



# Bergvesenet

Postboks 3021, 7002 Trondheim

## Rapportarkivet

|   |  |  |  |   |
|---|--|--|--|---|
| Bergvesenet rapport nr<br><b>BV 4007</b>  | Intern Journal nr                            | Internt arkiv nr                             | Rapport lokalisering<br>Trondheim              | Gradering<br><b>Fortrolig</b><br><i>Åpen</i>              |
| Kommer fra ..arkiv  | Ekstern rapport nr                           | Oversendt fra<br>Daryl Hodges                | Fortrolig pga<br>Prospekteringsfondet<br>1993  | Fortrolig fra dato:<br><i>Åpen fra</i><br><b>17.02.97</b> |
| Tittel<br><b>Summary report and cost spesifications, 1993 exploration in South Pasvik, Finnmark Drilling Trenches and Grids.</b>  |  |  |  |   |
| Forfatter<br><b>Hodges, Daryl</b>   |  | Dato<br><b>jan 1994</b>                      | Bedrift<br><b>Sulfidmalm<br/>Falconbridge</b>  |   |
| Kommune<br><b>Sør-Varanger</b>  | Fylke<br><b>Finnmark</b>                     | Bergdistrikt<br><b>Troms og<br/>Finnmark</b> | 1: 50 000 kartblad<br><b>23332</b>             | 1: 250 000 kartblad<br><b>Kirkenes</b>                    |
| Fagområde<br><b>Boring Analyser<br/>Løsmassegeologi</b>   | Dokument type<br><b>Prospekteringsfondet</b> |  | Forekomster<br><b>Rømlingsås<br/>Blankvann</b> |   |
| Råstofftype<br><b>Malm/metall</b>   | Emneord<br><b>Ni Cu</b>                      |  |  |   |
| <b>Sammendrag</b><br>The result of the drilling were largely negative from an economic perspective. Traces of remobilized copper and nicel mineralizatin were identified locally.<br>Weakly mineralized boulders were discovered in test excavations in Blankvann and Rømlingsås and were followed up with IP and VLF-R surveys.<br>Comparison of the ultramafic rocks in South Pasvik with those from Allarchka and Pechenga show interesting trends.<br><br>It is concluded that the area of best potential, as present understood, is in the Rømlingsås - Blankvann area where mineralized boulders are interpreted to have been travelled a shor distance from source. The size of the specific sources is interpreted to be small. The follow up aproach on these mineralized zones continues to be to locate the local source of mineralization, then drill - test down- structures, once identified. Untested potetial also occurs east of Gjøkvann, along a subsidiary structure crossing the Tømmamoen structure at a high angle.<br>Any genetic model invoking mixing of ultramafic rocks with sulphidic sediments does not have a direct application to ultramafic bodies intersected so far in the Gjøkvatn zone at South Pasvik. The ultramafics are strictly enclosed in granite gneiss and do not appear to have interacted with the structurally higher sulphide-bearing sediments. This conclution led to the decision to allow several claims to lapse and focus effort closer to the Tømmamoen fault and inferred subisidary splay structures. |  |  |  |   |

SUMMARY REPORT  
AND  
~~COST SPECIFICATION~~

1993 EXPLORATION in SOUTH PASVIK  
SØR-VARANGER KOMMUNE  
FINNMARK, NORWAY



By  
Daryl Hodges, Falconbridge Limited

Prepared for  
A/S Sulfidmalm

January, 1994

## INTRODUCTION

As part of the ongoing Norwegian exploration activity carried out by A/S Sulfidmalm under the guidance of Falconbridge Limited, work in 1993 was focussed in the South Pasvik region, Finnmark Fylke. Application was made in February, 1993, to the Norwegian Bergvesenet for assistance in funding the planned nickel - copper exploration. Financial assistance of up to NOK 780 000: was approved by Bergvesenet to help cover the costs of the exploration. This summary is provided to outline the main activities carried out and the results of these activities and to provide a cost - specification on behalf of Sulfidmalm. A full report on all findings in 1993 will be delivered in the near future.

## SUMMARY

The objective of the exploration at South Pasvik is to discover high grade nickel mineralization or indications which could lead to an economic mineral discovery. To this end, field work in the South Pasvik area was conducted in a series of contracts and involved a summer drill program employing a Senior Project Geologist and two geology summer students, from University of Tromsø and NTH in Trondheim. Personnel involved in the project are summarized in Table 1. Peripheral to the direct object - oriented field work, co-operation continued with the NGU, based in Trondheim, on determining regional geological interpretations which can assist in discovering new sources of important nickel minerals.

### Expenditures

Total expenditures booked by A/S Sulfidmalm in the Pasvik area of Norway total NOK 2,924,757.58. Of this amount, NOK 17,060.60 was applied to the Oksfjell project (904) and NOK 186.05 to a General nickel project (902), leaving a total of NOK 2,907,510.93 directly applied to efforts on the South Pasvik project. The original proposal, submitted to Bergvesenet in February of 1993 outlined a proposal for expenditures of NOK 2,500,000. Table 2 provides a summary of actual expenditures and comparison to proposed expenditures. Notations are provided with the expenditure tables. The exploration expenditures in 1993 bring the total expenditures since 1991 to approximately NOK 8,250,000.

### Field Work

Approximately 300 line kilometres of geophysics surveying, 1,978 metres of drilling and 34 test excavations were completed. The Sør-Varanger Miljøvernvedelingen department was informed of all activities and were consulted before making decisions on the drilling contract and excavating. Site visits were conducted June 30 and August 9. The test excavations were coupled with a quaternary geology re-evaluation of the South Pasvik area including airphoto interpretation and evaluation of previous work and geochemical analysis of 168 till samples taken from the test pits.

