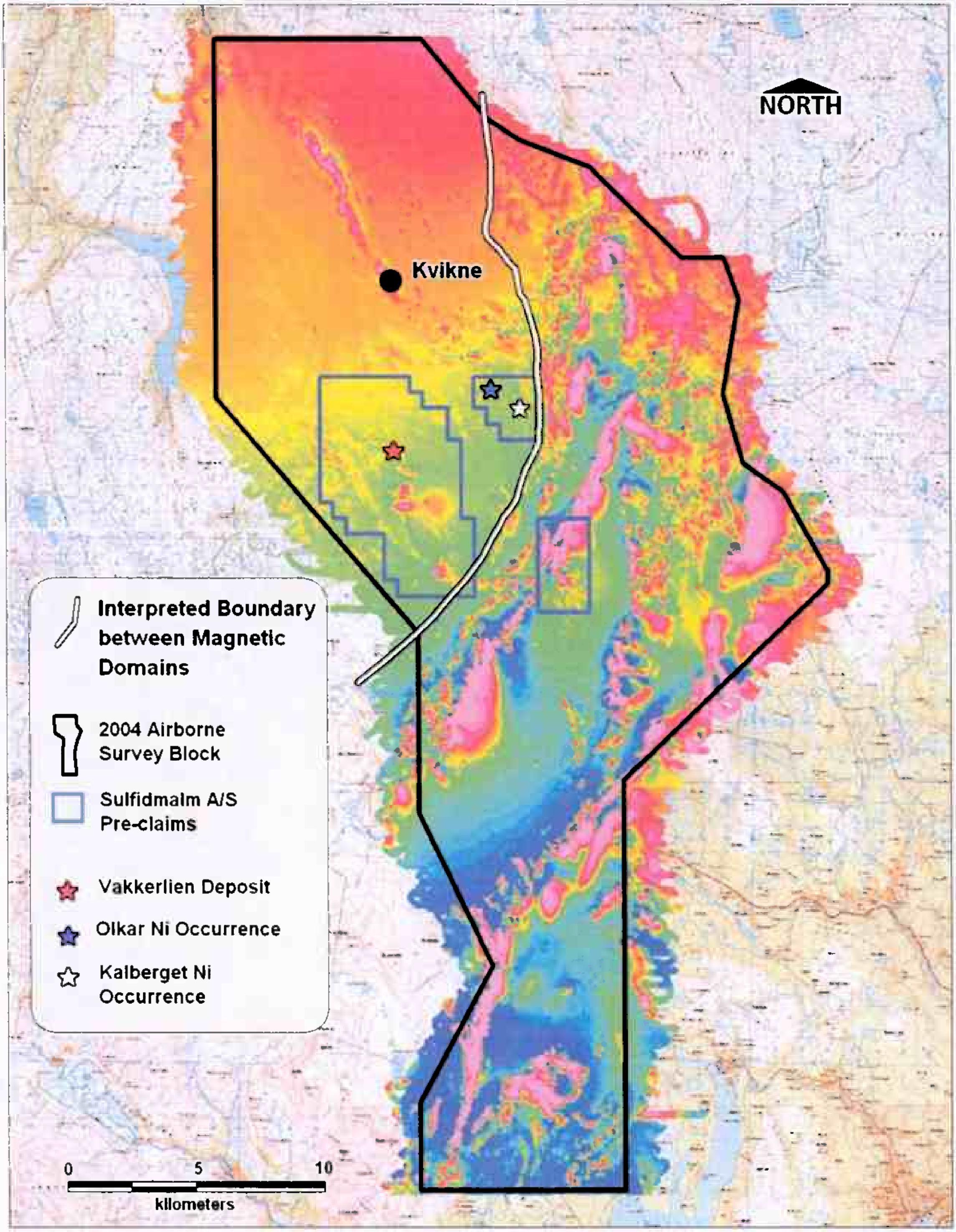
Significantly, all of the well-known nickel occurrences (Vakkerlien, Olkar & Kaltberget) are situated within the northwestern geophysical domain. Although there is a paucity of strong EM conductors, prospective targets may lie below the 60m depth penetration of the 2004 airborne survey.

Figure 3
2004 Airborne Survey Block



UTM WGS84 Zone 32N

Figure 4
2004 Airborne Survey – Total Field Magnetics



UTM WGS84 Zone 32N

5.2 Field Follow-up Program Appendix B

Immediately following the completion of the airborne survey, an in-house review of the preliminary data was carried out by A. Watts (Falconbridge Limited) in preparation for the field program. An interpretation of the EM axes across the survey block was completed and approximately 25 high conductance EM anomalies were identified. This geophysical information was then integrated with existing geological and geophysical data and a list of priority targets was compiled for ground follow-up.

The field follow-up program was carried out between June 28th and July 20th by Jean Laforest and Yannnick Beaudoin (Falconbridge Limited). There were three main components to the program:

- Airborne EM ground follow-up
- 1979 airborne VLF anomaly follow-up
- Traditional prospecting over selected areas of interest

Appendix B contains a detailed report by Jean Laforest of all work including a summary table of EM conductors visited and a listing of lithogeochemical results.

5.2.1 Airborne EM ground follow-up

A total of 43 EM anomalies were located on the ground and checked using a combined VLF and Beep-mat prospecting technique. Most of the anomalies were explained and found to be associated with sulphidic and/or graphitic metasediments. In many case, sulphides showings show evidence of past work in the form of stripping, pits and trenches. Anomalous metal values were obtained from samples collected over three EM conductors, #4, #2 and #25 (see Appendix B) of which #4 in the Olkar area is the most significant.

<u>Anomaly #4 – Olkar Area</u>
Anomaly #4 strikes N-S, is estimated to be 300m in strike length and has a strong in-phase response and high in-phase to quadrature ratio. The conductor was located by VLF and Beep-mat and found to be buried beneath 0.6m of overburden on the forested slope of the river valley. This site is located 150m NNW of a vertical shaft on the northeastern side of the Orkla River in the immediate vicinity of the historic Olkar mine and across the river from drilling done by Sulfidmalm in the 1970's. An in situ sample containing pyrite-pyrrhotite-chalcopyrite veinlets in apparent metasediments assayed **0.62% Ni, 0.53% Cu, 0.13% Co, 0.02 g/t Pt, 0.08 g/t Pd & 19.1% S**. On the western side of the river, two grab samples of mineralized diorite (?) from a what appears to be a muck pile returned values of **1.44% Ni, 4.83% Cu, 0.18% Co, 0.82 g/t Pt, 0.08 g/t Pd & 28.2% S** and **1.43% Ni, 0.52% Cu, 0.24% Co, <0.02 g/t Pt, 0.2 g/t Pd and 33% S**, respectively. The in-situ sample on the eastern side of the river is located at the approximate center of the airborne conductor and the grab samples on western side of the river lie very close to the southern end of the conductor.

This anomaly may have been incompletely covered by the airborne survey due to its position at the bottom of a river valley bounded on the east by a steep hill. A previous Sulfidmalm ground VLF survey would have covered only the extreme southern end of the conductor. High quality time domain ground EM (such as UTEM) would help resolve this target but surveying would be complicated by steep, topography, the river and cultural features (fences, powerlines, roads).

Anomalies #2 & #25:
Both of these anomalies are strong, laterally extensive conductors and show evidence of past exploration as evidenced by trenches and pits. At anomaly #2 in the northeastern portion of the survey block, one sample of semi-massive pyrrhotite in intermediate gneiss returned an anomalous value of 0.21 g/t Pd but negligible amounts of other metals. Anomaly #25 is located in the northeastern corner of the survey block and is attributed to sulphides in metasediments. However, a leucogabbro containing abundant disseminated pyrrhotite and minor chalcopyrite was also sampled and returned values of 0.06 g/t Pt and 0.17% Cu.

5.2.2 1979 Airborne VLF Anomaly Follow-up

Several of the 1979 airborne VLF anomalies in the area of the Vakkerlien deposit area were checked but prospecting efforts were hampered by thick overburden and did not produce any new showings.

5.2.3 Traditional prospecting

A number of locations were selected and visited based on the presence of one or more of the following positive attributes: high magnetic signature, ultramafic rocks, stream sediment anomalies and historical showings. The following sites were found to be of interest:

Magnetic Anomalies South of Vakkerlien
The two strong magnetic anomalies, located 1km south and 3km SE of Vakkerlien, respectively, were visited and found to be covered by overburden. However, boulders and float of altered ultramafic rocks were found at the anomaly situated 1km south of Vakkerlien lending credence to the interpretation that the magnetic anomalies are ultramafic-sourced.

Gardsjöen "Ultramafic"
Maps from former Sulfidmalm reports indicated the occurrence of ultramafic rocks on the former "Gardsjöen" claims. A site visit revealed the presence of an old trench at the mineralized contact between an intermediate intrusion and metasediments. A sample of granodiorite containing semi-massive pyrrhotite and pyrite as well as chalcopyrite veins and disseminations assayed **0.23% Ni, 1.72% Cu, 0.09% Co, <0.02 g/t Pt, 0.06 g/t Pd and 18% S.** Oddly, no obvious ultramafic rocks were observed.

Kaltberget Nickel Occurrence
Several samples of nickeliferous gabbro and ultramafic were collected with the best sample assaying **1.55% Ni, 1.11% Cu, 0.07% Co, 0.29 g/t Pt, 0.29 g/t Pd and 10.8% S.** Nickel values re-calculated to 100% sulphides indicate favorable tenors ranging from 1.59% Ni to 6.54% Ni.

A review of the old drilling data indicates that there are at least two small mafic-ultramafic bodies or "boundins" in the Kaltberget area. The intersected mineralization is shallow (0-30m) and of limited extent. The new airborne data shows the presence of weak EM conductors and the continuation of a subtle magnetic trend extending 1km to the north and 1km to the south of the old showings and drilling. (The magnetic trend is weak to moderate and is best seen on the calculated first derivative map product). The northern portion of this magnetic trend straddles the western side of a steep hill (100m local relief) which would have limited the effectiveness of the airborne EM.

Near surface (<60m) potential appears to be limited but the high nickel tenors, magnetic data and boudinaged nature of the ultramafics may justify deeper-looking ground geophysics.

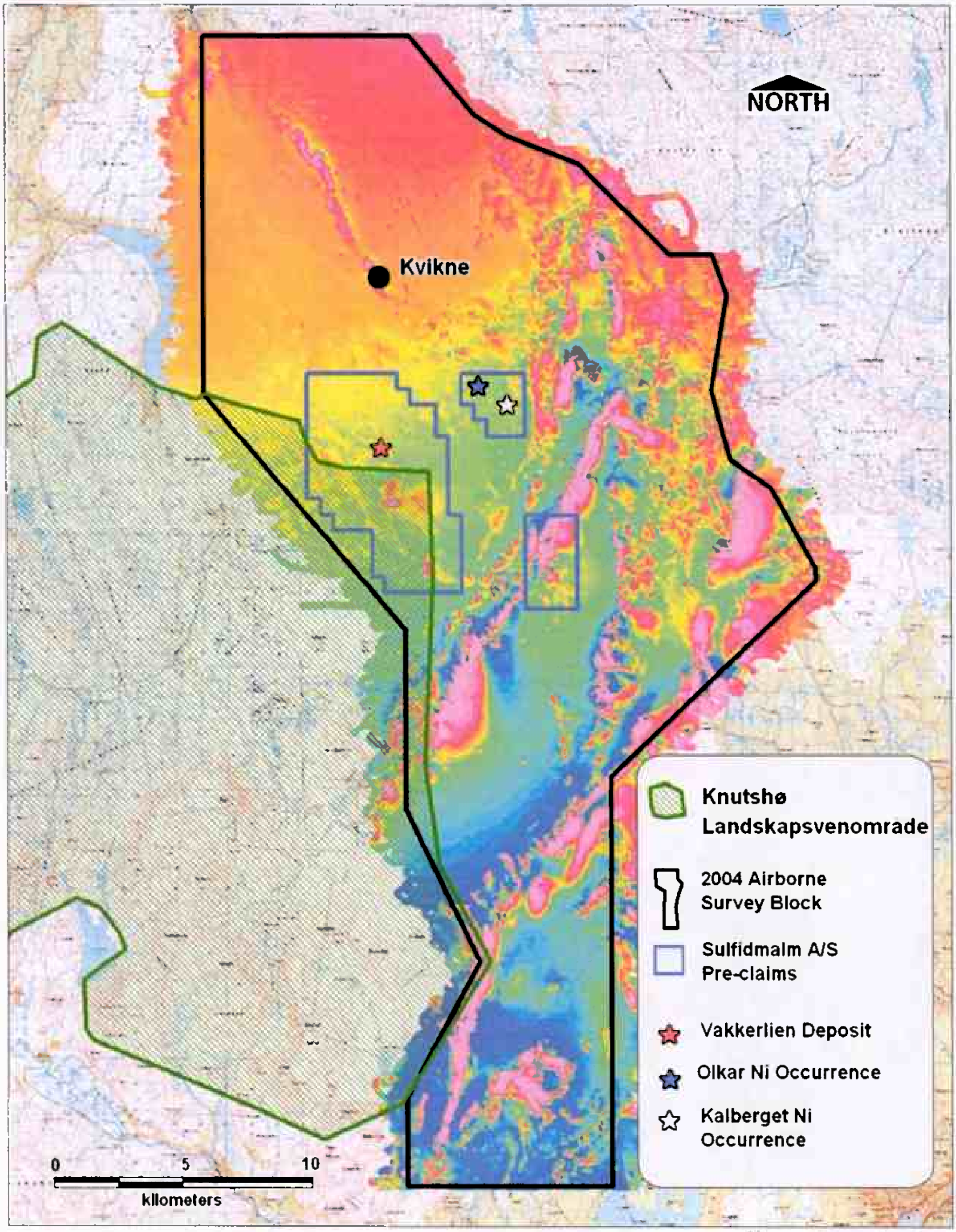
6.0 Land Access Issues

The extreme western edge of the 2004 airborne survey block lies within the "Knutshø Landskapsvenområde" (landscape protected area) as shown in Figure 5. Significantly, this includes the two large magnetic highs situated south and southeast of Vakkerlien. Company representatives met with the Head of the National Park Section of the Directorate of Nature Management in early 2005 in order to discuss land access for the purpose of exploration. The following information was obtained:

- Activities which will significantly alter the nature of the landscape are not allowed in a landscape protected area
- Geophysics, diamond drilling and, in the case of mining, vent raises are not considered to substantially alter the nature of the landscape
- Permissions will be required for ground geophysics and drilling and application can be made to the Fylke (county) office in Oppdal; (permission from the local commune for off-road vehicle use is also required as per usual)

Indications were that permission could be obtained for exploration activities within the Knutshø Landskapsvenområde. Furthermore, mining within a National Park can be authorized (e.g. Spitzbergen Island) if near enough to a boundary such that mine access and infrastructure can be located external to the park.

Figure 5
Location of Knutshø Landskapsvenområde in Relation to 2004 Airborne Survey Block



UTM WGS84 Zone 32N

APPENDIX A

NGU

Norges geologiske undersøkelse
Geological Survey of Norway

GEOLOGY FOR SOCIETY

NGU Report 2004.042

Data Acquisition and Processing - Helicopter
Geophysical Survey, Kvikne,
Hedemark county, Norway

NGU
Norges geologiske undersøkelse
Geological Survey of Norway

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REPORT

Report no.: 2004.042	ISSN 0800-3416	Grading: Confidential until 15.10.2006	
Title: Data Acquisition and Processing - Helicopter Geophysical Survey, Kvikne, Hedemark county, Norway			
Authors: John Olav Mogaard		Client: A/S Sulfidmalm	
County: Hedemark		Commune: Tynset, Tolga	
Map-sheet name (M=1:250.000) Røros		Map-sheet no. and -name (M=1:50.000) 1620 III Kvikne, 1619 IV Kvikneskogen 1520 I Einunna , 1519 II Innset	
Deposit name and grid-reference: Vakkerlien UTM 565 000 6933 000 (32 V)		Number of pages: 12 Price (NOK): Map enclosures:	
Fieldwork carried out: June 2004	Date of report: 01.10.2004	Project no.: 2990.04	Person responsible: Jan S. Rønning

Summary:

In June 2004, a helicopter geophysical survey was carried out over Kvikne, Hedemark county. The purpose of the surveys was to provide geophysical information for mineral exploration. The data were collected and processed by Geological Survey of Norway (NGU). A total of approx. 3750 line-km of electromagnetic (EM) and magnetic data were acquired using a nominal 150-m line spacing. The nominal flying height was 60 m above ground level (AGL), and lines were flown in alternating directions at headings of 090 and 270 degrees. Noise levels were within survey specifications.

All initial processing was carried out on a flight-by-flight basis. Magnetic data, consisting of total field measurements collected by a cesium vapor magnetometer, were corrected by removing diurnal variations as recorded at a magnetic base station at the base at Kvikne Fjellhotell. EM data were leveled using data from frequent high altitude excursions 300-m AGL. All final processed data were gridded using 40-m (magnetic) and 75-m square cells (electromagnetic). Geophysical maps were produced at a scale of 1:50 000 and are considered as stand alone products.

This report covers aspects of data acquisition and processing.

Keywords: Geofysikk (Geophysics)		Magnetometri (Magnetometry)
Elektromagnetisk måling (Electromagnetic measurements)	Databehandling (Data processing)	Fagrapport (Technical report)

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FIGURES:

APPENDIX A: Data delivery formats.

Maps in scale: 1:50 000 produced as stand alone products:

Map 2004.042-01:	Flight path.
Map 2004.042-02:	Total magnetic field.
Map 2004.042-03:	First vertical derivative of magnetic total field.
Map 2004.042-04:	EM stacked profiles 7001 Hz coaxial.
Map 2004.042-05:	EM stacked profiles 6606 Hz coplanar.
Map 2004.042-06:	EM stacked profiles 980 Hz coaxial.
Map 2004.042-07:	EM stacked profiles 880 Hz coplanar.
Map 2004.042-08:	EM stacked profiles 34133 Hz coplanar.
Map 2004.042-09:	EM apparent conductivity 6606 Hz coplanar.
Map 2004.042-10:	EM apparent conductivity 7001 Hz coaxial.

1 INTRODUCTION

As a contract work for AS Sulfidmalm, in June, 2004, a helicopter geophysical survey was carried out over parts of Kvikne, Hedemark county. The total area covered is app. 550 km^2, and the total distance flown was app. 3750 line-km (see Fig.1). Magnetic and electromagnetic (HEM) data were collected. The primary objective of the survey was to provide geophysical information for mineral prospecting in the area.

2 SURVEY VARIABLES AND CONDITIONS

Several conditions may influence on the quality of the geophysical data.

2.1 Weather conditions

Strong wind can increase the noise level of airborne geophysical data. High winds were not frequent during the survey, but were encountered occasionally and two flights was aborted during the survey period because of that .