Table 3 outlines the exploration activities and general results. Drilling is summarized in Table 4 and summary logs and drill sections are provided in the Appendix. The report on Magnetic and Electromagnetic surveys completed in March

were submitted to Bergvesenet in June, 1993. The work was carried out over three grids, A, B and C (Figure 1) as follow up to the airborne survey completed in 1992. The results showed very close correlation with the airborne survey and were used to provide exact locations for placing the diamond drillholes. IP (induced polarization) surveying was conducted between October and December of 1993 as follow up to the summer exploration. A logistics report is submitted along with this report to Bergvesenet. Data processing is in progress at the time of writing. The boulder prospecting and excavating was carried out over a wide area as shown in Figure 1. The main areas of excavating are shown in Figure 2 (near Sulfidmalm hole SP-18), Figure 3 (Rømlingsås) and at Blankvann, where the boulder prospecting was augmented by use of a shallow - penetrating combined magnetometer and electromagnetic detector to assist in detecting hidden boulders (Figure 4). Discovery of mineralized boulders in Pit 17 resulted in an expanded excavation and further mineralized boulder discoveries (Figure 5).

### Results

The results of the drilling were largely negative from an economic perspective. Traces of remobilized copper and nickel mineralization were identified locally. The drilling did improve the understanding of the structure of South Pasvik and the possible controls on nickel - copper mineralization, to be applied to future efforts. The main result is that the structures have a monoclinical dip away from the Blankvanngneiss and ultramafic bodies are strongly boudinaged but continuous (i.e. the position can be predicted fairly accurately) down the structural dip. There is no infolding.

Weakly mineralized boulders were discovered in test excavations in Blankvann and Rømlingsås and were followed up with IP and VLF-R surveys. Till geochemistry results are provided for the Rømlingsås and Blankvann areas (Figure 6), showing the greatest nickel and copper anomalies occur at Blankvann. Details of the two areas are provided in Figures 7 (Rømlingsås) and 8 (Blankvann).

Comparison of the ultramafic rocks in South Pasvik with those from Allarechka and Pechenga shows interesting trends. All rock types share the common tholeiitic affinity (Figure 9), resulting from the relatively high iron content or ferro picritic composition. On the  $\text{Cr}_2\text{O}_3$  -  $\text{MgO}$  plot (Figure 10), the Pasvik 2a (wehrlite) and South Pasvik ultramafics cluster on a steep trend distinct from the Pechenga and Allarechka belt and the type 1a and 1b ultramafics from Oksfjell. The ultramafic rocks at South Pasvik have much higher  $\text{MgO}$  contents. The mineralized ultramafic rocks from South Pasvik correlate with the Allarechka and Vostok rocks (Figure 11). Work continues on determining the significance of these chemical trends.

### **PROPERTY**

A total of 69 claims were staked and covered by the exploration. Approximately 45 of these met with negative encouragement on the basis of drill testing and trenching and were abandoned in late 1993. Negotiations and a legal Agreement are underway to acquire an additional 14 claims from E. Kreivi and K. Magnar and plans are underway to stake additional claims in South Pasvik. The current property position is shown in Figure 12.

*\* Magnar Kreivi*

## CONCLUSIONS

It is concluded that the area of best potential, as presently understood, is in the Rømlingsås - Blankvann area where mineralized boulders are interpreted to have travelled a short distance from source. The size of the specific sources is interpreted to be small. The follow up approach on these mineralized zones continues to be to locate the local source of mineralization then drill - test down - structure, once identified. Untested potential also occurs east of Gjøkvatn, along a subsidiary structure crossing the Tommamoen structure at a high angle.

Any genetic model invoking mixing of ultramafic rocks with sulphidic sediments does not have a direct application to ultramafic bodies intersected so far in the Gjøkvatn zone at South Pasvik. The ultramafics are strictly enclosed in granite gneiss and do not appear to have interacted with the structurally higher sulphide - bearing sediments. This conclusion led to the decision to allow several claims to lapse and to focus efforts closer to the Tommamoen fault and inferred subsidiary splay structures.

There remain a number of areas in South Pasvik which have received little or no follow up since the exploration activities of Sulfidmalm over ten years ago. These other areas will be assessed in 1994.

Plans are underway for follow up efforts in South Pasvik. The results of the IP and VLF surveys and trenching/Quaternary geology work will be followed up with additional drilling where warranted. Additional ground acquisition will be made to conduct follow up surveys in alternate up-ice directions from the mineralized blocks at Blankvann and a modest trenching program will be carried out at Rømlingsås. The results of these surveys in 1994 will be incorporated into a drill program scheduled for Winter, 1995.

Respectfully Submitted,



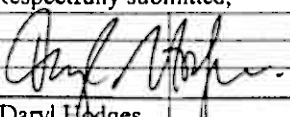
Table 1. Personnell.

The following personnel were involved in the 1993 exploration:

|                |                              |                         |
|----------------|------------------------------|-------------------------|
| Oyvind Hushovd | President                    | A/S Sulfidmalm          |
| Jørn Jacobsen  | Director                     | A/S Sulfidmalm          |
| Tony Green     | Regional Exploration Manager | Falconbridge Limited    |
| Daryl Hodges   | Senior Project Geologist     | Falconbridge Limited    |
| Øyvind Ottesen | Accountant                   | Falconbridge Nikkelverk |
| Trond Watne    | Senior Geological Assistant  | A/S Sulfidmalm          |
| Sveinung Hagen | Junior Geological Assistant  | A/S Sulfidmalm          |

In addition to the above, Tony Watts, Chief Geophysicist and Robert Stewart Senior District Geologist for Falconbridge Limited and Lars-Petter Nilsson Geologist with NGU assisted with data interpretation.

**Table 2. South Pasvik Project (906) Expenditures for 1993**

| Code | Item  | Proposed     | Actual       | Comment   |
|------|---|--------------|--------------|---|
| 601  | <b>GEOLOGY</b>  | 550,000.00   | 729,801.80   |   |
| 001  | Salaries  |              | 252,336.00   | Includes overall project management             |
| 120  | Travel and  |              | 32,304.00    |   |
|      | Related Expense   |              |              |   |
| 600  | Contracts   |              | 278,275.13   | Quaternary Geology, Trenching and NGU contract* |
| 604  | Field Expenses  |              | 156,232.94   |   |
| 608  | Assays  |              | 10,653.73    |   |
| 602  | <b>GEOPHYSICS</b>   | 450,000.00   | 809,438.26   |   |
| 001  | Salaries  | 75,000.00    | 80,056.00    |   |
| 120  | Travel and  | 25,000.00    | 4,092.00     |   |
|      | Related Expense   |              |              |   |
| 600  | Contracts   | 300,000.00   | 678,207.49   | Mag, EM, IP and VLF-R surveys                   |
| 604  | Field Expenses  | 50,000.00    | 47,082.77    |   |
| 603  | <b>GEOCHEM</b>  |              | 188,657.49   |   |
| 001  | Salaries  |              | 9,154.00     |   |
| 120  | Travel and  |              | 0.00         |   |
|      | Related Expense   |              |              |   |
| 600  | Contracts   |              | 160,204.49   | Trench mapping and geochem study                |
| 604  | Field Costs   |              | 749.00       |   |
| 608  | Analyses  |              | 18,550.00    |   |
| 605  | <b>DRILLING**</b>   | 1,500,000.00 | 963,496.71   |   |
|      | metres  | 2,000        | 1,978        |   |
| 001  | Salaries  | 200,000.00   | 134,410.00   |   |
| 120  | Travel and  | 50,000.00    | 16,024.40    |   |
|      | Related Expenses  |              |              |   |
| 600  | Contracts   | 1,100,000.00 | 697,853.10   | Drilling contract                               |
| 604  | Field Costs   | 100,000.00   | 102,794.87   |   |
| 608  | Analyses  | 50,000.00    | 12,413.96    |   |
| 607  | <b>ENVIRONMENT</b>  |              | 8,815.20     |   |
| 001  | Salaries  |              | 8,456.20     |   |
| 604  | Field Costs   |              | 359.00       |   |
| 615  | <b>PROPERTY</b>   |              | 140,532.47   |   |
|      | <b>ACQUISITION</b>  |              |              |   |
| 640  | <b>PROPERTY</b>   |              | 66,769.00    |   |
|      | <b>MAINTENANCE</b>  |              |              |   |
|      | <b>TOTAL</b>  | 2,500,000.00 | 2,907,510.93 |   |
|      | <b>TOTAL FIELD</b>  |              |              |   |
|      | <b>PROGRAMS</b>   | 2,500,000.00 | 2,700,209.46 | Excludes Property Maintenance, Acquisition      |
|      | *NGU contract 45,000  |              |              |   |
|      | ** The reduction in cost of drilling contract allowed the completion of trenching, geochem work and additional geophysics surveying |              |              |   |
|      | Respectfully submitted,   |              |              |   |
|      |    |              |              |   |
|      | Daryl Hodges  |              |              |   |
|      | Senior Project Geologist  |              |              |   |

**Table 3. Exploration Activity and Results**

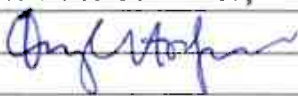
| Activity   | Dates                       | Contractor   | Results, Comments   |
|--|-----------------------------|--------------|---|
| 602. Mag, EM Surveys<br>85 line km each  | March, 1993                 | Suomen Malmi | Confirmed airborne surveys,<br>data modelled for drill target<br>selection.   |
| 601. Quaternary<br>Geology Review<br>Air photo review  | Mar- Apr, 1993<br>May, 1993 | Multilog     | Confirmed best potential area<br>for trenching program<br>Updated interpretation<br>of glacial history, ice transport |
| 605. Diamond Drilling  | July-Aug, 1993              | Suomen Malmi | Completed 1978 m in 11 holes<br>see Table 4 and Appendix  |
| 601. Trench Excavating   | July-Aug, 1993              | Pasvik Malm  | 34 test trenches completed.   |
| 603. Trench mapping,<br>sampling   | July-Aug, 1993              | Multilog     | Confirmed local boulder source<br>limited geochemical anomalies<br>in 168 samples                                     |
| 602. IP Survey<br>70 kilometres  | Oct-Dec, 1993               | Suomen Malmi | Interpretation in progress<br>Untested IP targets, structures<br>related to weak mag bodies                           |
| 602. VLF-R survey<br>60 kilometres   | Oct-Dec, 1993               | Pasvik Malm  | Correlation to IP chargeability<br>to use for future programs.  |
| Activities Confirmed,<br> |                             |              |   |
| Daryl Hodges<br>Senior Project Geologist   |                             |              |   |