2.2 Topographic conditions

The resolution of geophysical sensors decreases exponentially with flying height. To achieve the greatest possible resolution, the aircraft should be flown as low as is safely possible.
The topography in the Kvikne area is varying from fairly flat to quite steep. The survey were flown using a helicopter strong enough to climb the hills. Despite of this, it was impossible to drape the terrain with the bird 30 +/- 10 meters above ground as specified in the contract. The effect of this was alternating flying heights dependent on the directions the profiles were measured. This effected both the magnetic and the electromagnetic datasets.

2.3 Magnetic conditions

Diurnal changes in the earth's magnetic field affect magnetic data. The base station magnetic field never indicated strong magnetic storm conditions during the surveys. No lines had to be reflown due to diurnal changes. Magnetic data quality on all lines used for production are within project specification.

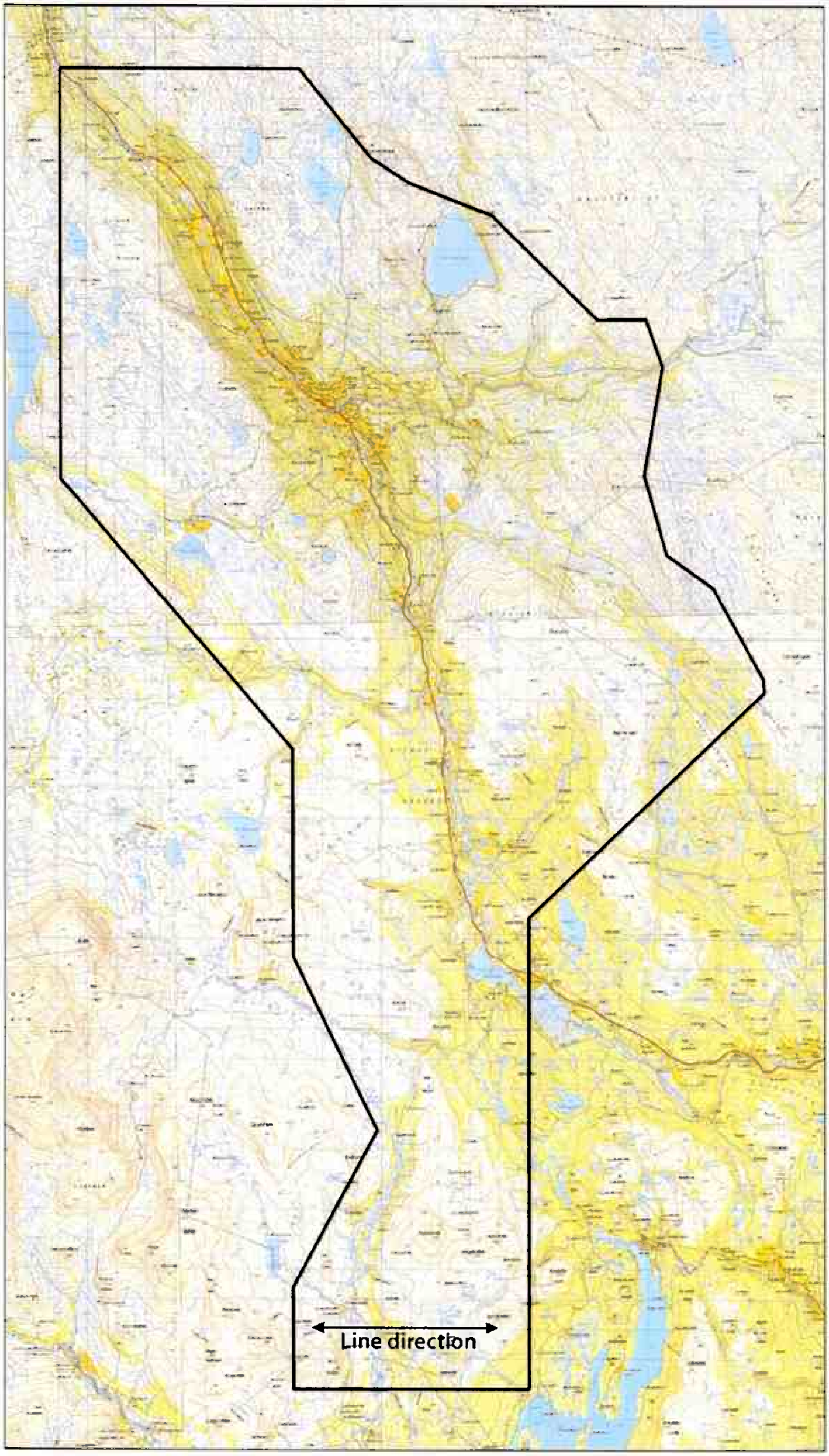


Fig. 1: Outline of the surveyed area (flight direction 090/270°)

2.4 EM data conditions

Strong vertical temperature gradients can affect EM leveling because the temperature at the 300-m nulling altitude is different from the temperature when the EM sensors are only 30 m above ground level. In addition to this, measuring at different altitudes may cause drift effects along profiles. Drift effects between nullings are corrected using standard linear interpolation. EM drift is characterized as low.
There were strong EM signals in the area and producing EM conductivity maps were fairly straight forward. The quality of the EM data can be characterized as good.

3 DATA ACQUISITION

The survey aircraft was an Areospatiale Ecureuil SA 350 B-2. Flying speed was approximately 100 km per hour (28 meters per second). Flight lines over survey area were in directions 090/270 degrees with a line spacing of 150 m. The 5-frequency EM system and the magnetometer were enclosed in a 6-m long 'bird' suspended by cable 30 m beneath the helicopter. Nominal flying hight was 60 metres AGL.

NGU personnel responsible for data acquisition were John Olav Mogaard and Janusz Koziel. Pilot from HELITRANS ASA was Jens Fjelnset.

3.1 Magnetic measurements

A Scintrex CS-2 cesium vapor magnetometer was used. The magnetometer resolution is 0.01 nT. Sampling rate was 10 measurements per second (approximately 3 meter spacing).

A Scintrex ENVI-mag proton precession magnetometer located at Kvikne fjellhotell, was used for base station measurements. The base station magnetometer was synchronized with the helicopter-borne magnetometer to ensure proper removal of diurnal magnetic changes from the helicopter magnetic measurements. The magnetic total field at the base station was digitally recorded during flights every third second.

3.2 Electromagnetic system

The EM system used was the 5-frequency Hummingbird system made in Canada by Geotech, Ltd. The Hummingbird records data at a sampling rate of 10 measurements per second. It has two coil orientations, vertical coaxial (VCA) and horizontal coplanar (HCP). The VCA coils operate at 980 Hz and 7001 Hz. The HCP coils operate at 880 Hz, 6606 Hz, and 34133 Hz. The transmitter-receiver separation is approx. 6 m for lower frequencies and 4.2 m for 34133 Hz. The manufacturer specified noise level for each frequency is 1-2 ppm.

3.3 Navigation, altimetry, and data logging

The navigation system used was an Ashtech G12, 12 channel GPS receiver. Position accuracy using this system is better than +/- 5 m.

The navigation console was a PNAV 2001 manufactured by the Picodas Group, Ltd. of Canada. Profile line data are entered into the console and the helicopter pilot can view the traces. The pilot can see his position with respect to these predefined lines and adjust accordingly.

The helicopter is equipped with a King KRA-430 radar altimeter that measured height above ground level. The altimeter was recorded digitally and data were displayed in front of the pilot. The altimeter is accurate to 5 percent of the true flying height.

The data logging system is an integral part of the Hummingbird electromagnetic system, manufactured by Geotech, Ltd. of Canada. Data is recorded both digitally and analog.

4 PROCESSING

The data were processed at the Geological Survey of Norway in Trondheim using Geosoft processing software (Geosoft 1996, Geosoft 1997) designed for NT operating systems. Obvious inaccuracies in navigation were manually removed from the data. The datum used was WGS84 and the projection was UTM zone 32.

4.1 Standard processing

Total field magnetic data: The data were inspected flight-by-flight and any cultural anomalies were identified and manually removed. A base station correction was applied to each flight using corrections based on the diurnal measurements from the base station magnetometer at Kvikne fjellhotell. Finally a time lag of 0.5 sec (5 points) were applied to the basemag-corrected (levelled) magnetic data.

EM data: EM data were processed on a flight-by-flight basis. Zero levels and drift control for each frequency were obtained by frequent excursions 300 m AGL, usually at the end of every second flight line. A nonlinear filter was applied to all EM data to remove data spikes resulting from sferics. Before levelling, all data were mildly low passed using a 45 m filter. Noise levels for all frequencies were within an envelope of 2 ppm. Noise levels over 2 ppm occurred near powerlines. Magnetic structures having high susceptibility may produce negatively oriented in-phase anomalies. A time lag of 0.6 sec (6 points) were applied to all EM channels before plotting of data.

4.2 Map Production

Magnetic maps in scale 1: 50 000, Total magnetic field and first vertical derivative (gradient), were produced using a grid cell size of 40 x 40 metres. The contoured color maps are produced with a shaded relief of the high frequency content. Shading was from the east at 45° sun inclination above the horizon. In agreement with the clients representative, magnetic measurements outside the predefined area was kept in the magnetic maps. Flying height and profile separation may be out of specifications and as a result lower data quality. High quality data (original area) is marked with a frame on the magnetic maps.

As a standard, stacked profiles of all EM frequencies in scale 1: 50 000 were produced following standard procedures. Based on quadrature data, apparent resistivity was computed for 6606 Hz coplanar and 7001 Hz coaxial using least squares inversion and a homogeneous half space model (Geosoft 1997). In agreement with the company representative, Tony Watts, conductivity maps rather than resistivity maps were produced using 6606 Hz coplanar and 7001 Hz coaxial frequencies. A micro-leveling technique was used to remove long wavelength noise along survey lines. Grid cell size was 75 x 75 metres.

5 DATA DELIVERIES

In agreement with the clients representative, the following stand alone maps in scale 1: 50 000 are produced and delivered to the client as printed maps:

- **Map 2004.042-01**: Flight path.
- **Map 2004.042-02**: Total magnetic field.
- **Map 2004.042-03**: First vertical derivative of magnetic total field.
- **Map 2004.042-04**: EM stacked profiles 7001 Hz coaxial.
- **Map 2004.042-05**: EM stacked profiles 6606 Hz coplanar.
- **Map 2004.042-06**: EM stacked profiles 980 Hz coaxial.
- **Map 2004.042-07**: EM stacked profiles 880 Hz coplanar.
- **Map 2004.042-08**: EM stacked profiles 34133 Hz coplanar.
- **Map 2004.042-09**: EM apparent conductivity 6606 Hz coplanar.
- **Map 2004.042-10**: EM apparent conductivity 7001 Hz coaxial.

These maps are also delivered digitally on CD in Geosoft formats.

Digital magnetic an electromagnetic data in Geosoft XYZ file formats and grid files of these data are delivered on CD as described in Appendix A.

6 REFERENCES

Geosoft Inc., 1996: OASIS montaj Version 4.0 User Guide, *Geosoft Incorporated. Toronto.*

Geosoft Inc.; 1997: HEM System (Windows®95 & NT™) User Guide. *Geosoft Incorporated*

Geosoft Inc.; 2003: Microleveling Using FFT Decorrugation, Geosoft technical note

Appendix A: Data delivery formats.

Kvikne Geosoft XYZ file formats.
Final delivery on CD

File: Magnetic_final.XYZ (including tielines T10, T20 and T30)

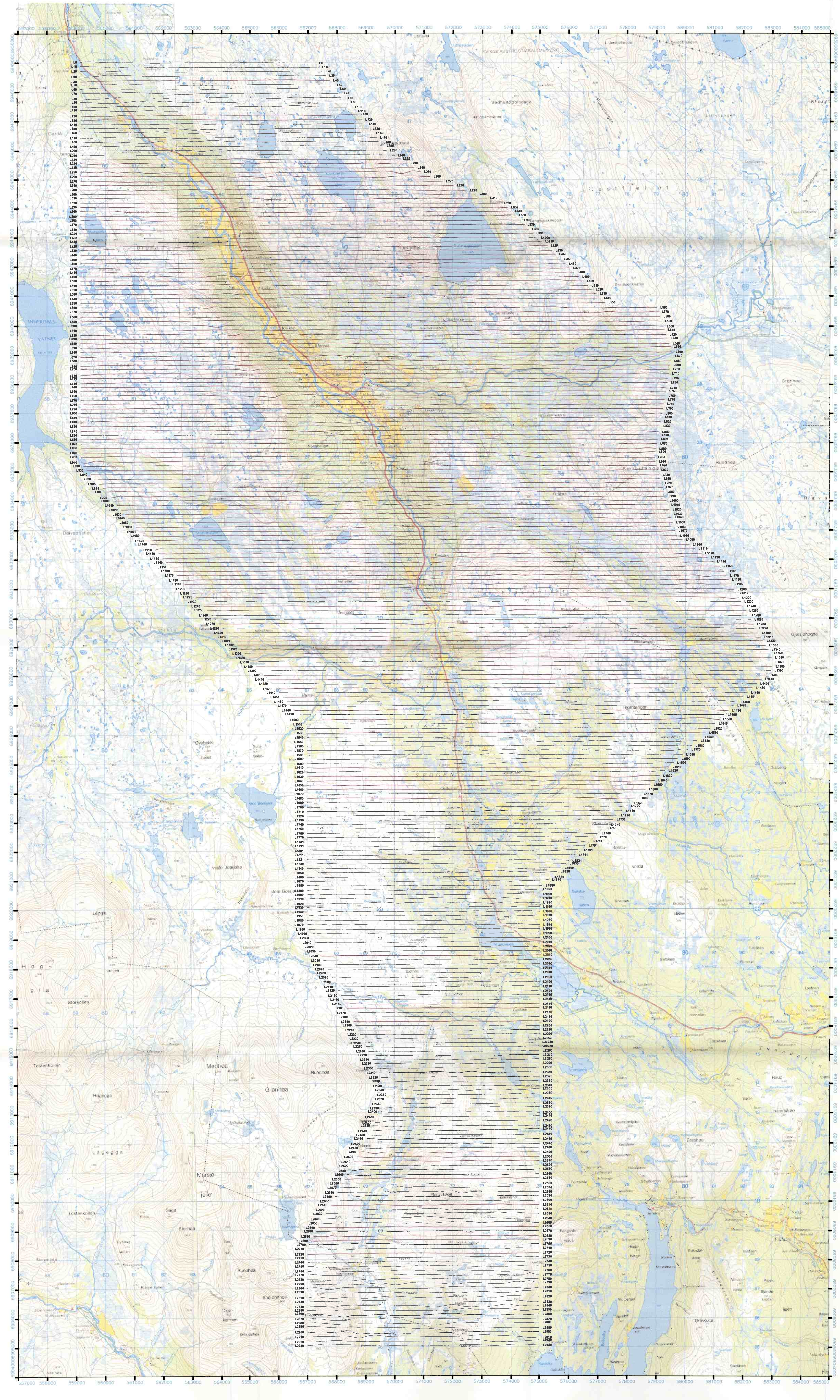
x_filt	meters	Final processed x (masked to the extended area polygon)
y_filt	meters	Final processed y (masked to the extended area polygon)
recnum		Internal record number, ordinal, per flight; incremented at 0.1 per tenth of a second
UTCtimecorr		Universal time Hours: Minutes: Seconds. decimal_seconds
mag_levl_lag	nT	Levelled and time-lagged magnetic data

File: EM_final.XYZ

x_filt	meters	Final processed x (masked to the area polygon)
y_filt	meters	Final processed y (masked to the area polygon)
recnum		Internal record number, ordinal, per flight, incremented at 0.1 per tenth of a second
UTCtimecorr		Universal time Hours: Minutes: Seconds. decimal_seconds
Raltm_birdh	meters	Processed radar altimeter data minus 30 meter
IP1_f_L_lag	ppm	Filtered, leveled and lagged inphase 7001 Hz Coaxial
Q1_f_L_lag	ppm	quadrature 7001 Hz Coaxial
IP2_f_L_lag	ppm	inphase 6606 Hz Coplanar
Q2_f_L_lag	ppm	quadrature 6606 Hz Coplanar
IP3_f_L_lag	ppm	inphase 980 Hz Coaxial
Q3_f_L_lag	ppm	quadrature 980 Hz Coaxial
IP4_f_L_lag	ppm	inphase 880 Hz Coplanar
Q4_f_L_lag	ppm	quadrature 880 Hz Coplanar
IP5_f_L_lag	ppm	inphase 33133 Hz Coplanar
Q5_f_L_lag	ppm	quadrature 33133 Hz Coplanar
res6606	ohm-m	Apparent resistivity (6606 Hz coplanar)
res7001	ohm-m	Apparent resistivity (7001 Hz coaxial)
cond6601_micro	mS/m	Apparent conductivity (6606 Hz coplanar)
cond7001_micro	mS/m	Apparent conductivity (7001 Hz coaxial)

The following Geosoft grid files are copied to the CD :

mag_lag_final.grd	Grid generated from mag_lag channel (40 m cell size)
mag_lag_final_filt_1D.grd	Calculated vertical gradient grid used in map based on the final magnetic grid file .
cond6606_micro_filt.grd	Final conductivity grid file used in map after micro-leveling and filtering 6606 Hz coplanar freq. (75 m cell size)
cond7001_micro_filt.grd	Final conductivity grid file used in map after micro-leveling and filtering 7001 Hz coaxial freq. (75 m cell size)



NGU
Geology for Society since 1858

GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

FLIGHTPATH

Kvikne

Hedemark

Drawing: *Mogaard,J.O.*	Date: *AUG 2004*	Obs: *JOM/JK*
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): *1620 III Kvikne* *1619 IV Kvikneskogen* *1520 I Einunna* *1519 II Innset*