TABLE 4. SOUTH PASVIK 1993 DRILL PROGRAM

| Drillhole Number (Proposed) | Claim                           | UTM Collar            | Dip | Azimuth | Depth   | Target/Result  |
|-----------------------------|---------------------------------|-----------------------|-----|---------|---------|--|
| SP-93-50 (F)                | Gjokvatn 20<br>NM462/1992-FB    | 7672740 N<br>584200 E | -60 | 180     | 134.80  | T: Weakly magnetic broken up formational conductor. Within the granite gneiss - metasediment transition zone.<br>R: Metasediments to 105 m. 35% pyrrhoite in quartz - rich sediment from 70.15 to 70.85. Q-F gneiss from 105 to EOH.   |
| SP-93-51 (J)                | Gjokvatn 3<br>NM445/1992-FB     | 7670950 N<br>582530 E | -60 | 90      | 154.70  | T: West dipping conductor on strike from magnetic anomaly inferred massive sulphide remobilized from ultramafic.<br>R: Weakly mineralized and locally graphitic metasediments 9.0 to 84.5 m. Granite gneiss contact at 88.8 m. Ultramafic within granite gneiss at 149 to 152, down dip from hole SP-25.   |
| SP-93-52 (I)                | Gjokvatn 8<br>NM450/1992-FB     | 7671150 N<br>582580 E | -60 | 90      | 170.10  | T: Weakly conductive edge of mineralized magnetic ultramafic within metasediments.<br>R: Mineralized metasediments define conductors, down to 54.59 metres, followed by Granite Augen Gneiss -GAG- UM (hosted by GAG) from 96 to 154 metres. Weak chalcopyrite (1806 ppm Cu) at the upper chilled contact, no visible sulphides in remainder.  |
| SP-93-53                    | Gjokvatn 8<br>NM450/1992-FB     | 7671225 N<br>582625 E | -80 | 90      | 160.40  | T: Based on SP-93-52. Hole is to probe ultramafic at depth. Continue drilling to test for sediment contact below gneiss.<br>R: Intersected GAG - hosted ultramafic from 58.90 to 130.45. Hole intersected metasediment below gneiss at 153.0 m. No mineral.  |
| SP-93-54 (K)                | Gjokvatn 10<br>NM452/1992-FB    | 7672700 N<br>583100 E | -80 | 90      | 140.15  | T: Ultramafic body. Probe through to lower contact for possible hidden sulphides.<br>R: Ultramafic from 54.50 to 88.65. Mixed ultramafic/ Granite Augen gneiss 89.95 to 103.10. Remobilized sulphide 101.40-101.60. 3224 ppm Ni, 4712 pp related to biotite remobilize ala Vostok. Lower sediment at 136.55 m.   |
| SP-93-55 (B)                | Gjokbuktnyra 4<br>NM460/1992-FB | 7672300 N<br>586705 E | -65 | 135     | 303.40  | T: Inferred deep plug. NW contact area broad zone of conductivity, best response at low frequencies.<br>R: The EM and magnetic results are from weakly mineralized sediments, sitting as a roof pendant or fault block in the gneiss.  |
| SP-93-56 (C)                | Gjokbuktnyra 5<br>NM424/1992-FB | 7671900 N<br>586400 E | -55 | 135     | 200.50  | T: As in B (SP-55), move 500 m along weakly conductive zone into the outer rim of weak magnetics.<br>R: This result confirms the results of hole 55. The increased magnetic response is a result of a strongly magnetic gabbro within the gneiss. The sediments have more grph and po.   |
| SP-93-57                    | Krokfjellet 9<br>NM338/1992-FB  | 7669025 N<br>584575 E | -70 | 90      | 203.65  | T: Inferred downplunge of source to weakly mineralized ultramafic blocks on Kreivi claims, push hole to lower sediment contact.<br>R: Weakly mineralized ultramafic (<1% po.cpy) from 70.0 to 83.5; 368-730 ppm Ni, 119-303 ppm Cu. Granite gneiss to 191.0, sediments to e.o.h.   |
| SP-93-58                    | Gjokvatn 29<br>NM75/1992-FB     | 7669650 N<br>583360 E | -80 | 90      | 135.10  | T: Possible Romlingsas mineralized boulder source. Large ultramafic to be drilled, hole to continue to footwall sediments.<br>R: Ultramafics (unmineralized) from 17.0 to 20.6 and from 50.2 to 68.8, both within granite gneiss. Sediments from 118.7 to e.o.h.   |
| SP-93-59                    | Gjokvatn 9<br>NM451/1992-FB     | 7673030 N<br>583139 E | -70 | 180     | 162.50  | T: Test possible mineralization in inferred anticlinal folding of ultramafics on strike from mineralized ultramafics in hole SP-93-54.<br>R: Metasediments with pegmatite to 71.50, then meta-gabbro to 79.20, and a weakly mineralized (max 851 ppm Ni) hornblende to 87.00. From 87.00 to end of hole at 162.50 granite augen gneiss with occasional thin hbl+bt-schist and a meta-gabbro at 121.50 to 124.50.   |
| SP-93-60                    | Nyrud 2<br>NM301/1992-FB        | 7671925 N<br>588772 E | -75 | 150     | 206.40  | T: Test conductor from MPP-survey carried out by Russian geophysicists from Pechenganikel Kombinat on Erkki Kreivis claims. Target estimated at 180 m.<br>R: Overburden to 43 metres, GAG to 108.00 m, sediments to 195, then meta-gabbro to end of hole. The conductors were layers within the sediments containing 10-30% po, and py besides graphitic layers. The conductors were intersected at 157.40-160.50 and 179.50-181.70. (Russian interpretation put base of flat - lying body at 180. m vertical) |
| SUBTOTAL                    |                                 |                       |     |         | 1978.70 |  |
| CONTINGENCY                 |                                 |                       |     |         | 21.30   |  |
| PROPOSED TOTAL (m)          |                                 |                       |     |         | 2000.00 |  |

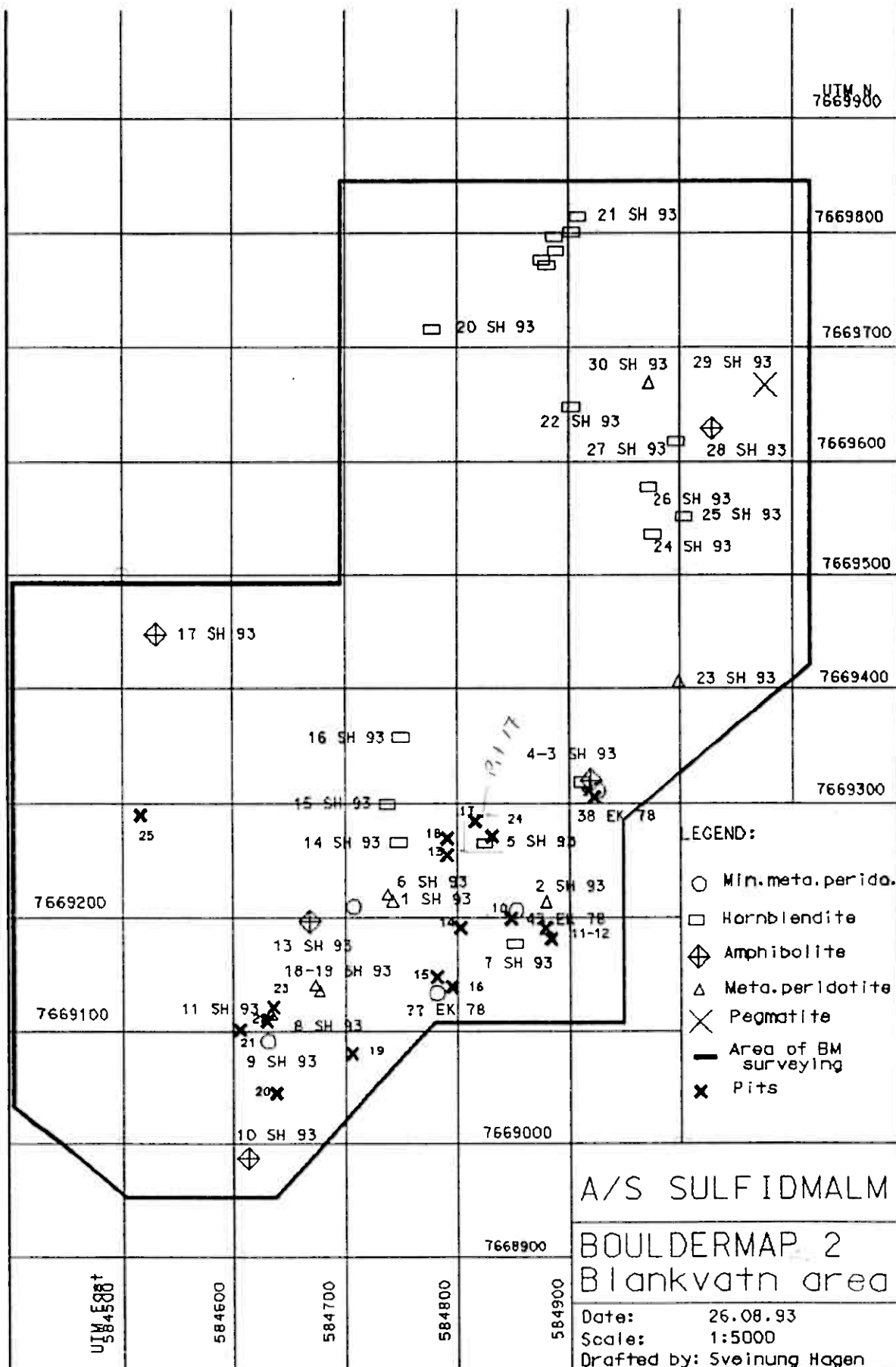


Figure 4

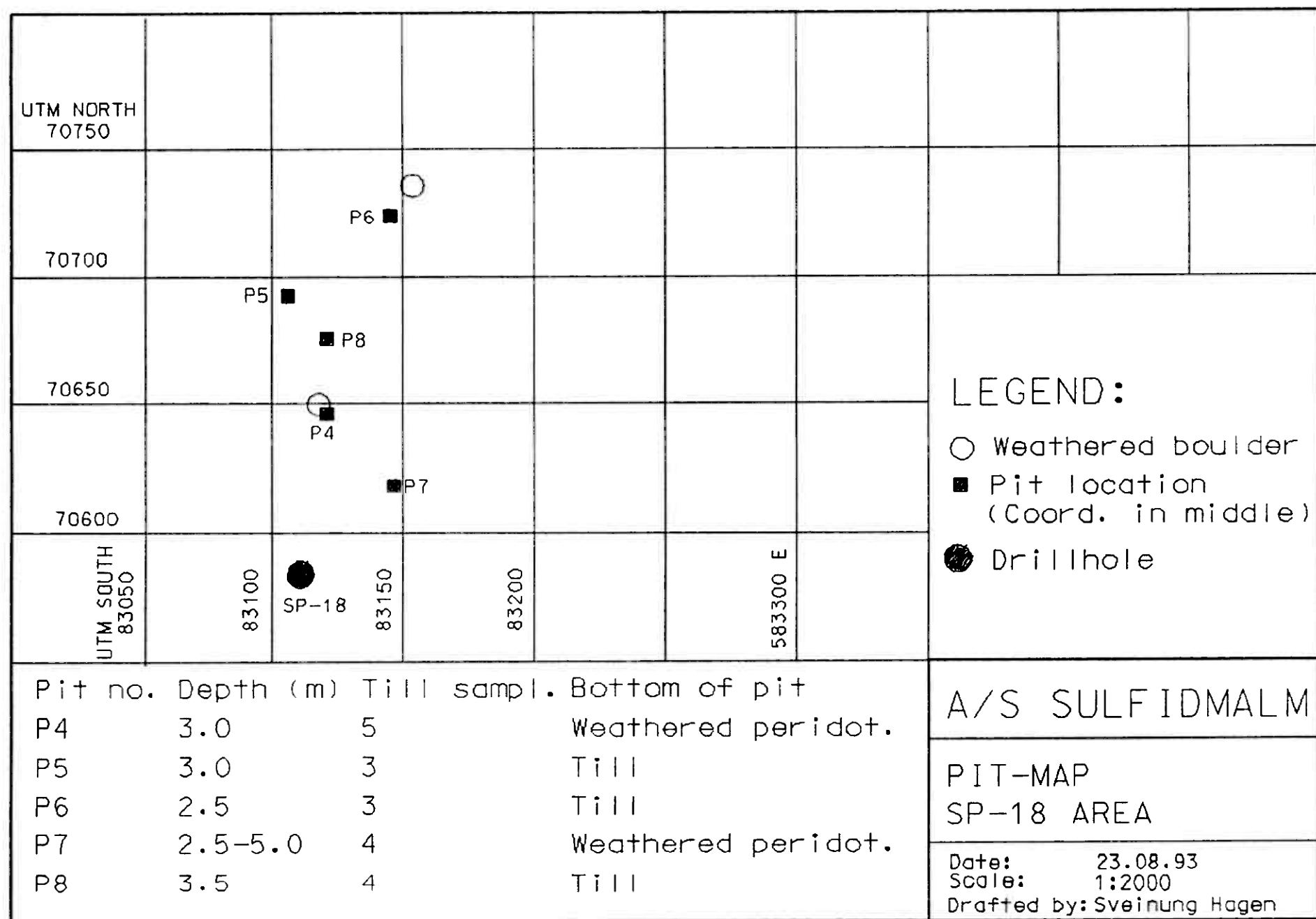