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http://www.ngu.no

Drawing no:
2004.042-01

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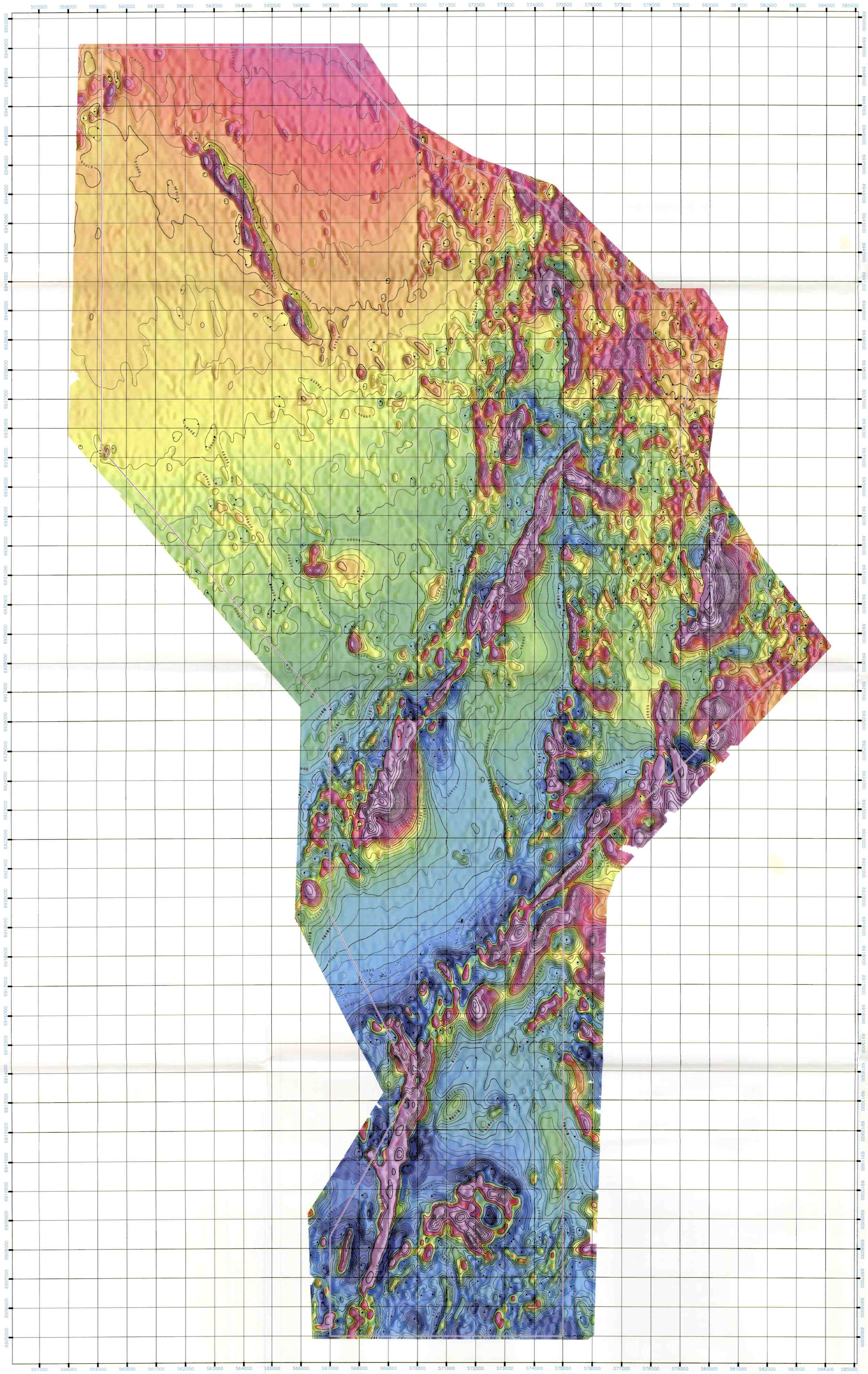

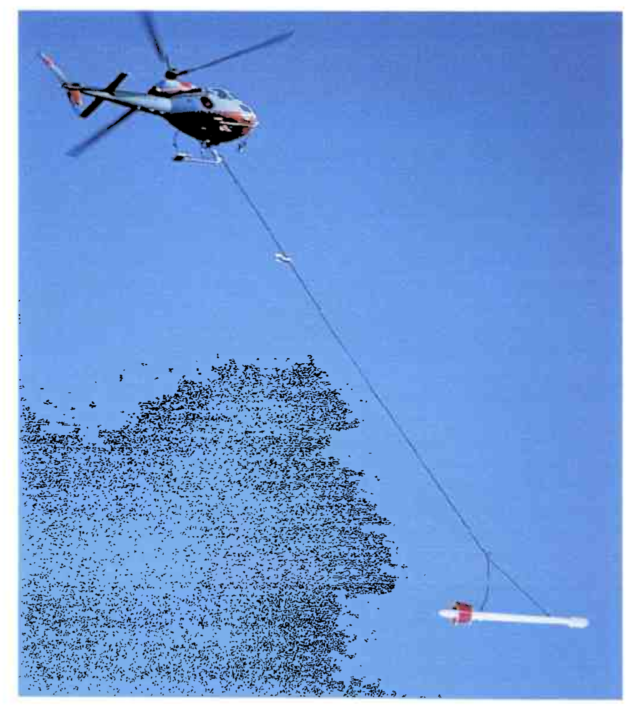

GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

nTesla

50920 50940 50951 50958 50966 50974 50979 50982 50985 50989 50992 50995 50998 51001 51005 51010 51015 51024 51057

TOTAL MAGNETIC FIELD

The intensity of the total magnetic field is in nanoTesla.

Contours given in following intervalls:

5nT
10nT
50nT
500nT

Colours - distributed after colourscale.

Data are corrected for diurnal variations using a basemagnetometer located at Kvikne fjellhotell, Kvikne.

A high sensitivity cesiummagnetometer sensor is used and nominal sensor elevation is 30 metres.

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

TOTAL MAGNETIC FIELD
Colours and contours

Kvikne
Hedemark

Drawing: Mogaard,J.O.	Date: AUG 2004	Obs: JOM/JK
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): 1620 III Kvikne 1619 IV Kvikneskogen 1520 I Einunna 1519 II Innset

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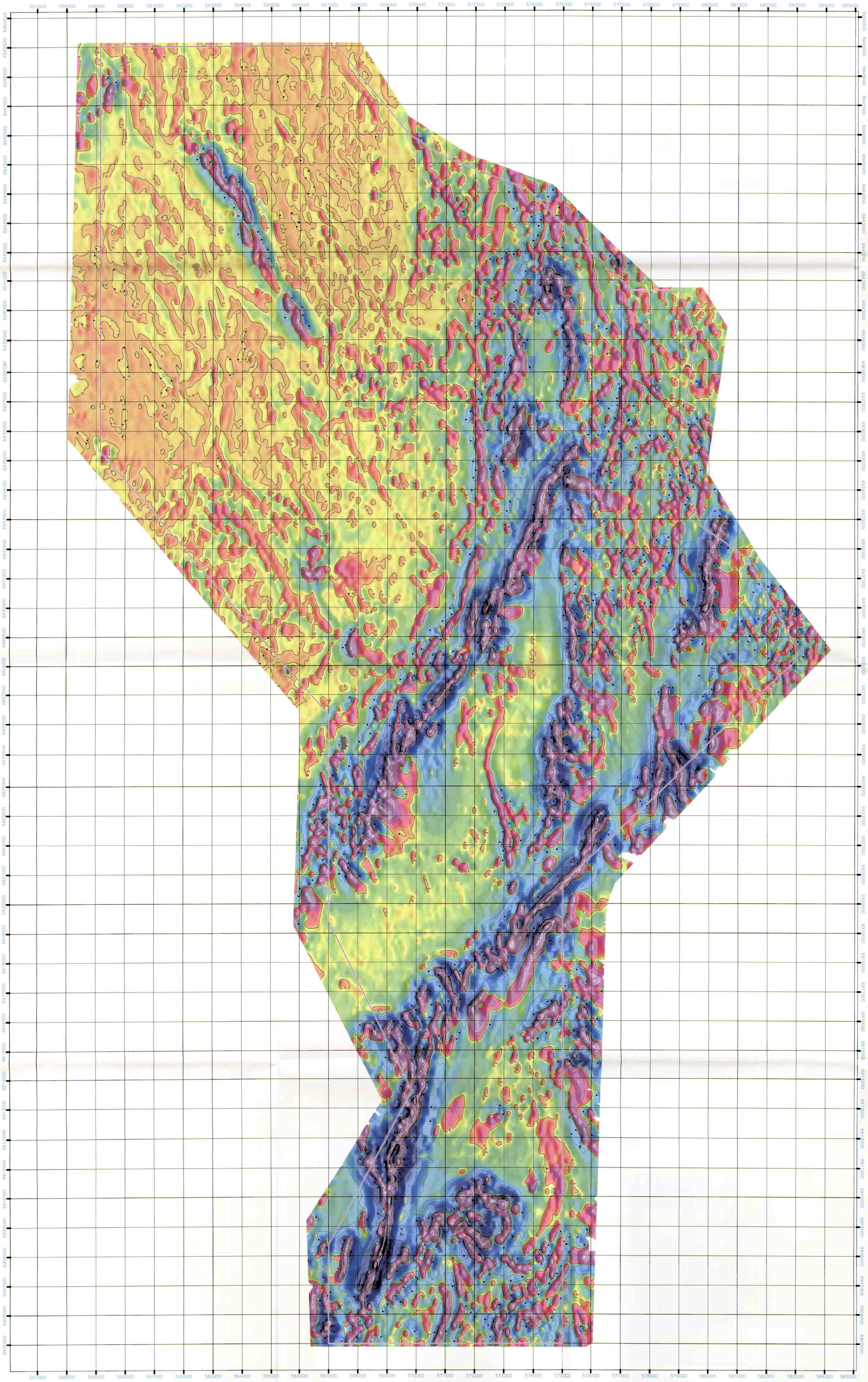
Drawing no: 2004.042-02



GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

nTesla/m

-0.3524 -0.1623 -0.1037 -0.0717 -0.0509 -0.0359 -0.0251 -0.0174 -0.0122 -0.0083 -0.0052 -0.0028 -0.0007 0.0014 0.0043 0.0113 0.0295 0.0707 0.1996

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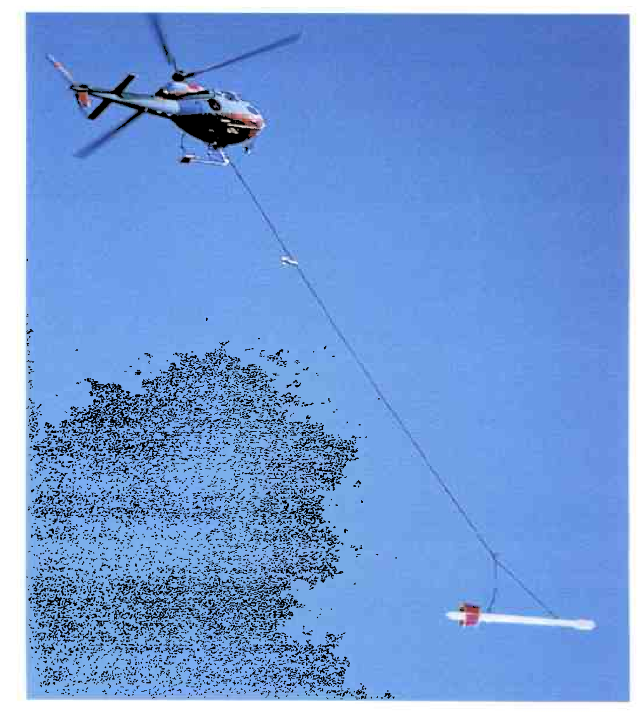
N



CALCULATED VERTICAL GRADIENT

Vertical Magnetic Gradient (in NanoTeslas per meter).
Calculated from the total field magnetics and upward continuated 25 metres.
Contours given in following intervalls:

0.1nT/m
0.5nT/m
1.0nT/m
2.0nT/m

Colours - distributed after colourscale.

Cesium high sensitivity magnetometer.
Sensor elevation - 30 metres.

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

CALCULATED VERTICAL MAGNETIC GRADIENT

Colours and contours

Kvikne

Hedemark

Drawing: *Mogaard,J.O.*	Date: *AUG 2004*	Obs: *JOM/JK*
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): *1620 III Kvikne* *1619 IV Kvikneskogen* *1520 I Elnunna* *1519 II Innset*

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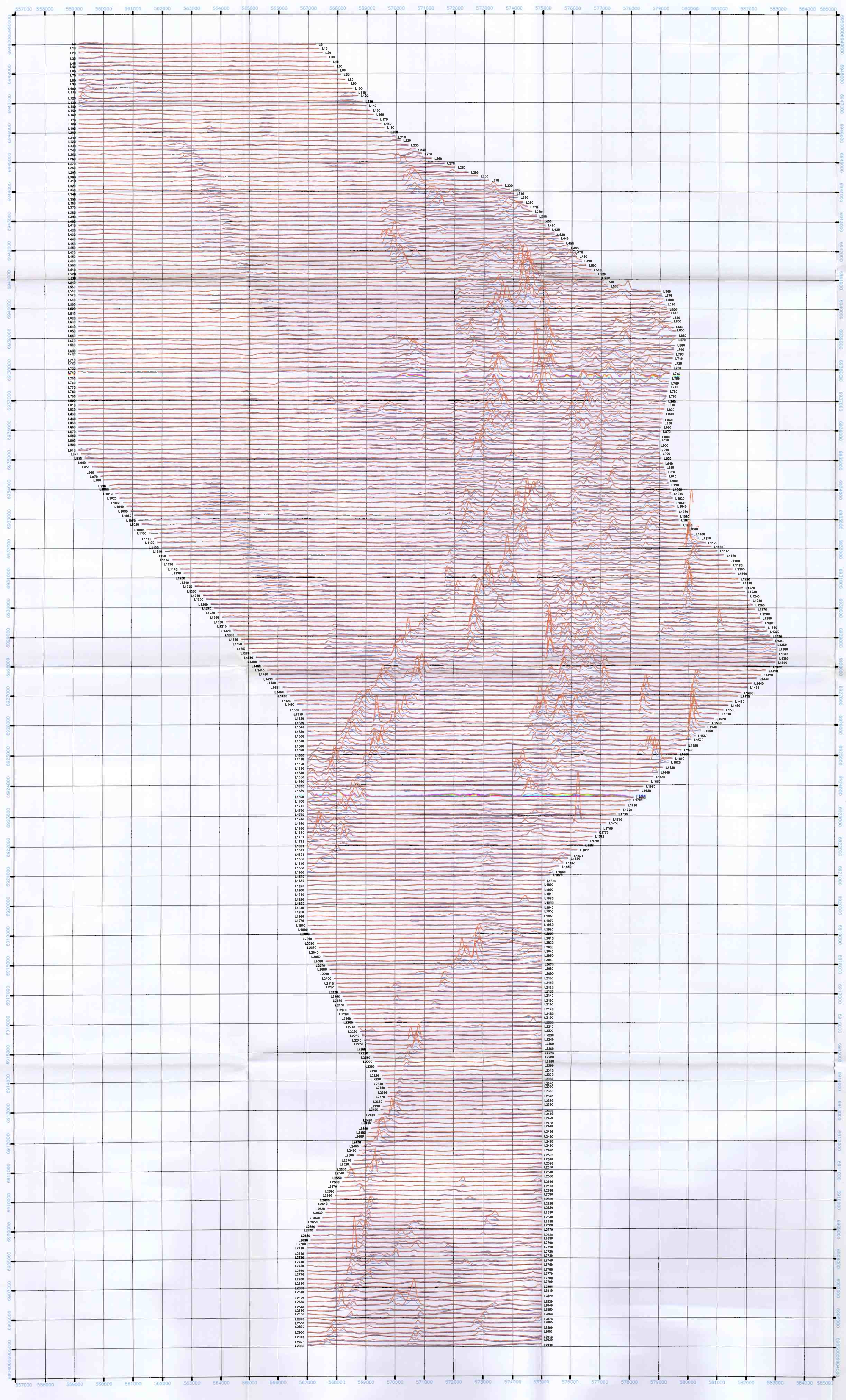
Drawing no:
2004.042-03



GEODETIC DATUM:: WGS84
CONFORM CYLINDIERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

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HEM 7001 Hz COAXIAL

Frequency : 7001 Hz (coaxial orientation)
Coil spacing : 6 m

InPhase
Quad

Inphase : 10 ppm/mm
Quadrature : 10 ppm/mm

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

HEM STACKED PROFILES 7001 Hz COAXIAL

Kvikne

Hedemark

Drawing: Mogaard,J.O.	Date: AUG 2004	Obs: JOM/JK

Scale 1:50 000

1000 0 1000 2000 3000 (metres)

Mapsheet (1:50 000):
1620 III Kvikne
1619 IV Kvikneskogen
1520 I Einunna
1519 II Innset

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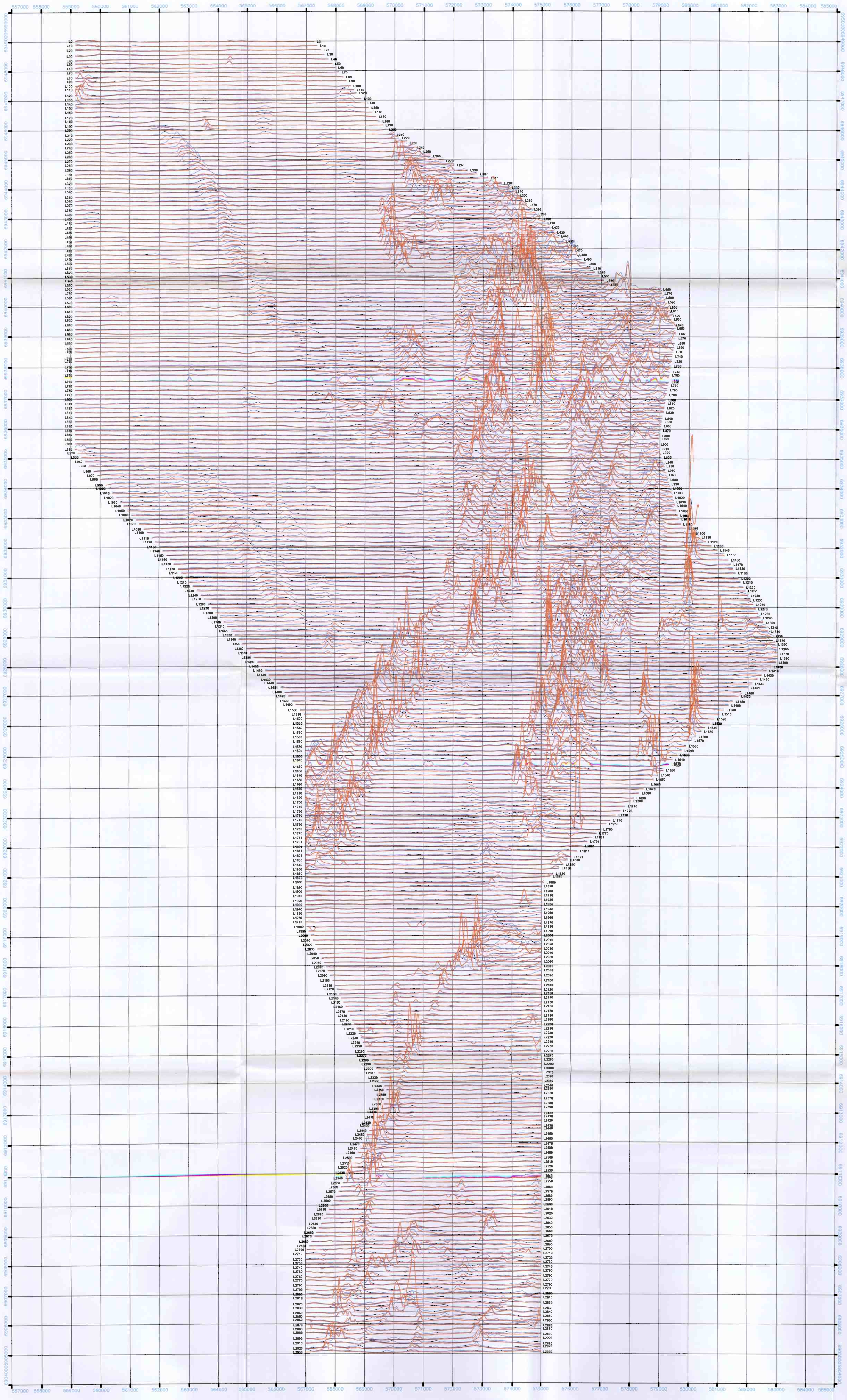
Drawing no: 2004.042-04



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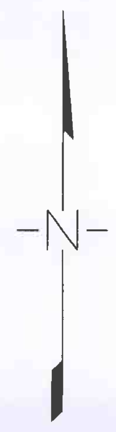

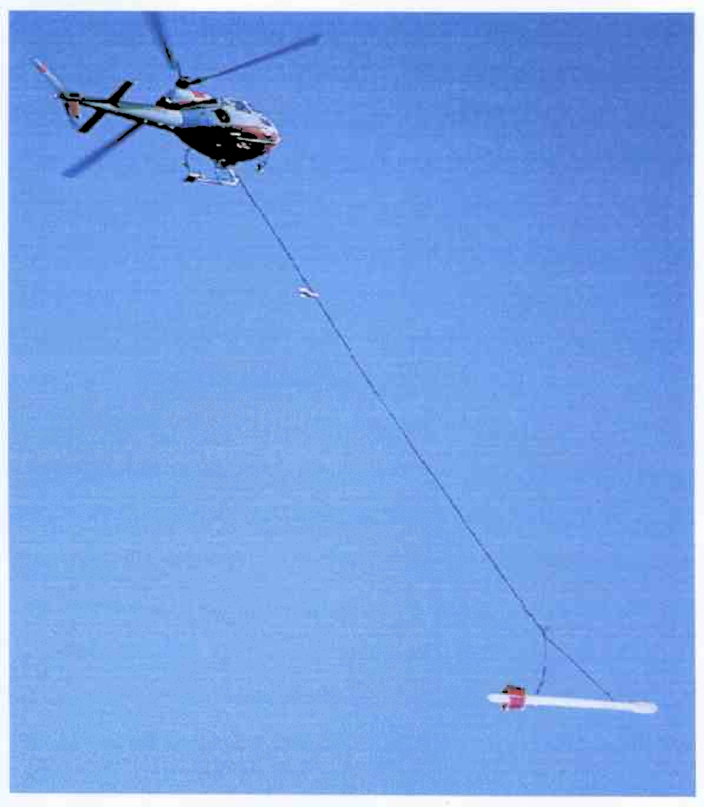

HEM 6606 Hz COPLANAR

Frequency : 6606 Hz (horizontal, coplanar orientation)
Coil spacing : 6 m

InPhase
Quad.

Inphase : 20 ppm/mm
Quadrature : 20 ppm/mm

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

HEM STACKED PROFILES 6606 Hz COPLANAR

Kvikne
Hedemark

Drawing: *Mogaard,J.O.*	Date: *AUG 2004*	Obs: *JOM/JK*
Scale 1:50 000 (1000 0 1000 2000 3000 (metres))		Mapsheet (1:50 000): *1620 III Kvikne*, *1619 IV Kvikneskogen*, *1520 I Einunna*, *1519 II Innset*

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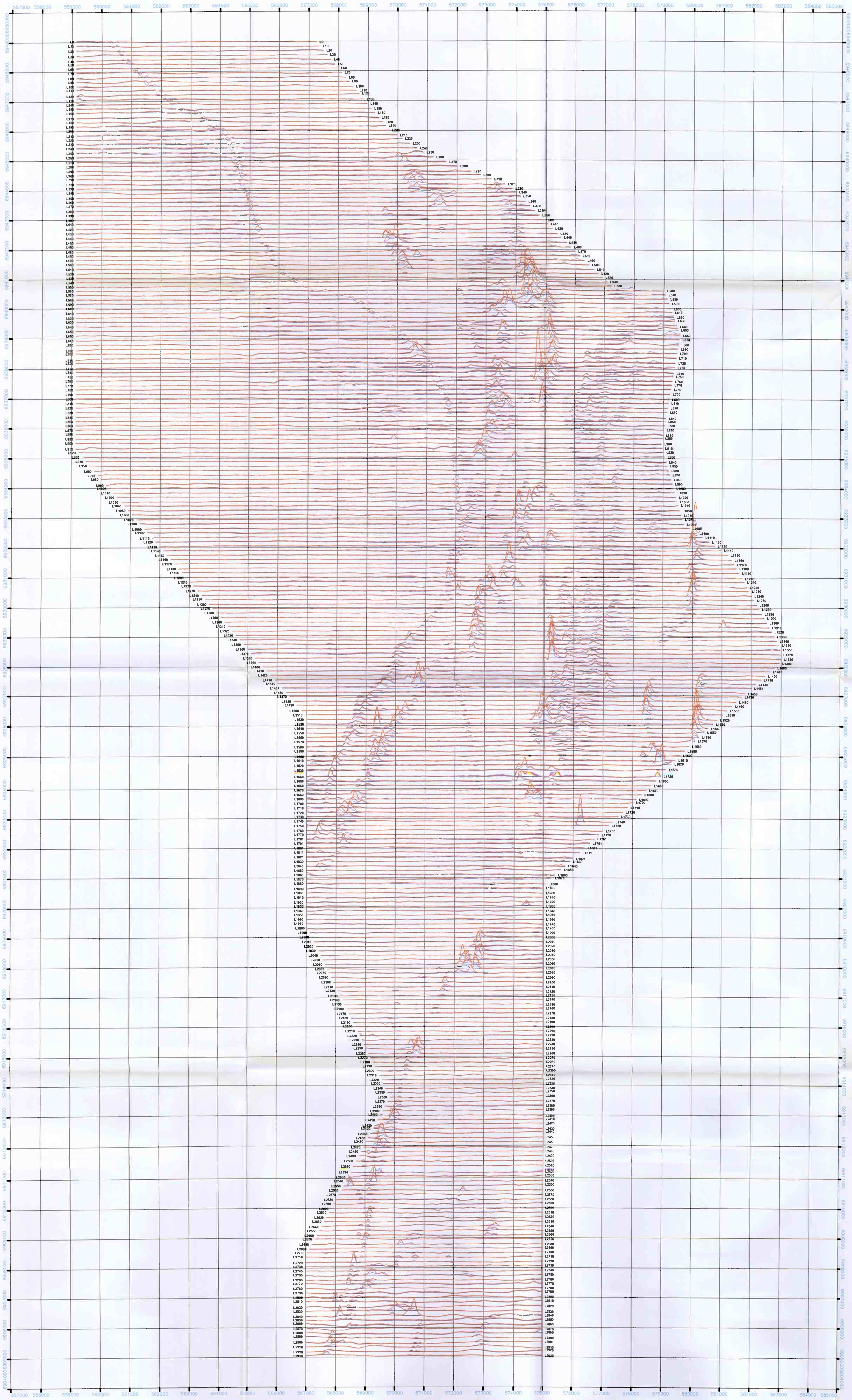
Drawing no: 2004.042-05

GEODETIC DATUM: WGS84
CONFORM CYLINDER PROJECTION
Numbers in BLUE for UTM coordinates, zone 32N



NGU

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HEM 980 Hz COAXIAL

Frequency : 980 Hz (coaxial orientation)
Coil spacing : 6 m

InPhase
Quad

Inphase : 10 ppm/mm
Quadrature : 10 ppm/mm

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

HEM STACKED PROFILES 980 Hz COAXIAL

Kvikne

Hedemark

Drawing: Mogaard,J.O.	Date: AUG 2004	Obs: JOM/JK
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): 1620 III Kvikne 1619 IV Kvikneskogen 1520 I Einunna 1519 II Innset

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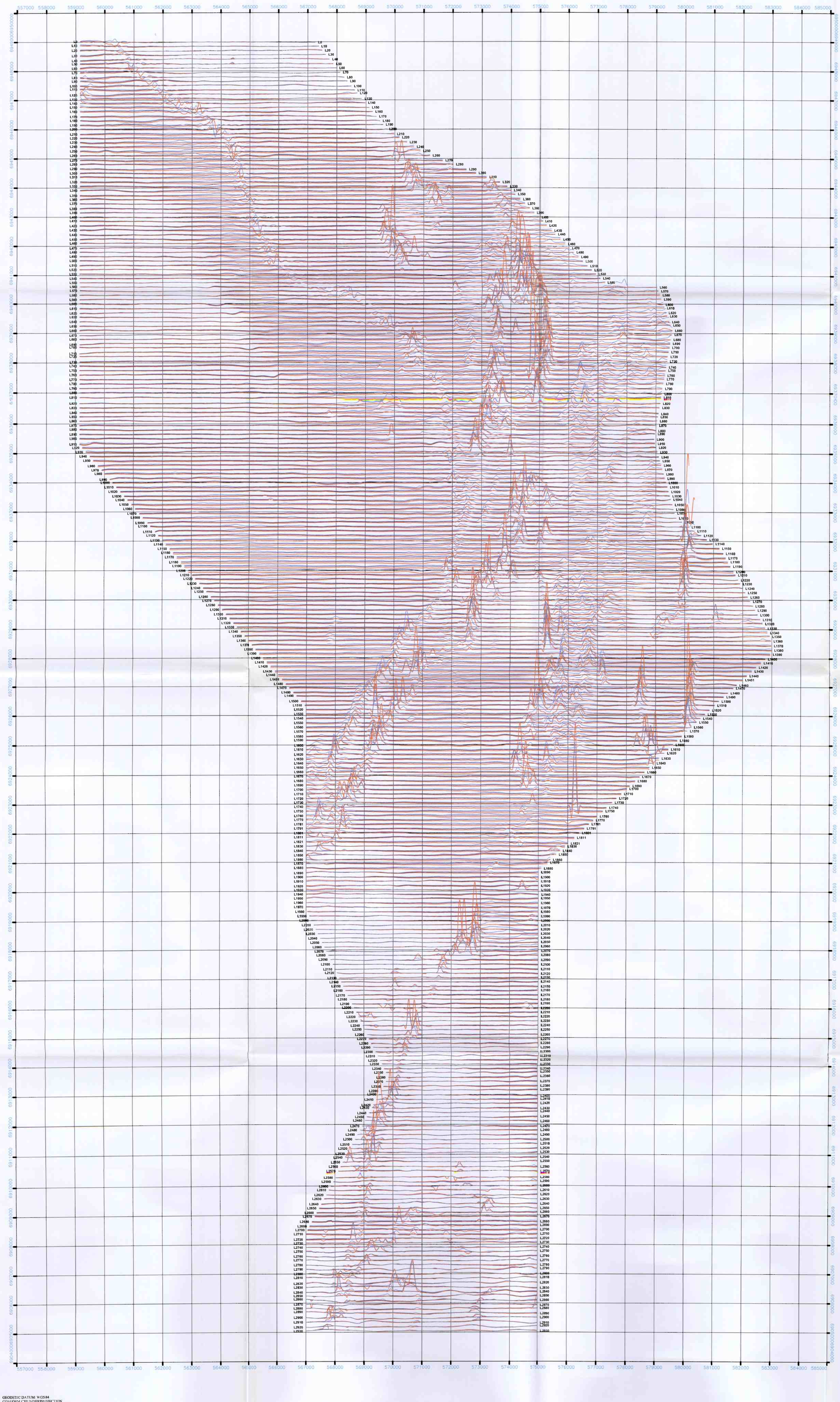
Drawing no: **2004.042-06**

GEODETIC DATUM: WGS84
CONFORM CYLINDER PROJECTION
Numbers in BLUE for UTM coordinates, zone 32N



N

HEM 880 Hz COPLANAR

Frequency : 880 Hz (horizontal, coplanar orientation)
Coil spacing : 6 m

InPhase
Quad.

Inphase : 20 ppm/mm
Quadrature : 20 ppm/mm

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

HEM STACKED PROFILES 880 Hz COPLANAR

Kvikne

Hedemark

Drawing: *Mogaard,J.O.*	Date: *AUG 2004*	Obs: *JOM/JK*
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): *1620 III Kvikne* *1619 IV Kvikneskogen* *1520 I Einunna* *1519 II Innset*

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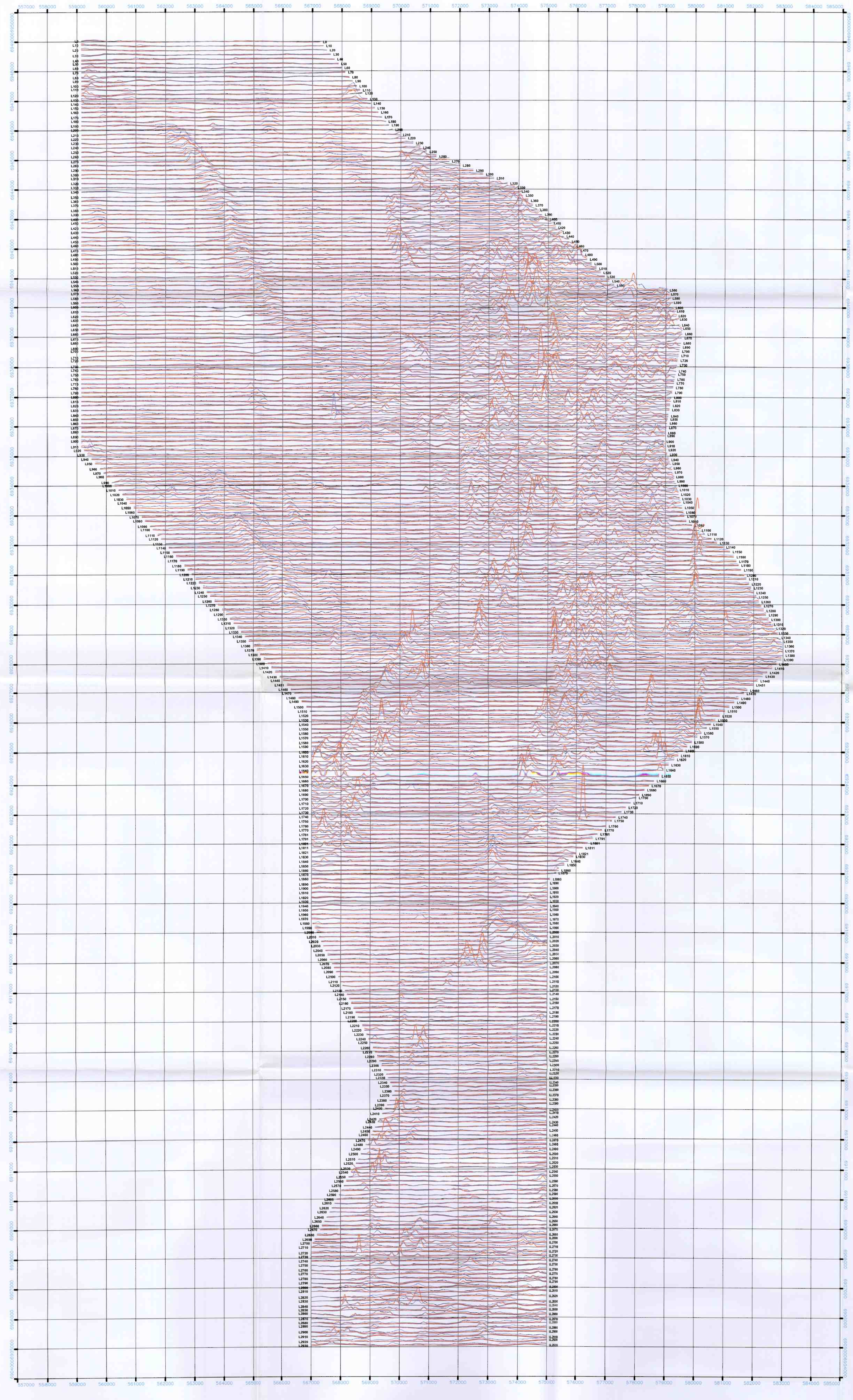
Drawing no: 2004.042-07

GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N



GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

Geology for Society since 1858

HEM 34133 Hz COPLANAR

Frequency : 34133 Hz (horizontal, coplanar orientation)
Coil spacing : 4.2 m

InPhase
Quad

Inphase : 40 ppm/mm
Quadrature : 40 ppm/mm

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

HEM STACKED PROFILES 34133 Hz COPLANAR

Kvikne

Hedemark

Drawing: Mogaard,J.O.	Date: AUG 2004	Obs: JOM/JK
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): 1620 III Kvikne 1619 IV Kvikneskogen 1520 I Einunna 1519 II Innset

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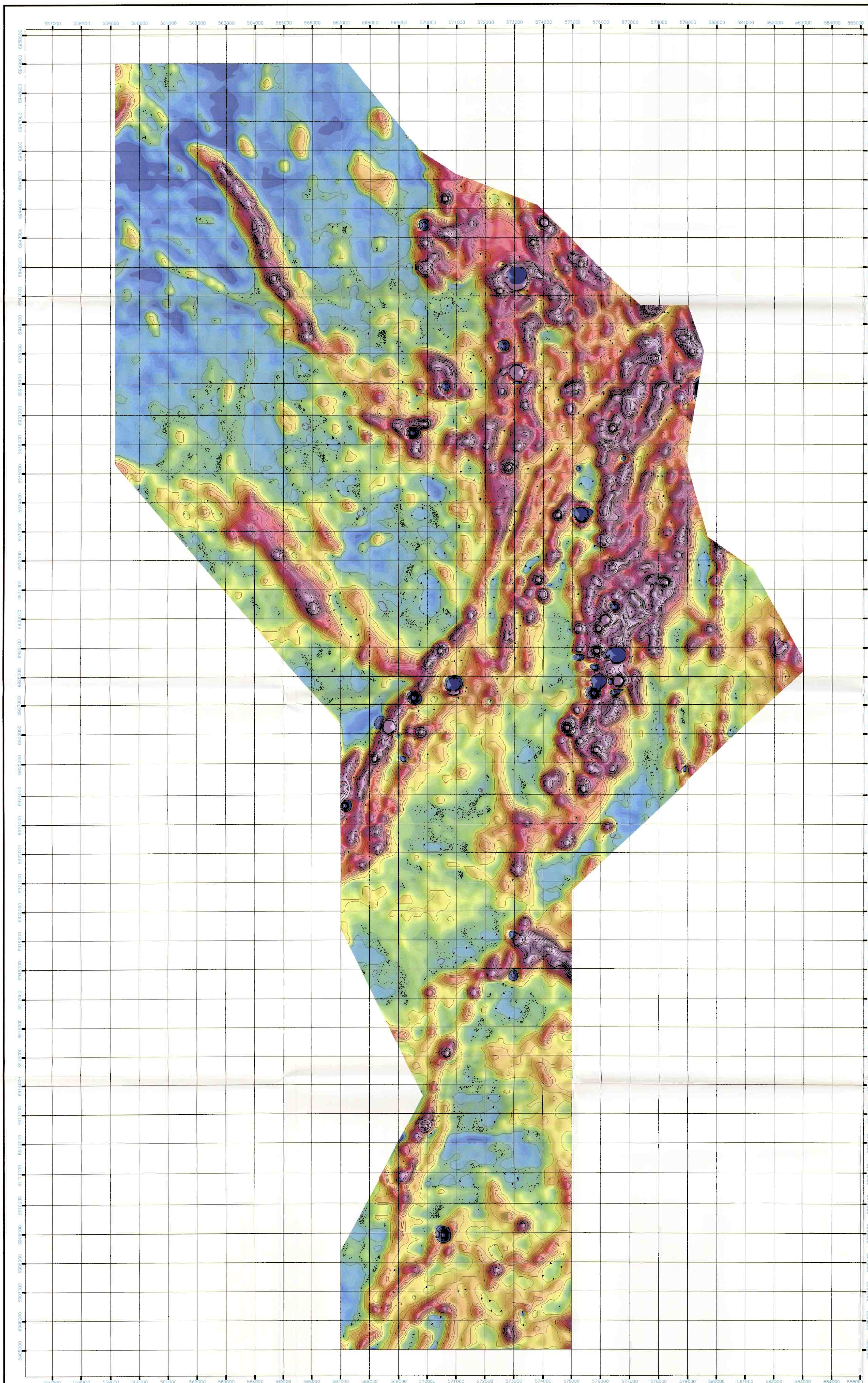
Drawing no:
2004.042-08



GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

NGU
Geology for Society since 1858

N

APPARENT CONDUCTIVITY

Calculated from 6606 horizontal coplanar response.