Figure 2

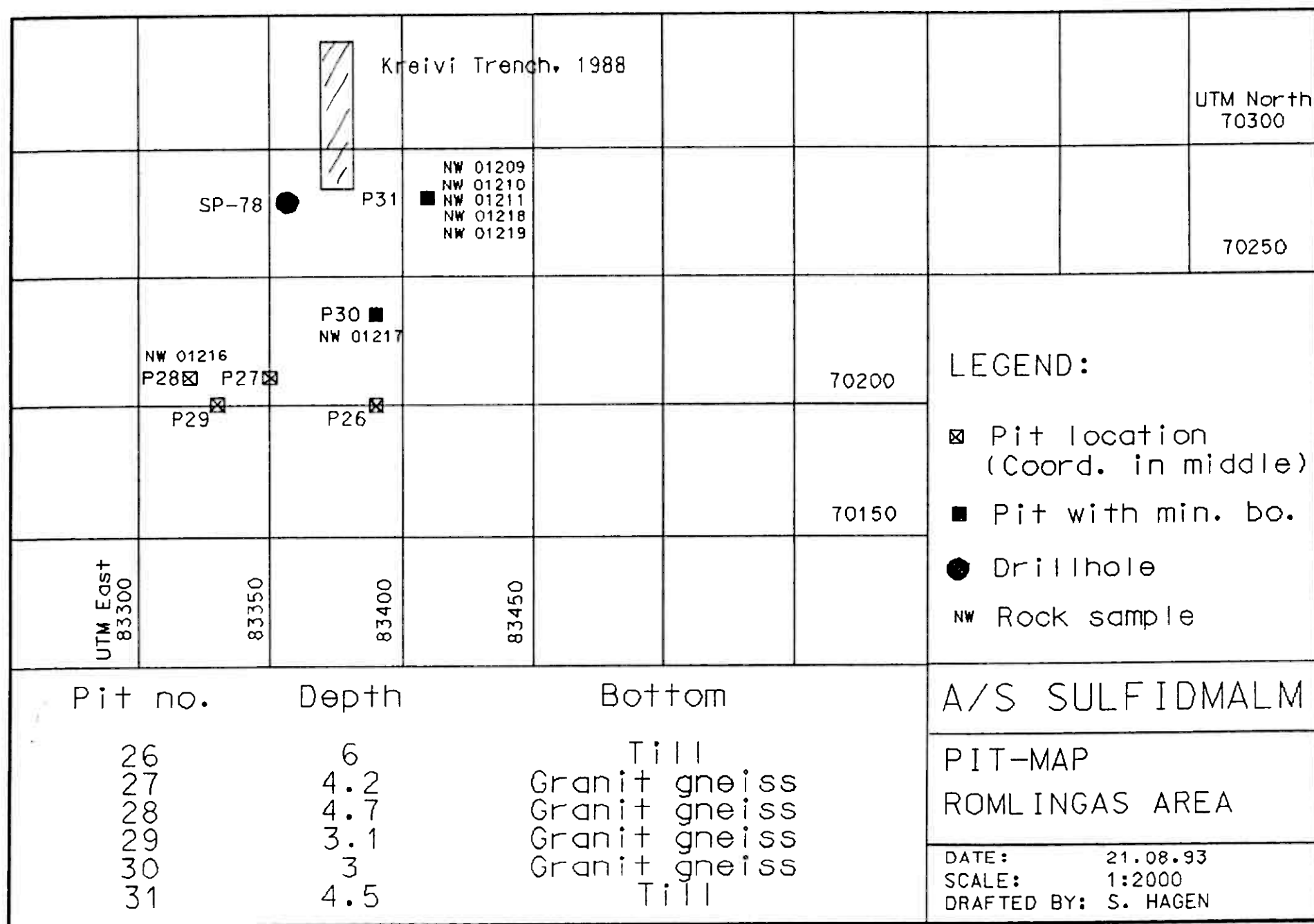


Figure 3