Contours: given in following intervalls (mS/m)

0.2
1.0
2.0
5.0

Colours - distributed after colourscale.

Sensor elevation - 30 meters.

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

A/S SULFIDMALM

EM APPARENT CONDUCTIVITY 6606 Hz H. COPLANAR
Colours and contours

Kvikne

Hedemark

Drawing: Mogaard,J.O.	Date: AUG 2004	Obs: JOM/JK
Scale 1:50 000 1000 0 1000 2000 3000 (metres)		Mapsheet (1:50 000): 1620 III Kvikne 1619 IV Kvikneskogen 1520 I Einunna 1519 II Innset

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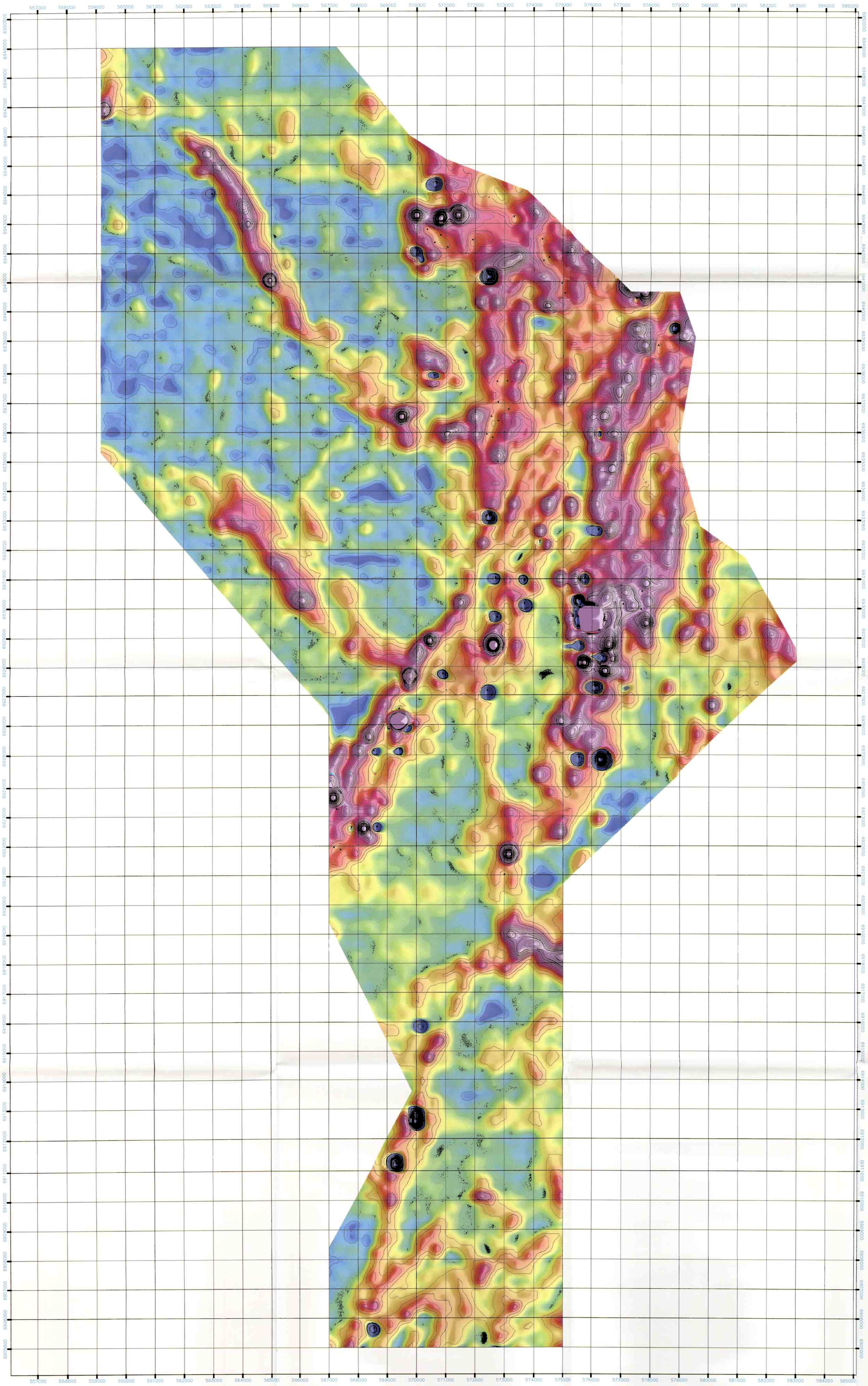
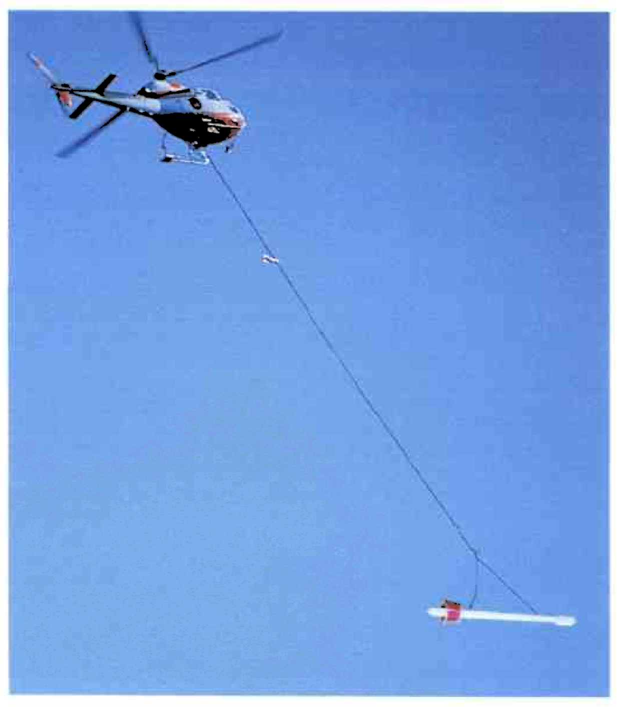
Drawing no:
2004.042-09

Geology for Society since 1858





APPARENT CONDUCTIVITY

Calculated from 7001 coaxial response.

Contours: given in following intervalls (mS/m)

0.2
1.0
2.0
5.0

Colours - distributed after colourscale.

Sensor elevation - 30 meters.

NAVIGATION

The entire area was covered by GPS navigation.

The nominal flying height above ground level in the area is 60 metres.

GEODETIC DATUM: WGS84
CONFORM CYLINDERPROJECTION
Numbers in BLUE for UTM coordinates, zone 32N

mS/m

0.0836 0.1086 0.1335 0.1584 0.1835 0.2102 0.2369 0.2637 0.2974 0.3459 0.4049 0.4980 0.6343 0.8175 1.0627 1.3743 1.8267 2.4358 3.5564

A/S SULFIDMALM

EM APPARENT CONDUCTIVITY 7001 Hz COAXIAL

Colours and contours

Kvikne

Hedemark

Drawing: Mogaard,J.O.	Date: AUG 2004	Obs: JOM/JK

Scale 1:50 000

1000 0 1000 2000 3000

(metres)

Mapsheet (1:50 000):
1620 III Kvikne
1619 IV Kvikneskogen
1520 I Elnunna
1519 II Innset

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http://www.ngu.no

Drawing no:
2004.042-10

APPENDIX B

Ground follow-up of an Airborne EM survey Vakkerlien Area Norway

Falconbridge Limited
Queen's Quay Terminal
Suite 800, 207 Queen's Quay West
Toronto, Ontario

Jean Laforest
November 2, 2004

Summary

From June 28th, 2004 to July 19th, 2004, a two person team (Jean Laforest and Yannick Beaudoin) performed a ground based follow-up of anomalies identified in the context of an airborne electromagnetic survey (AEM) flown over the Vakkerlien area, Norway.

43 EM anomalies were located and traced on the ground. The geological cause for these anomalies was positively identified in 85% of cases.

The majority of anomalies are caused by a variety of pelitic gneisses containing stratiform pyrrhotite-pyrite layers, iron-oxide, -sulfide formations and graphitic sediment units.

Compilation work is recommended for the Kaltberget showing area. Compilation and modelisation of drillholes, magnetic inversion and a UTEM survey are recommended over a group of high mag anomalies South of the Vakkerlien Deposit.

Introduction

From June 28th, 2004 to July 19th, 2004, a two person team (Jean Laforest and Yannick Beaudoin) performed a ground based follow up of anomalies identified in the context of an airborne electromagnetic survey (AEM) flown over the Vakkerlien area, Norway.

Work done and methodology

Ground truthing of EM anomalies is accomplished by a two person team. The team travels to the geographical coordinates of the anomaly using a standard GPS. The conductor axis is located and flagged by the VLF operator while tuned to an appropriate frequency. An experienced operator can therefore trace out on the ground a conductor axis with 1 to 2 m precision. Afterwards the Beep-mat operator surveys the anomaly by covering the ground between the flags. If the conductor is within less than 1m from the surface, it will be detected by the Beep-mat. The best Beep-mat response is investigated by digging a hole until the conductor is exposed. A sample is collected when the mineralization is worthwhile. When no Beep-mat response is detected, the surrounding outcrops are examined in the context of potential mineralizing environments (ultramafic rocks, felsic rocks, alteration, sediments, etc…).

Accumulated results are used to regularly re-prioritize the targets by studying the profiles of the airborne survey using Geosoft's Oasis Montaj software package.

Instruments used include the Geonics VLF EM-16 and the Beep-mat by Instrumentation GDD. In resistive terrain, the VLF allows for the detection of conductors to a depth equivalent to that obtained by most frequency domain airborne EM systems. The elevated operating frequency of the VLF allows for the relatively easy detection of conductors even if they are weak. On the other hand, the VLF method is dependant on the orientation of the primary field. The Beep-mat is essentially a portable electromagnetic device that reproduces the operating principals of a frequency domain airborne EM system. It's investigation depth is in the order of 1 to 1.5 m.

VLF frequencies used during the survey were : NAA-Maine (24.0kHz, Azimuth 090), NPM-Hawai (21.4 kHz, Azimuth 180) and JXZ-Norway (16.4 kHz, azimuth 040).

For more details on instrument specifications, see Appendix 1.

In addition to EM anomaly follow-up, a number of areas were selected for traditional prospecting. The selection of these areas was based on one or more of the following characteristics: high magnetic signature, presence of ultramafics, presence of historical showings and presence of stream sediment anomalies from past surveys.

The sub-economic Vakkerlien deposit does not present an airborne EM anomaly despite the presence of a strong VLF anomaly detected on the ground. For this reason, the follow up of VLF anomalies detected during a 1979 Sulfidmalm airborne survey was also completed at the end of the current campaign. This follow up was conducted in the general area of the Vakkerlien showing.

Results

Airborne EM ground follow-up

Based on recommendations by project geophysisist Anthony Watts and by project geologist Patti Tirschmann, 43 EM anomalies were selected and visited. The causes of 37 of these anomalies were positively identified in the field. See Appendix 2 for a summary table of the visited EM anomalies and maps #1 and #2 for locations. See Appendix 3 for sample locations and geochemical results.

The majority of the visited anomalies were caused by pelitic gneisses containing stratiform pyrrhotite-pyrite bands, oxide, sulfide-oxide and silicate-sulfide iron formations and graphitic gneisses. The anomalies for which the cause was not identified were concealed under bogs, lakes or thick overburden.

Only EM anomalies #25 and #4 have reported anomalous assay results. Anomaly #25 is a 2 kilometer long conductor located in the NW corner of the survey. The conductor had been previously followed-up with at least 7 blasted trenches and pits spread over the entire length of the conductor. All of the trenches expose various types of sulfide bearing metasediments. Sample PG01408 reported an anomalous value of 210ppb palladium. Anomaly #4 is located near the Olkar showing and is described in a latter section of the report. Sample PG01403 was collected at the site of the past producing Rostvangen Mine. It was collected to test for the presence of nickel. The massive sulfide sample reported grades of <0.05%Ni, 4.91%Cu, 0.32%Zn and 22.9g/t Ag. The cause of anomaly #30 was not identified due to heavy overburden although the casing for an old drill hole was located. It was tagged as hole NM161 1975 TB1 and was drilled vertically over the anomaly.

More than 50% of anomalies visited showed signs of previous work done by other companies or prospectors. These workings consisted of manual stripping, blasting, trenching and in some cases drilling. The frequency of workings found on geophysical anomalies often hidden by overburden shows that the region has previously been the subject of geophysical surveys and of extensive ground follow up prior to the current campaign. As work progressed from high conductivity targets to lower priority ones, the occurrence of past follow-up work became less frequent.

1979 airborne VLF anomaly follow-up

The follow-up of VLF anomalies from a 1979 airborne survey did not produce any new showing. Outside the Vakkerlien deposit, the VLF anomalies were extremely weak and hard to pinpoint on the ground. They were covered by thick overburden in most cases. Old grid pickets were found over 5 of the 11 anomalies visited.

Traditional prospecting

Please refer to map 3 for locations of prospected areas.

South-East Vakkerlien Mag anomaly

Boulders of an altered, slightly magnetic ultramafic rock were found over a mag anomaly, 1700m SSE of Vakkerlien deposit. A whole rock sample (PG01441) confirms the ultramafic composition of the boulders. Other boulders of mafic intrusive (melanogabbro) were located in an area of 100m x 100m and are also believed to be derived locally. These boulders are the probable cause of the magnetic anomaly.

Orkla Mag anomaly

This anomaly was visited during the investigation of a weak AEM conductor located in the area. The immediate cause of the conductor was not seen in the field but a thick sequence of rusty metasediments was located in the bed of the Orkla River, on strike with the southern extension of the EM anomaly. The cause of the mag high was not found even if exposure was good in the beds of two creeks flowing down to the main river valley. As the rock units are shallow dipping (metasediments), the cause of the mag anomaly is probably concealed under a veneer of metasediments.

Kletten ultramafic

The North-South trending Kletten ultramafic body measures 1600m x 125m. The intrusion is well exposed on a ridge and in an old stone quarry. 1 to 2% disseminated pyrrhotite was seen near the southern end of the intrusion and locally along the west contact. Samples collected were not anomalous in nickel.

A stream sediment geochemical anomaly was followed-up near the southern end of the Kletten intrusion. Stream banks were prospected all the way to the head of the anomaly. The cause of the anomaly was not explained.

Kobberverk discordant mag anomaly

A discordant mag anomaly was prospected South of the Kobberverk mine. Cause of the anomaly was not explained despite good exposure.

Sottdalen stream sediment anomaly

Parts of a wide area showing a group of strong nickel anomalies in stream sediments was prospected. A number of conductors and mineralized occurences were found near the apparent head of the anomaly but none of them reported nickel values. These occurences consisted of semi-massive pyrite and pyrrhotite bands in metasediments and felsic gneisses (PG01433, PG01434, PG01437), an amphibolite containing 1% disseminated pyrrhotite (PG01435) and 3-5% disseminated pyrrhotite with traces of chalcopyrite in a graphitic metasediment (PG01436). However, outcrops of metamorphised mafic volcanics were much more numerous in the area than elsewhere on the survey. This mafic volcanic terrain, opposed to the more sediment rich areas around might explain part of the anomaly.

Kaltberget showing

The Kaltberget showing is located on the western slope of the Kaltberget hill. There, a 8m thick gabbro unit trending 076 and dipping 024 degrees into the hillside shows an old excavation following its sheared base. A sample (PG01431) selected from the debris pile in front of the excavation reported a grade of 0.46%Ni. A sample (PG01451) taken from a pyroxenite outcrop located 100m North of the pit and showing up to 20% disseminated po and cp reported grades of 0.75%Ni, 0.38%Cu and 180ppb Pt. The mineralization is patchy and covers a 1*2m area. On the same outcrop, composition of the intrusive varies from melanogabbro to ultramafic over short distances. An ultramafic boulder taken from a creek bed 80m North of sample PG01451 showed 15% disseminated po and cp. This sample (PG01432) reported grades of 1,55%Ni, 1,11%Cu, 290ppb Pt and 290ppb Pd. The calculated Ni% content in massive sulfide is highly variable, going from 1.59% for sample PG01451 to 6.54% for sample PG01431.

Prospecting has outlined the mafic intrusive for a strike length of 200m. The intrusive shows a complex geometry and might be displaced by faults. Five casings were located over a 200m long area near the showing. Most were vertical holes and one was oriented Az 080/-70 degrees. They were drilled from a plateau located on top of the shallow dipping intrusive.

Garsdjoen ultramafic

On the site of the presumed Gardsjoen ultramafic is an old trench exposing a metasediment in contact with an intermediate intrusion. Both the intrusion and the metasediments show pods and veins of semi-massive pyrrhotite and pyrite with trace to 5% chalcopyrite. A selected sample (PG01444) reported anomalous grades of 0.23%Ni, 1.72%Cu and 60ppb Pd. The calculated Ni% content in massive sulfide is 0.49%. No ultramafic was seen in the area but obviously, the anomalous nickel and palladium content of the sulfide veins point to a magmatic source for the sulfides.

Olkar showing

Old workings were located on both shores of the Orkla River. On the Western shore, a pile of rubble showing various metasediment types and semi-massive pyrrhotite and pyrite veins and pods seems to have originated from mining of a shallow dipping mineralized layer previously exposed on surface. Samples (PG01422, PG01423) selected from the debris pile reported grades of 1.4%Ni and up to 4.83%Cu. The copper rich sample also reported 820ppb platinum. On the Eastern shore, amphibole rich, shallow dipping metasediments (see whole rock PG01442) contains 1-3% disseminated py-po. Sample PG01420, taken in the metasediments reported a grade of 0.16%Cu and no nickel. A vertical pit (at least 15m deep) is located on a hill 50m East of the River and seems to have been dug to intersect this mineralisation.

VLF and Beep-mat follow-up of airborne EM anomaly #4 reported a zone of py-po-cp veinlets in a metasediment. This area is located 150m NNW of the old pit. Sample PG01443 reported grades of 0,62%Ni, 0,53%Cu and 80ppb Pd. There was no trace of previous work near at this new occurrence. The occurence was covered by 0.6m of overburden.

The calculated Ni% content in massive sulfide from all of the anomalous Olkar samples varies from 1.25% to 1.92%.

Conclusions and recommendations

The airborne EM follow-up work identified the majority of conductors investigated as being of no interest for nickel exploration. However, data and samples gathered in the field outlined 4 areas of interest. Work is recommended on 2 of these.

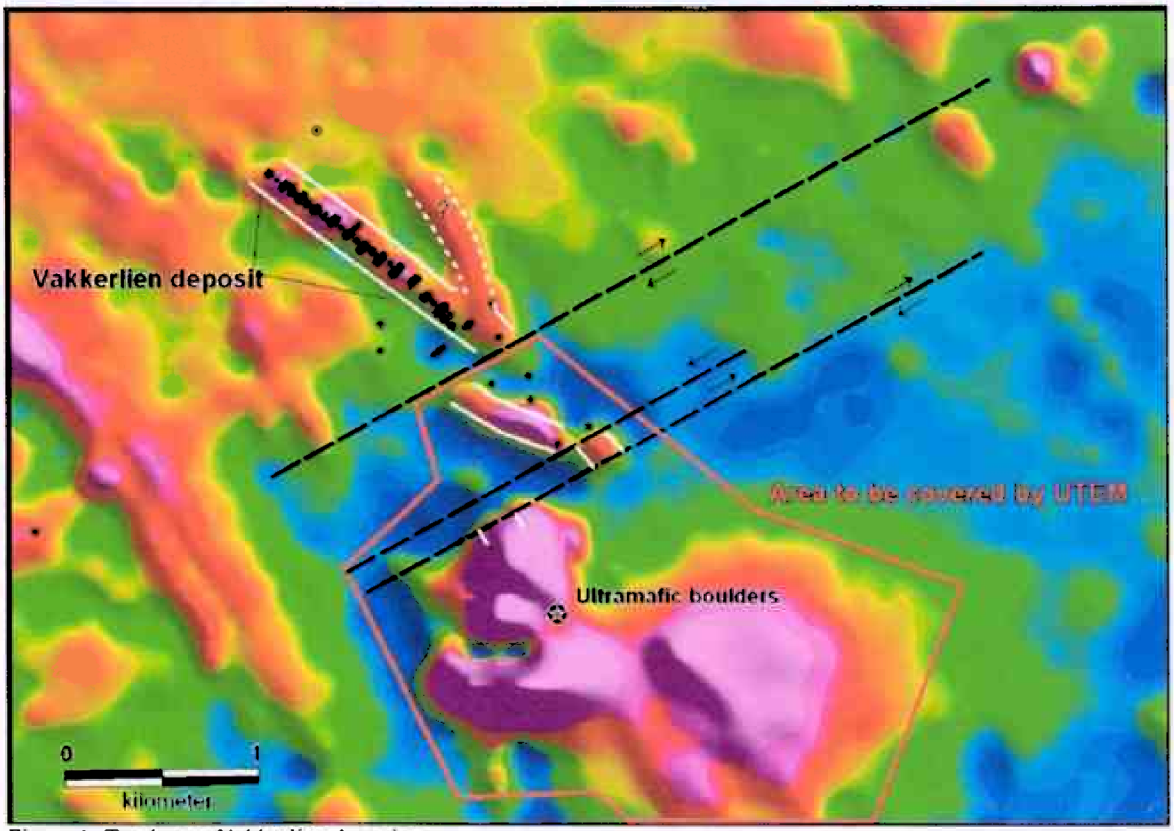


Figure 1: Total mag, Vakkerlien deposit area

Vakkerlien area

Past work on the Vakkerlien deposit defined a feeder dyke of tube hosted type of deposit. The pencil shape body has been traced for 1250m down plunge. The body is exposed on surface at its NW end and is cut by a trondhjemite body at a depth of 60m, at its SE end.

The airborne mag survey shows clearly the trace of the host dyke (see fig. 1). Its SE end seems to be offset by ENE structures. Before the faulting, the linear mag was probably continuous all the way to a group of prominent circular high mags located 1700m SSE of Vakkerlien deposit. Over the circular mag anomaly, outcrops are scarce and mostly composed of trondjhemite but recent prospecting uncovered ultramafic and mafic boulders of local derivation. The circular mag anomaly is thus believed to be caused by one or several mafic-ultramafic intrusions.

If magma was flowing in the system in a SE direction, the locus of the intersection of the mineralized dyke into the circular intrusion would make an outstanding Ovoid type target.

To test for this possibility, compilation of the drill holes done near the SE end of the Vakkerlien deposit should be done to assess the cause of the linear magnetic anomaly past the South East end of the deposit limits. An inversion of the magnetic field data should also be done over the circular mag anomalies to get an idea of the attitude of the intrusions and finally the entire area should be covered by a deep penetrating, fixed loop EM method. The inversion could probably help in designing the survey parameters of the fixed loop EM survey (in-loop versus out-of-loop surveying).

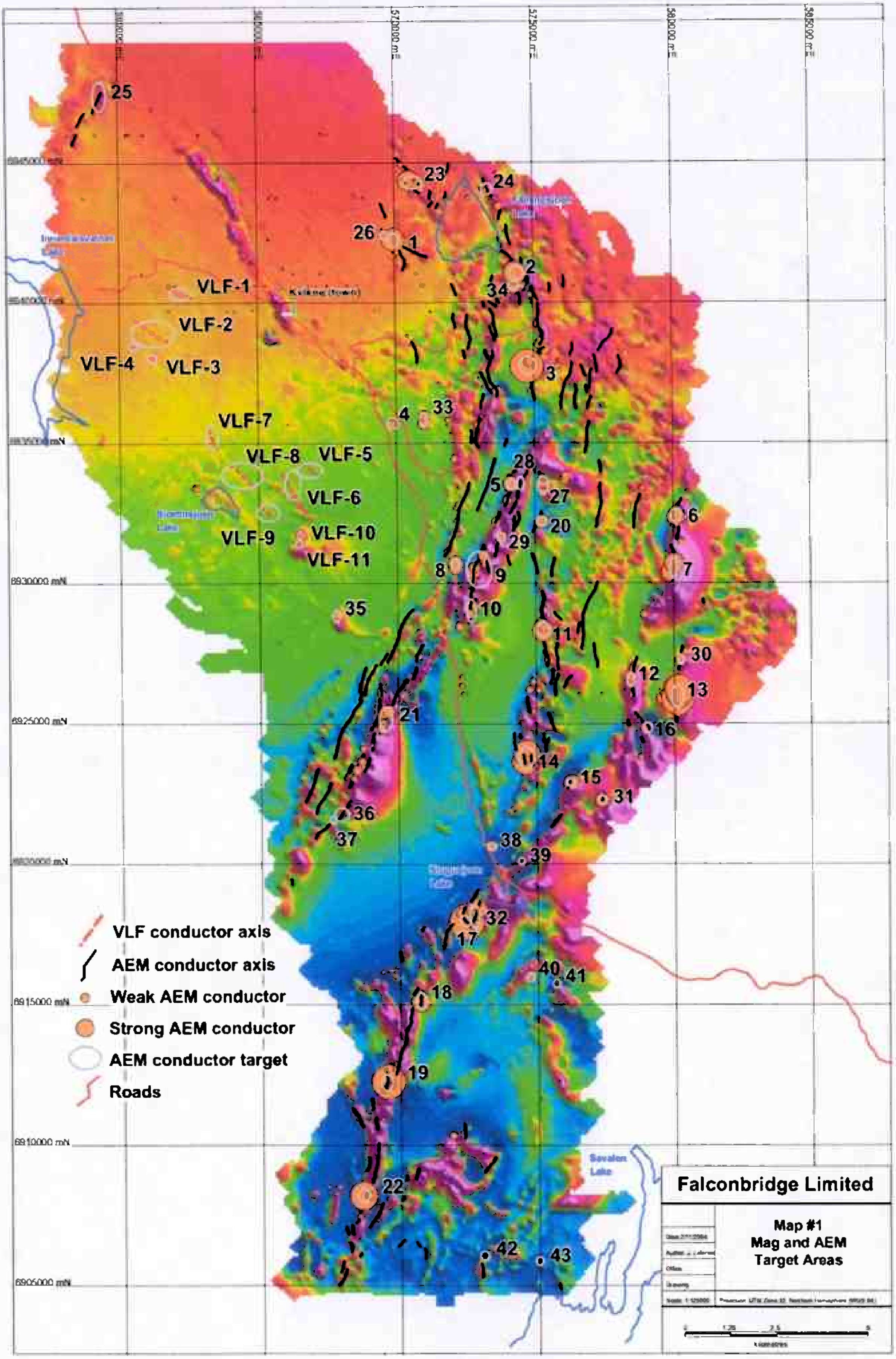
Kaltberget area

Two out of three samples from the Kaltberget showing area reported interesting nickel grades when recalculated to 100% sulfides. At first view, the host intrusion seems small but its complex geometry could be misleading and its various changes of composition for such a seamingly small intrusion could indicate some degree of complexity in its history (turbulence? magma mixing?).

Evidences of a fair amount of work (old pit and at least 5 drill holes) were seen in the field. If records still exist, a thorough compilation of this work should be done prior to any supplemental field work.

Olkar and Gardsjoen areas

At both Olkar and Gardsjoen, veins of pyrrhotite-chalcopyrite show anomalous nickel, copper, cobalt and PGE grades without the presence of mafic-ultramafic intrusions nearby. The geological units in both area are shallow dipping to flat. This attitude makes it easy to imagine a concealed intrusion under a thin veneer of metasediments or one that has been eroded away, as a source for the sulfides. Nevertheless, the possibility to find an economical orebody in such a context is low. At both area, the nickel tenor calculated for 100% sulfide is low and the veins themselves are not a viable target. No supplementary work is recommended for these two areas.



Falconbridge Limited
Map #1
Mag and AEM
Target Areas
VLF conductor axis
AEM conductor axis
Weak AEM conductor
Strong AEM conductor
AEM conductor target
Roads
VLF-1
VLF-2
VLF-3
VLF-4
VLF-5
VLF-6
VLF-7
VLF-8
VLF-9
VLF-10
VLF-11
1
2
3
4
5
6
7
8
9
10
11
12
13
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25
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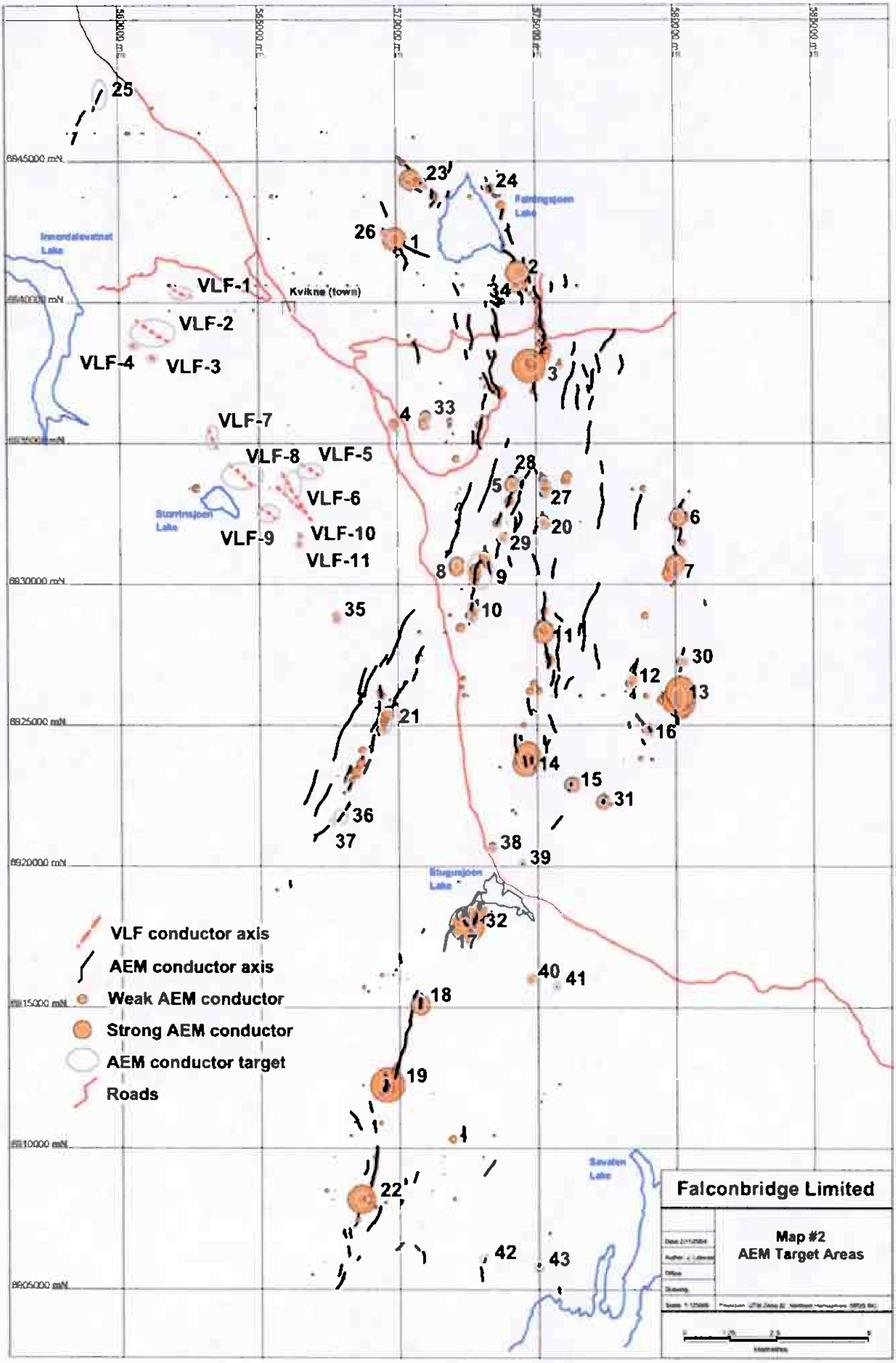
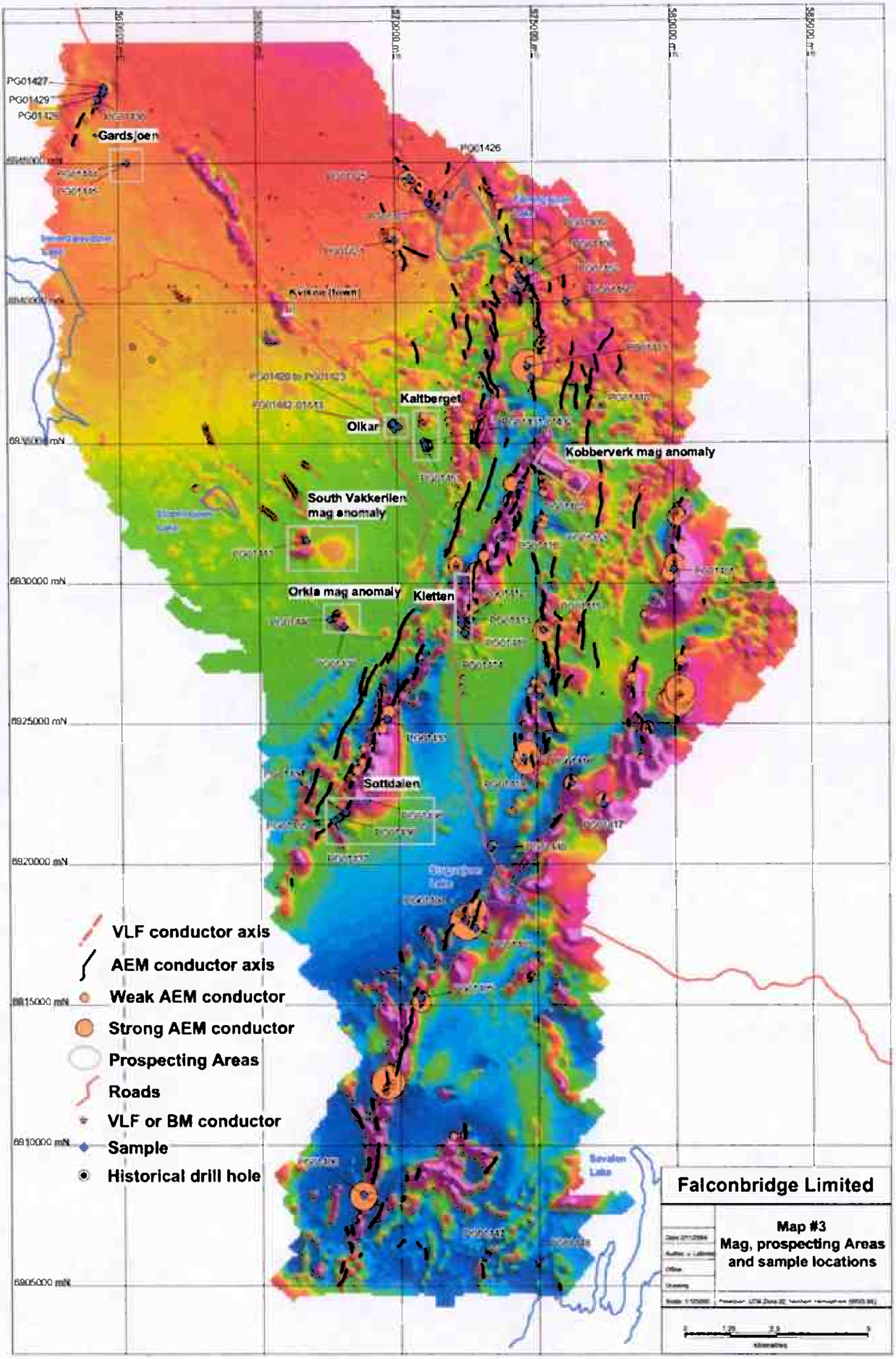
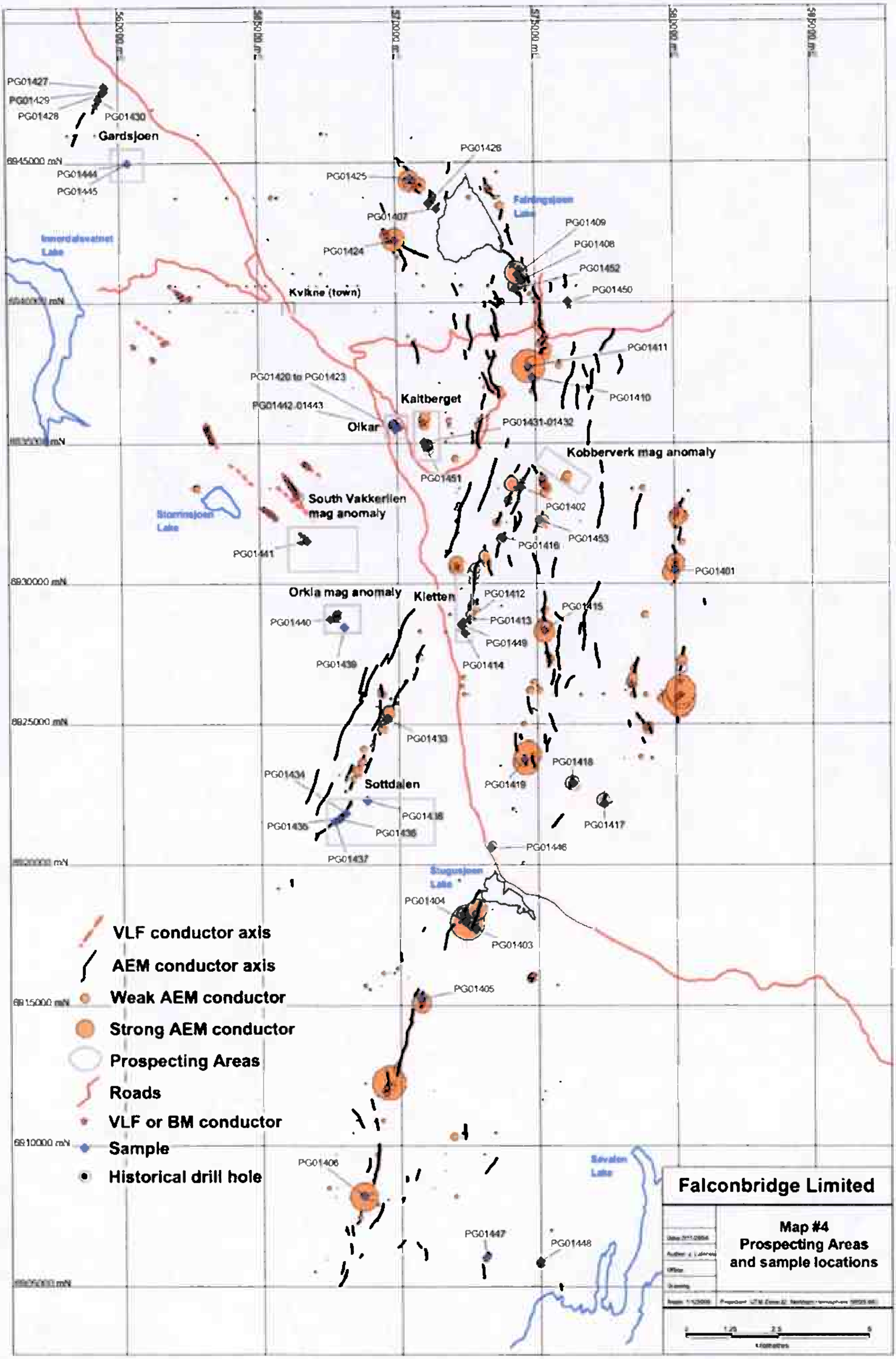
42
43
Savalon
Lake