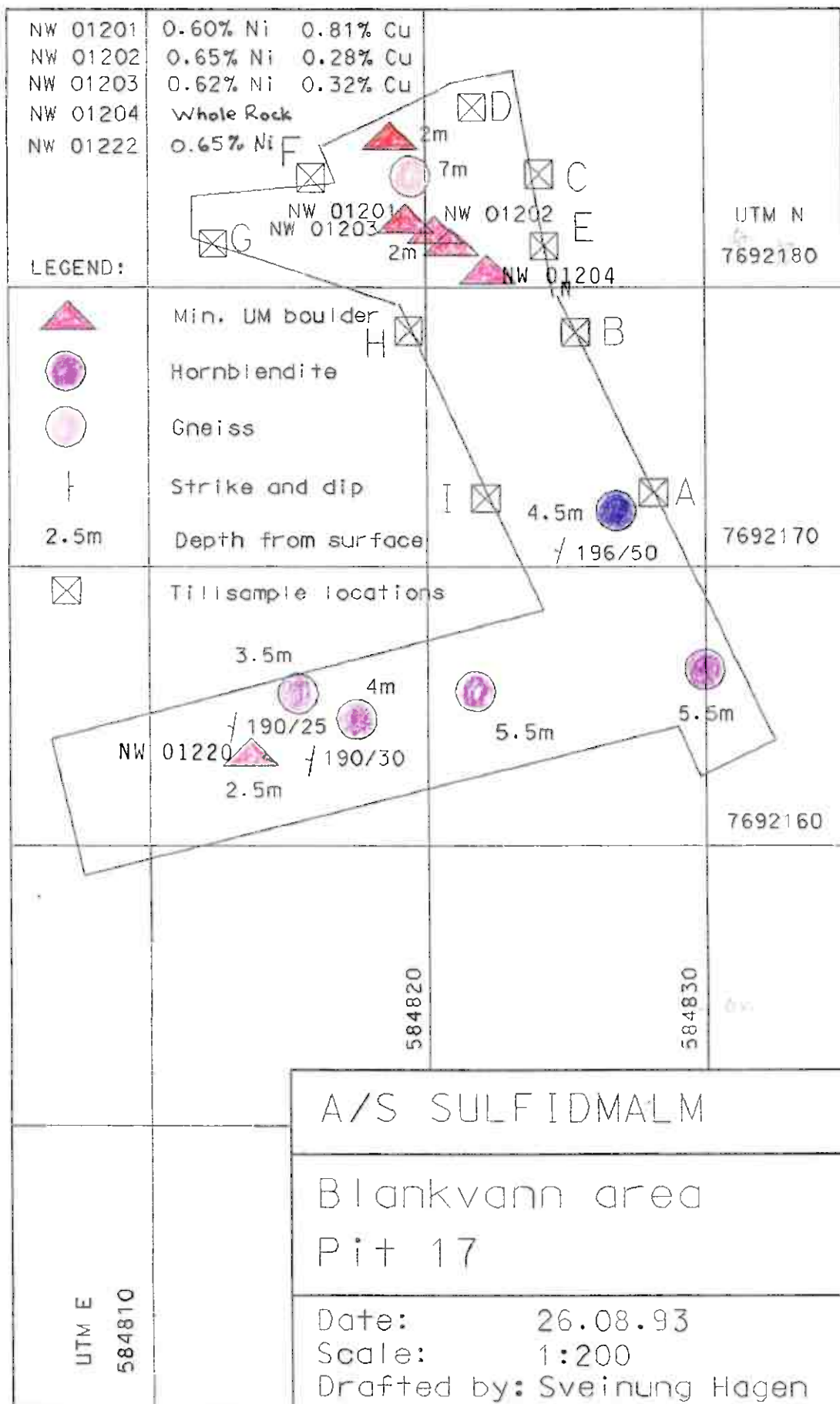
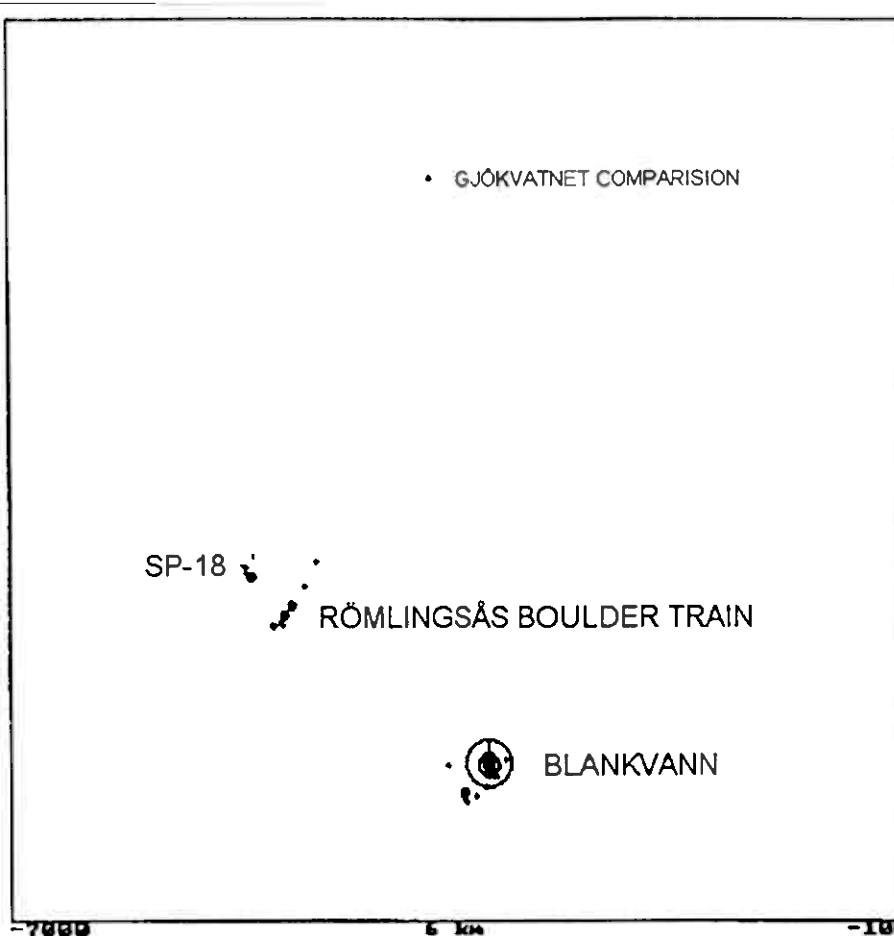