Falconbridge Limited
Map #2
AEM Target Areas
VLF conductor axis
AEM conductor axis
Weak AEM conductor
Strong AEM conductor
AEM conductor target
Roads
Kvikne (town)
Stugusjoen Lake
Savalen Lake
VLF-1
VLF-2
VLF-3
VLF-4
VLF-5
VLF-6
VLF-7
VLF-8
VLF-9
VLF-10
VLF-11
6945000 mN
6920000 mN
6905000 mN
580000 mE
585000 mE


PG01427
PG01429
Gardsjoen
PG01426
Kvikne (town)
Kaltberget
Olkar
Kobberverk mag anomaly
South Vakkerlien
mag anomaly
Orkla mag anomaly
Kletten
Sottdalen
VLF conductor axis
AEM conductor axis
Weak AEM conductor
Strong AEM conductor
Prospecting Areas
Roads
VLF or BM conductor
Sample
Historical drill hole
Falconbridge Limited
Map #3
Mag, prospecting Areas
and sample locations



560000 mE
565000 mE
570000 mE
575000 mE
580000 mE
585000 mE
6945000 mN
6940000 mN
6935000 mN
6930000 mN
6925000 mN
6920000 mN
6915000 mN
6910000 mN
6905000 mN
PG01427
PG01429
PG01428
PG01430
Gardsjoen
PG01444
PG01445
Innerdalsvatnet Lake
PG01426
PG01425
PG01407
PG01424
Kvikne (town)
PG01409
PG01408
PG01452
PG01450
PG01411
PG01410
PG01420 to PG01423
PG01442-01443
Kaltberget
Oikar
PG01431-01432
PG01451
Kobberverk mag anomaly
PG01402
PG01453
PG01416
PG01401
Stormsjoen Lake
South Vakkerlien mag anomaly
PG01441
Orkla mag anomaly
Kletten
PG01412
PG01413
PG01449
PG01414
PG01415
PG01440
PG01439
PG01433
PG01418
PG01419
PG01417
PG01434
Sottdalen
PG01438
PG01435
PG01436
PG01437
PG01446
Stugusjoen Lake
PG01404
PG01403
PG01405
PG01406
PG01447
PG01448
Savalen Lake
VLF conductor axis
AEM conductor axis
Weak AEM conductor
Strong AEM conductor
Prospecting Areas
Roads
VLF or BM conductor
Sample
Historical drill hole
Falconbridge Limited
Map #4
Prospecting Areas and sample locations
kilometres

Appendix 1

Geophysical instruments specifications

EM16

VLF Electromagnetic Unit

Pioneered and patented exclusively by Geonics Limited, the VLF method of electromagnetic surveying has been proven to be a major advance in exploration geophysical instrumentation.

Since the beginning of 1965 a large number of mining companies have found the EM16 system to meet the need for a simple, light and effective exploration tool for mining geophysics.

The VLF method uses the military and time standard VLF transmissions as primary field. Only a receiver is then used to measure the secondary fields radiating from the local conductive targets. This allows a very light, one-man instrument to do the job. Because of the almost uniform primary field, good response from deeper targets is obtained.

The EM16 system provides the *in-phase* and *quadrature* components of the secondary field *with the polarities indicated.*

Interpretation technique has been highly developed particularly to differentiate deeper targets from the many surface indications.

Principle of Operation
The VLF transmitters have vertical antennas. The magnetic signal component is then horizontal and concentric around the transmitter location.

Specifications

Source of primary field	VLF transmitting stations.
Transmitting stations used	Any desired station frequency can be supplied with the instrument in the form of plug-in tuning units. Two tuning units can be plugged in at one time. A switch selects either station.
Operating frequency range	About 15-25 kHz.
Parameters measured	(1) The vertical in-phase component (tangent of the tilt angle of the polarization ellipsoid). (2) The vertical out-of-phase (quadrature) component (the short axis of the polarization ellipsoid compared to the long axis).
Method of reading	In-phase from a mechanical inclinometer and quadrature from a calibrated dial. Nulling by audio tone.
Scale range	In-phase ± 150%, quadrature ± 40%.
Readability	± 1%.
Reading time	10-40 seconds depending on signal strength.
Operating temperature range	−40 to 50° C.
Operating controls	ON-OFF switch, battery testing push button, station selector, switch volume control, quadrature, dial ± 40%, inclinometer dial ± 150%.
Power Supply	6 size AA (penlight) alkaline cells. Life about 200 hours.
Dimensions	42 x 14 x 9 cm (16 x 5.5 x 3.5 in.)
Weight	1.6 kg (3.5 lbs.)
Instrument supplied with	Monotonic speaker, carrying case, manual of operation, 3 station selector plug-in tuning units (additional frequencies are optional), set of batteries.
Shipping weight	4.5 kg (10 lbs.)

GEONICS LIMITED Designers & Manufacturers of Geophysical Instruments
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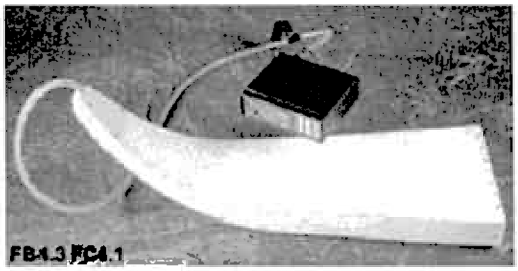
Cables: Geonics

BEEP MAT

Model BM4+



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1. INTRODUCTION

This manual is intended for geologists and prospectors. It concerns the model BM4+. However, the general theory of the Beep Mat can be used to better understand any previous model.

1.1 Brief Description of the Beep Mat

The Beep Mat is a simple and efficient electromagnetic prospecting instrument adapted to the search of outcrops and/or boulders containing conductive and/or magnetic minerals. It basically consists of a sleigh-shaped short probe and a reading unit. For prospecting, you pull the probe on the ground to be explored. The Beep Mat takes continuous readings while you walk and sends out a distinctive audible signal when detecting a conductive or magnetic object in a radius of up to 3 meters. The Beep Mat directly detects and signals the presence of ores, even slightly conductive, containing chalcopyrite, galena, pentlandite, bornite and chalcocite. It also detects native metals (copper, silver, gold) as well as generally barren conductive bodies (pyrite, graphite and pyrrhotite), but which may contain precious ores such as gold or zinc (sphalerite), which are themselves non-conductive. Besides detecting conductors, the Beep Mat measures their intrinsic conductivity and their magnetic susceptibility (magnetite content). This helps geologists and geophysicists to better interpret others geophysical and geological surveys.

1.2 Beep Mat Components

When you receive your Beep Mat, check if it contains all components shown at illustration 1. Please note the terminology used on that illustration since it will be used next in this manual.

The following optional components may also be included:

- a solar panel with a rechargeable battery
- an external high volume beeper
- a 12 feet cable
- a dumping cable
- an undershell

Make sure that you have all components as shown at illustration 1. If not, please contact Instrumentation GDD Inc.

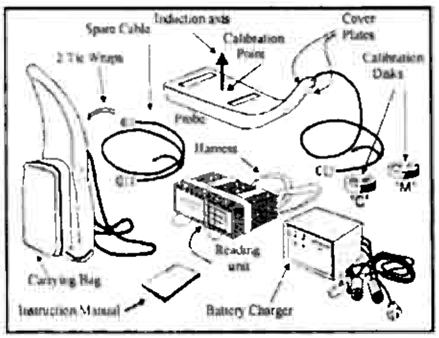

Illustration 1. Beep Mat Components

1.3 Specifications

Power supply:		2 rechargeable 6-V batteries
Autonomy:		over 10 hours
Memory capacity:		[illegible] readings
Size:	Reading unit	[illegible] cm
	Probe	[illegible] cm
Weight:	Reading unit	1.9 kg
	Probe	1.8 kg
Operating temperature:		from -20 °C to 40 °C
Humidity:		can be operated on rainy, foggy or snowy days

4. OPERATING PRINCIPLE

The probe contains an inductive coil within its shell. When the probe is in normal position on the ground, as shown at illustration 6, the axis of the inductive electromagnetic field transmitted by the coil is in vertical position.

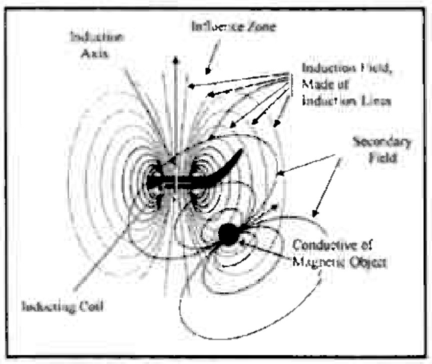

Illustration 6. Operating principle

The influence zone of its inductive field has an average radius (called "range") of about 3 meters. This inductive field is similar to the field of a magnet. Any conductive or magnetic object within the zone reacts by sending out again a secondary field (or "induced field"). The secondary field is weaker and has distinctive features. The probe reacts on the part of this field that goes through its inductive coil. That reaction is then displayed on the reading unit in terms of σL, dH, MAG and RT values.

Appendix 2

EM conductors table

Summary table of conductors

Target ID	Source	UtmE	UtmN	Located	Cause identified	Description	Sample	Comments
1	2004 NGU Humingbird	569936	6942248	Yes	Yes	Graphite-pyrite schist	PG01424	Flat lying
2	2004 NGU Humingbird	574468	6941062	Yes	Yes	Semi-massive Po-Py	PG01408,1409	Previously investigated, old trench
3	2004 NGU Humingbird	574748	6937741	Yes	Yes	Graphite-pyrite metasediments	PG01410,1411	Previously investigated, stripping
4	2004 NGU Humingbird	569881	6935650	Yes	Yes	Po veins and graphite in metasediment	PG01443	Near Olkar showing
5	2004 NGU Humingbird	574121	6933540	Yes	Yes	Semi-massive Po-Py	PG01402	Previously investigated, old trench
6	2004 NGU Humingbird	580095	6932364	Yes	Yes	Heavily disseminated Po-Py		Previously investigated
7	2004 NGU Humingbird	580011	6930720	Yes	Yes	Semi-massive Po-Py	PG01401	Previously investigated, back-hoe trench. In contact with BIF
8	2004 NGU Humingbird	572101	6930574	Yes	Yes	Graphitic beds		Previously investigated, old pit
9	2004 NGU Humingbird	573129	6931024	Yes	Yes	Semi-massive Po-Py in metasediments		
10	2004 NGU Humingbird	572597	6928906	Yes	Yes	Diss. Po in metasediment	PG01413	Well exposed in stream bed
11	2004 NGU Humingbird	575247	6928307	Yes	Yes	Gossan/metasediments	PG01415	Previously investigated, stripping
12	2004 NGU Humingbird	578412	6926491	Yes	Yes	Iron formation		Previously investigated, old pit
13	2004 NGU Humingbird	580121	6925900	Yes	No	Under a non-mineralized metased layer		Metasediments immediate environment, no intrusives
14	2004 NGU Humingbird	574558	6923648	Yes	Yes	30% Po-Py	PG01419	Previously investigated, stripping
15	2004 NGU Humingbird	576243	6922895	Yes	Yes	Silicate-sulfide iron formation	PG01418	
16	2004 NGU Humingbird	578997	6924849	Yes	Yes	Iron formation, flat lying		Previously investigated, stripping
17	2004 NGU Humingbird	572425	6917938	Yes	Yes	Amphibolite+diss. Po-Py	PG01404	
18	2004 NGU Humingbird	570748	6915082	Yes	Yes	Semi-massive Po-Py in metasediments	PG01405	Previously investigated, 30m long back-hoe trench
19	2004 NGU Humingbird	569548	6912238	Yes	Yes	Oxyde-minor sulfide iron formation		
20	2004 NGU Humingbird	572244	6932196	Yes	Yes	Diss. Po in metasediment	PG01453	
21	2004 NGU Humingbird	569627	6925442	Yes	Yes	Semi-massive Po-Py in metasediments	PG01433	Previously investigated, old pits and trenches
22	2004 NGU Humingbird	568615	6908183	Yes	Yes	Oxyde-minor sulfide iron formation	PG01406	
23	2004 NGU Humingbird	570499	6944354	Yes	Yes	Amphibolite+20% py	PG01425	Flat lying
24	2004 NGU Humingbird	573378	6944035	Yes	No			Weak VLF, metasediments immediate environment
25	2004 NGU Humingbird	579225	6947147	Yes	Yes	Various types of sulfide bearing metasediments	PG01427,1428,1429,1430	Previously investigated, 7 trenches and pits on conductor axis
26	2004 NGU Humingbird	569620	6942410	Yes	Yes	Graphite-pyrite schist		Flat lying
27	2004 NGU Humingbird	575309	6933486	Yes	Yes	Silicate-sulfide iron formation		
28	2004 NGU Humingbird	574491	6933552	Yes	Yes	Semi-massive Po-Py		Previously investigated, old trench
29	2004 NGU Humingbird	573776	6931631	Yes	Yes	Semi-massive Po-Py in metasediments	PG01416	Previously known occurrence, old tunnel
30	2004 NGU Humingbird	580231	6927260	Yes	No	Under a bog		Previously investigated, casing -90, number
31	2004 NGU Humingbird	577358	6922290	Yes	Yes	Po-magnetite-garnet amphibolite	PG01417	Previously investigated, old pit
32	2004 NGU Humingbird	572774	6918402	Yes	Yes	Silicate-sulfide iron formation	PG01403	
33	2004 NGU Humingbird	570988	6935838	Yes	Yes	Graphitic beds		
34	2004 NGU Humingbird	574299	6940599	Yes	Yes	Massive Po-Py in metasediments	PG01452	Previously investigated, old pit
35	2004 NGU Humingbird	567767	6928820	Yes	No	Thick overburden		Rusty metasediments 300mS, on strike with conductor
36	2004 NGU Humingbird	567929	6921743	Yes	Yes	Amphibolite+metased.+diss. Po-Py	PG01434,1435,1436	
37	2004 NGU Humingbird	567634	6921545	Yes	Yes	Semi-massive Po-Py	PG01437	Previously investigated, old pit
38	2004 NGU Humingbird	573305	6920592	Yes	Yes	Banded iron formation	PG01446	Strong conductor
39	2004 NGU Humingbird	574423	6920096	No	No	Several blocks of sulfide iron formation nearby		Not traced because located among cottages
40	2004 NGU Humingbird	574734	6915970	Yes	No			Thick overburden
41	2004 NGU Humingbird	575669	6915724	Yes	Yes	Banded iron formation		Previously investigated, stripping
42	2004 NGU Humingbird	573020	6906033	Yes	Yes	Graphite magnetite schist	PG01447	Previously investigated, old grid pickets
43	2004 NGU Humingbird	574994	6905851	Yes	No		PG01448	Thick ablation till. One sample from a conductive boulder
VLF-1	1979 airborne	562330	6940270	Yes	No	In part bog filled valley		Previously investigated, old grid pickets
VLF-2	1979 airborne	561272	6938864	Yes	Yes	Linear bog filled valley, structural		Previously investigated, old grid pickets
VLF-3	1979 airborne	561228	6938000	Yes	No			Under a lake
VLF-4	1979 airborne	560517	6938444	No	No			No VLF response

Target ID	Source	UtmE	UtmN	Located	Cause identified	Description	Sample	Comments
VLF-5	1979 airborne	567015	6933974	Yes	No	Extremely weak VLF		Well exposed in creek bed, no cause to be seen
VLF-6	1979 airborne	566339	6933096	Yes	No	Weak VLF, thick overburden		Extremely weak VLF response, drill tested near the eastern end
VLF-7	1979 airborne	563361	6935074	Yes	No			
VLF-8	1979 airborne	564463	6933798	No	No	Extremely weak VLF		Too much cultural noise around (power line, fences) to trace the axis. Old pickets
VLF-9	1979 airborne	565360	6932515	Yes	No	Under a bog		Previously investigated, old grid pickets. Lines oriented 055, stations at 25m spacing
VLF-10	1979 airborne	566550	6931667	Yes	No	One weak VLF conductor between axis 10 and 11		Previously investigated, old grid pickets
VLF-11	1979 airborne	566507	6931350	Yes	No	One weak VLF conductor between axis 10 and 11		Previously investigated, old grid pickets

Appendix 3

Sample Location and Assay/Whole Rock Results

ID_Assay	PG01401	PG01402	PG01403	PG01404	PG01405	PG01406	PG01407	PG01408
Easting	579997	574473	572720	572361	570730	568621	571493	574519
Northing	6930469	6933440	6917708	6917964	6915242	6908220	6943341	6940777
Rock_Facies	Massive sulfides	Metasediments	Massive sulfides	Metasediments	Gossan	Iron formation	Pyroxenite	Inter. gneiss
Mineralization	semi massive; po, py	semi massive py, po	py, minor po, minor cp	disseminated sulfides; py, trace cp, trace sph	semi massive py, po, trace cp	with disseminated, laminated py	blebby po; trace ccp	semi massive po
Type of Analysis	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni
SiO2	-9	-9	-9	-9	-9	-9	-9	-9
Al2O3	-9	-9	-9	-9	-9	-9	-9	-9
Fe2O3	-9	-9	-9	-9	-9	-9	-9	-9
MgO	-9	-9	-9	-9	-9	-9	-9	-9
CaO	-9	-9	-9	-9	-9	-9	-9	-9
Na2O	-9	-9	-9	-9	-9	-9	-9	-9
K2O	-9	-9	-9	-9	-9	-9	-9	-9
TiO2	-9	-9	-9	-9	-9	-9	-9	-9
P2O5	-9	-9	-9	-9	-9	-9	-9	-9
MnO	-9	-9	-9	-9	-9	-9	-9	-9
Cr2O3	-9	-9	-9	-9	-9	-9	-9	-9
V2O5	-9	-9	-9	-9	-9	-9	-9	-9
LOI	-9	-9	-9	-9	-9	-9	-9	-9
Total	-9	-9	-9	-9	-9	-9	-9	-9
Ni_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cu_%	0,1	0,06	**4,91**	0,11	0,14	< 0.05	0,1	0,07
Co_%	< 0.02	< 0.02	0,06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pb_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Zn_%	< 0.05	< 0.05	**0,32**	< 0.05	0,07	< 0.05	< 0.05	< 0.05
S_%	17	19,2	42,1	8,4	24,7	2,61	5,1	14,2
Pt_g/t	< 0.02	< 0.02	< 0.02	0,02	< 0.02	< 0.02	< 0.02	< 0.02
Pd_g/t	0,02	0,05	< 0.02	0,03	0,02	< 0.02	< 0.02	**0,21**
Au_g/t	0,06	0,04	**0,24**	0,04	0,08	< 0.02	0,03	0,04
Ag_g/t	1,6	0,5	22,9	1,7	1,4	< 0.5	0,6	0,7
Ni in 100% sulf.								

Note: -9 not analyzed

ID_Assay	PG01409	PG01410	PG01411	PG01412	PG01413	PG01414	PG01415	PG01416
Easting	574406	574891	574743	572332	572612	572410	575261	573759
Northing	6940998	6937348	6937730	6928642	6928740	6928219	6928340	6931633
Rock_Facies	Gossan	Inter. gneiss	Inter. gneiss	Olivine pyroxenite	Inter. gneiss	Massive sulfides	Metasediments	Metasediments
Mineralization	semi massive; po, py	blebby py,po	disseminated py, po	Tr. po	disseminated po; magnetic	semi massive; po, py	disseminated sulfide	semi masive po, py
Type of Analysis	Fe-Ni	Fe-Ni	Fe-Ni	Fe-Ni	Fe-Ni	Fe-Ni	Fe-Ni	Fe-Ni
SiO2	-9	-9	-9	-9	-9	-9	-9	-9
Al2O3	-9	-9	-9	-9	-9	-9	-9	-9
Fe2O3	-9	-9	-9	-9	-9	-9	-9	-9
MgO	-9	-9	-9	-9	-9	-9	-9	-9
CaO	-9	-9	-9	-9	-9	-9	-9	-9
Na2O	-9	-9	-9	-9	-9	-9	-9	-9
K2O	-9	-9	-9	-9	-9	-9	-9	-9
TiO2	-9	-9	-9	-9	-9	-9	-9	-9
P2O5	-9	-9	-9	-9	-9	-9	-9	-9
MnO	-9	-9	-9	-9	-9	-9	-9	-9
Cr2O3	-9	-9	-9	-9	-9	-9	-9	-9
V2O5	-9	-9	-9	-9	-9	-9	-9	-9
LOI	-9	-9	-9	-9	-9	-9	-9	-9
Total	-9	-9	-9	-9	-9	-9	-9	-9
Ni_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cu_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0,09	0,07	0,06
Co_%	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pb_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Zn_%	0,05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
S_%	1,22	7.77	14,2	0,77	2,09	13,7	1,38	11,2
Pt_g/t	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pd_g/t	< 0.02	< 0.02	0,02	< 0.02	< 0.02	0,02	< 0.02	< 0.02
Au_g/t	< 0.02	< 0.02	0,04	< 0.02	< 0.02	< 0.02	0,02	0,04
Ag_g/t	< 0.5	0,6	0,7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ni in 100% sulf.								

Note: -9 not analyzed

ID_Assay	PG01417	PG01418	PG01419	PG01420	PG01421	PG01422	PG01423	PG01424
Easting	577396	576255	574508	569908	570084	569921	569921	569969
Northing	6922158	6922905	6923740	6935540	6935573	6935502	6935502	6942228
Rock_Facies	Mafic gneiss	Iron formation	Metasediments	Gossan	Ultramafics	Diorite?	Diorite?	Biotite schist
Mineralization	minor sulfide; po	5-10% sulf; po, py	semi massive po, py		1% diss po	semi mass sulf; po; ccp	20% po; cp; stringer	pyrite 1%
Type of Analysis	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni
SiO2	-9	-9	-9	-9	-9	-9	-9	-9
Al2O3	-9	-9	-9	-9	-9	-9	-9	-9
Fe2O3	-9	-9	-9	-9	-9	-9	-9	-9
MgO	-9	-9	-9	-9	-9	-9	-9	-9
CaO	-9	-9	-9	-9	-9	-9	-9	-9
Na2O	-9	-9	-9	-9	-9	-9	-9	-9
K2O	-9	-9	-9	-9	-9	-9	-9	-9
TiO2	-9	-9	-9	-9	-9	-9	-9	-9
P2O5	-9	-9	-9	-9	-9	-9	-9	-9
MnO	-9	-9	-9	-9	-9	-9	-9	-9
Cr2O3	-9	-9	-9	-9	-9	-9	-9	-9
V2O5	-9	-9	-9	-9	-9	-9	-9	-9
LOI	-9	-9	-9	-9	-9	-9	-9	-9
Total	-9	-9	-9	-9	-9	-9	-9	-9
Ni_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	**1,43**	**1,44**	< 0.05
Cu_%	< 0.05	0,07	0,06	0,16	0,08	**0,52**	**4,83**	0,05
Co_%	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0,24**	**0,18**	< 0.02
Pb_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Zn_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
S_%	1,69	4,68	12,2	1,18	5,84	33	28,2	2,04
Pt_g/t	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0,82**	< 0.02
Pd_g/t	< 0.02	0,03	< 0.02	< 0.02	0,02	**0,2**	0,08	< 0.02
Au_g/t	< 0.02	0,02	0,03	< 0.02	0,03	0,02	0,08	< 0.02
Ag_g/t	< 0.5	< 0.5	1	< 0.5	< 0.5	0,8	1,2	< 0.5
Ni in 100% sulf.						1,66	1,92	

Note: - 9 not analyzed

ID_Assay	PG01425	PG01426	PG01427	PG01428	PG01429	PG01430	PG01431	PG01432
Easting	570517	571198	559513	559447	559498	559278	571039	570985
Northing	6944436	6943532	6947699	6947499	6947556	6947267	6934857	6935050
Rock_Facies	Inter. gneiss	Pyroxenite	Leucogabbro	Shale	Shale	Metasediments	Gabbro	Ultramafic boulder
Mineralization	metavolcanics 5% diss py, po		10-15% disseminated po, minor cp	20% bedded po	5% py	5-10% py, po, trace cp	3-5% po stringers; minor cp blebbs	15%po, 2%cp
Type of Analysis	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni
SiO2	-9	-9	-9	-9	-9	-9	-9	-9
Al2O3	-9	-9	-9	-9	-9	-9	-9	-9
Fe2O3	-9	-9	-9	-9	-9	-9	-9	-9
MgO	-9	-9	-9	-9	-9	-9	-9	-9
CaO	-9	-9	-9	-9	-9	-9	-9	-9
Na2O	-9	-9	-9	-9	-9	-9	-9	-9
K2O	-9	-9	-9	-9	-9	-9	-9	-9
TiO2	-9	-9	-9	-9	-9	-9	-9	-9
P2O5	-9	-9	-9	-9	-9	-9	-9	-9
MnO	-9	-9	-9	-9	-9	-9	-9	-9
Cr2O3	-9	-9	-9	-9	-9	-9	-9	-9
V2O5	-9	-9	-9	-9	-9	-9	-9	-9
LOI	-9	-9	-9	-9	-9	-9	-9	-9
Total	-9	-9	-9	-9	-9	-9	-9	-9
Ni_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	**0,46**	**1,55**
Cu_%	0,05	0,06	0,17	0,07	< 0.05	< 0.05	0,1	**1,11**
Co_%	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0,02	0,07
Pb_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Zn_%	< 0.05	< 0.05	< 0.05	0,07	< 0.05	< 0.05	< 0.05	< 0.05
S_%	6,25	0,95	9,84	17,9	6,47	4,88	2,63	10,8
Pt_g/t	< 0.02	< 0.02	0,06	< 0.02	< 0.02	< 0.02	0,09	**0,29**
Pd_g/t	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0,02	0,04	**0,29**
Au_g/t	< 0.02	0,02	0,03	0,03	0,04	< 0.02	< 0.02	0,03
Ag_g/t	< 0.5	< 0.5	< 0.5	1,4	< 0.5	< 0.5	< 0.5	1.8
Ni in 100% sulf.							6.54	5.35

Note: -9 not analyzed

ID_Assay	PG01433	PG01434	PG01435	PG01436	PG01437	PG01438	PG01439	PG01440
Easting	569580	568051	567829	567798	567631	568814	568029	567503
Northing	6925167	6921846	6921678	6921633	6921545	6922293	6928449	6928724
Rock_Facies	Metasediments	Metasediments	Amphibolite	Metasediments	Gossan	Gossan	Gabbro	Gabbro
Mineralization	semi massive py	minor mineralization	trace po	2-3% po, py, trace cp	massive po, py	5% po	3-5% disseminated po, py; boulder	blebby po 3%; py
Type of Analysis	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni
SiO_2	-9	-9	-9	-9	-9	-9	-9	-9
Al_2O_3	-9	-9	-9	-9	-9	-9	-9	-9
Fe_2O_3	-9	-9	-9	-9	-9	-9	-9	-9
MgO	-9	-9	-9	-9	-9	-9	-9	-9
CaO	-9	-9	-9	-9	-9	-9	-9	-9
Na_2O	-9	-9	-9	-9	-9	-9	-9	-9
K_2O	-9	-9	-9	-9	-9	-9	-9	-9
TiO_2	-9	-9	-9	-9	-9	-9	-9	-9
P_2O_5	-9	-9	-9	-9	-9	-9	-9	-9
MnO	-9	-9	-9	-9	-9	-9	-9	-9
Cr_2O_3	-9	-9	-9	-9	-9	-9	-9	-9
V_2O_5	-9	-9	-9	-9	-9	-9	-9	-9
LOI	-9	-9	-9	-9	-9	-9	-9	-9
Total	-9	-9	-9	-9	-9	-9	-9	-9
Ni_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cu_%	< 0.05	< 0.05	< 0.05	0,1	0,05	< 0.05	0,05	0,12
Co_%	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pb_%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Zn_%	0,07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
S_%	27,9	17,2	0,63	12,5	23,9	5,44	1,28	1,3
Pt_g/t	< 0.02	< 0.02	< 0.02	< 0.02	0,02	0,02	0,02	< 0.02
Pd_g/t	< 0.02	0,02	< 0.02	< 0.02	0,03	0,02	< 0.02	< 0.02
Au_g/t	0,02	0,02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Ag_g/t	0,9	< 0.5	< 0.5	< 0.5	0,9	< 0.5	< 0.5	< 0.5
Ni in 100% sulf.								

Note: -9 not analyzed

ID_Assay	PG01441	PG01442	PG01443	PG01444	PG01445	PG01446	PG01447	PG01448
Easting	566711	569942	569876	560311	560311	573305	573045	574993
Northing	6931522	6935525	6935691	6944990	6944990	6920592	6906033	6905880
Rock_Facies	Ol. pyroxenite	Metasediments	Metasediments	Granodiorite	Granodiorite	Iron formation	Graphitic gneiss	Metasediments
Mineralization	no visible sulphides		py, po vein	massive po, py with cp veins and disseminated cp		trace sulphide; iron formation	minor po, py	5% py
Type of Analysis	WR	WR	Fe-Ni	Fe-Ni	WR	Fe-Ni	Fe-Ni	Fe-Ni
SiO2	40,8	70,9	-9	-9	58,1	-9	-9	-9
Al2O3	3,85	11	-9	-9	15,7	-9	-9	-9
Fe2O3	12,4	4,26	-9	-9	4,97	-9	-9	-9
MgO	25,1	2,4	-9	-9	4,43	-9	-9	-9
CaO	4,5	0,7	-9	-9	8,22	-9	-9	-9
Na2O	0,07	0,94	-9	-9	4,25	-9	-9	-9
K2O	0,02	2,85	-9	-9	0,94	-9	-9	-9
TiO2	0,4	0,67	-9	-9	0,65	-9	-9	-9
P2O5	0,04	0,12	-9	-9	0,32	-9	-9	-9
MnO	0,23	0,05	-9	-9	0,06	-9	-9	-9
Cr2O3	0,31	< 0,01	-9	-9	0,01	-9	-9	-9
V2O5	0,03	0,03	-9	-9	0,03	-9	-9	-9
LOI	10,6	3,82	-9	-9	0,73	-9	-9	-9
Total	98,4	97,7	-9	-9	98,4	-9	-9	-9
Ni_%	-9	-9	**0,62**	**0,23**	-9	< 0,05	< 0,05	< 0,05
Cu_%	-9	-9	**0,53**	**1,72**	-9	< 0,05	< 0,05	0,05
Co_%	-9	-9	0,13	0,09	-9	< 0,02	< 0,02	< 0,02
Pb_%	-9	-9	< 0,05	< 0,05	-9	< 0,05	< 0,05	< 0,05
Zn_%	-9	-9	< 0,05	< 0,05	-9	< 0,05	< 0,05	< 0,05
S_%	-9	-9	19,1	18	-9	0,48	1,4	7,85
Pt_g/t	-9	-9	0,02	< 0,02	-9	< 0,02	< 0,02	< 0,02
Pd_g/t	-9	-9	0,08	0,06	-9	< 0,02	< 0,02	0,02
Au_g/t	-9	-9	0,02	< 0,02	-9	< 0,02	< 0,02	< 0,02
Ag_g/t	-9	-9	0,8	2,6	-9	< 0,5	< 0,5	1
Ni in 100% sulf.			1,25	0,49				

Note: -9 not analyzed

ID_Assay	PG01449	PG01450	PG01451	PG01452	PG01453
Easting	572298	576187	571015	574308	575087
Northing	6928500	6940033	6934964	6940482	6932275
Rock_Facies	Metasediments	Metasediments	Pyroxenite	Metasediments	Metasediments
Mineralization	30% po, py	trace sulf	20%po, 1%cp over a 1*2m area	semi-massive po,py	5%po, 2%py, 0,2%cp
Type of Analysis	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni	Ec-Ni
SiO2	-9	-9	-9	-9	-9
Al2O3	-9	-9	-9	-9	-9
Fe2O3	-9	-9	-9	-9	-9
MgO	-9	-9	-9	-9	-9
CaO	-9	-9	-9	-9	-9
Na2O	-9	-9	-9	-9	-9
K2O	-9	-9	-9	-9	-9
TiO2	-9	-9	-9	-9	-9
P2O5	-9	-9	-9	-9	-9
MnO	-9	-9	-9	-9	-9
Cr2O3	-9	-9	-9	-9	-9
V2O5	-9	-9	-9	-9	-9
LOI	-9	-9	-9	-9	-9
Total	-9	-9	-9	-9	-9
Ni_%	< 0,05	< 0,05	**0,75**	< 0,05	< 0,05
Cu_%	< 0,05	0,07	**0,38**	0,06	0,06
Co_%	< 0,02	< 0,02	0,03	< 0,02	< 0,02
Pb_%	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05
Zn_%	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05
S_%	15,8	7,42	18,2	24,2	4,86
Pt_g/t	< 0,02	< 0,02	0,18	< 0,02	< 0,02
Pd_g/t	< 0,02	0,02	0,06	0,02	< 0,02
Au_g/t	< 0,02	< 0,02	0,02	0,02	< 0,02
Ag_g/t	1	0,8	1,1	1,4	< 0,5
Ni in 100% sulf.			1,59		

Note: -9 not analyzed