Figure 5



# Ni

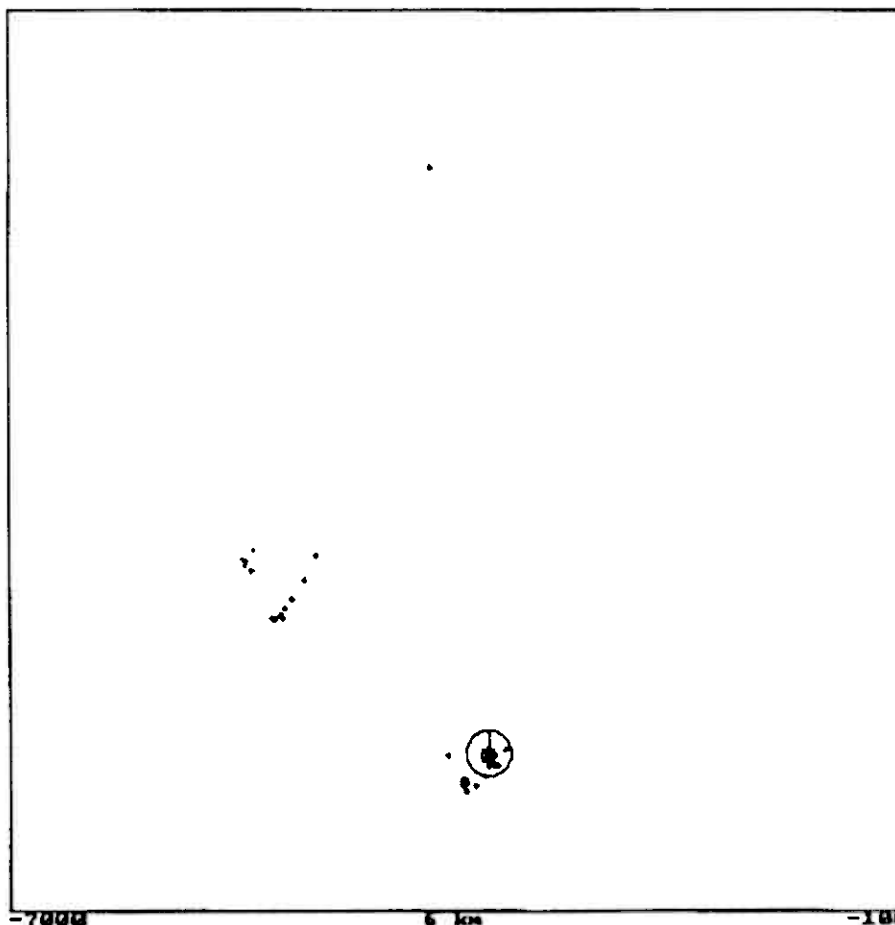
Highest value = 565 ppm

*lokalt stikkingsnett  
se Ek og gull Seltetvann  
rapporter.*

TILL GEOCHEMISTRY, EXCAVATION PITS 1993 SOUTH PASVIK

OVERVIEW OF AREAS (Name)

Radius prop value  
Sample site in center  
SCALE 1:50 000

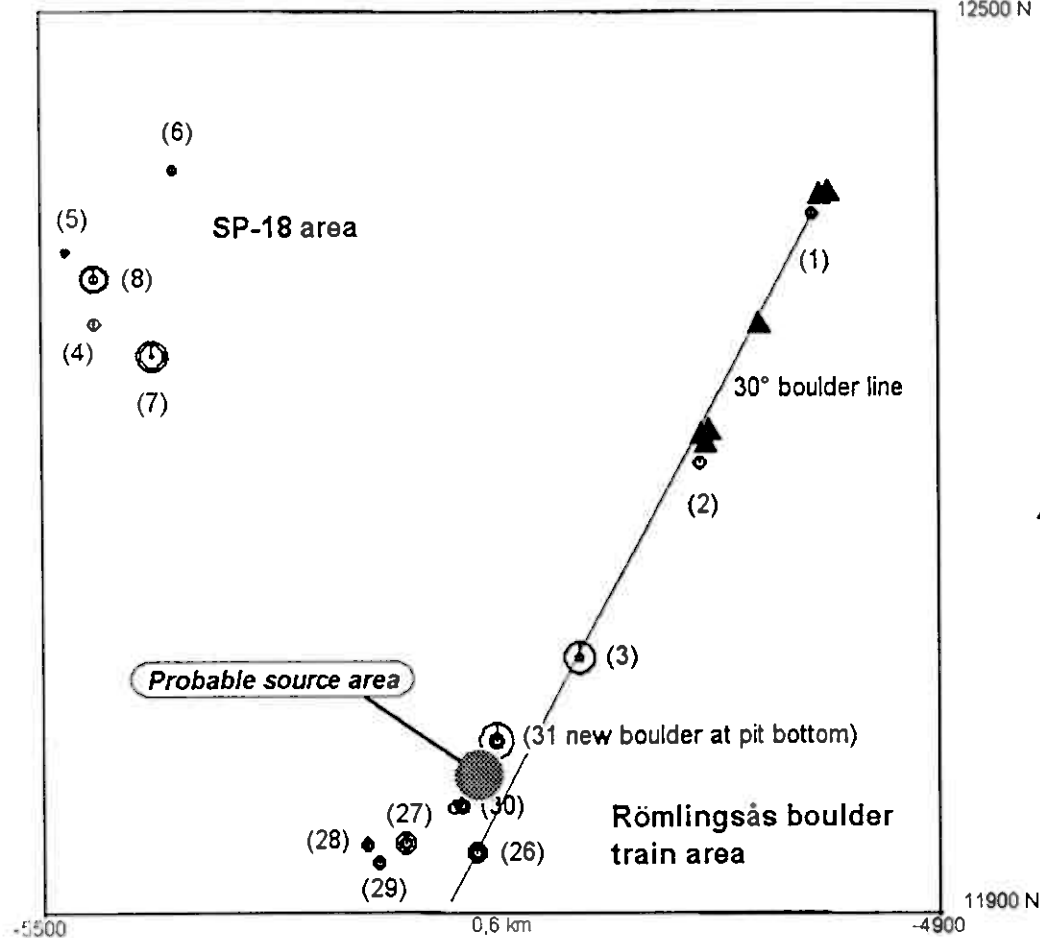


# Cu

Highest value = 1127 ppm

Figure 6

12500 N



Ni

Highest value = 82 ppm  
(in bottom of pit 31)

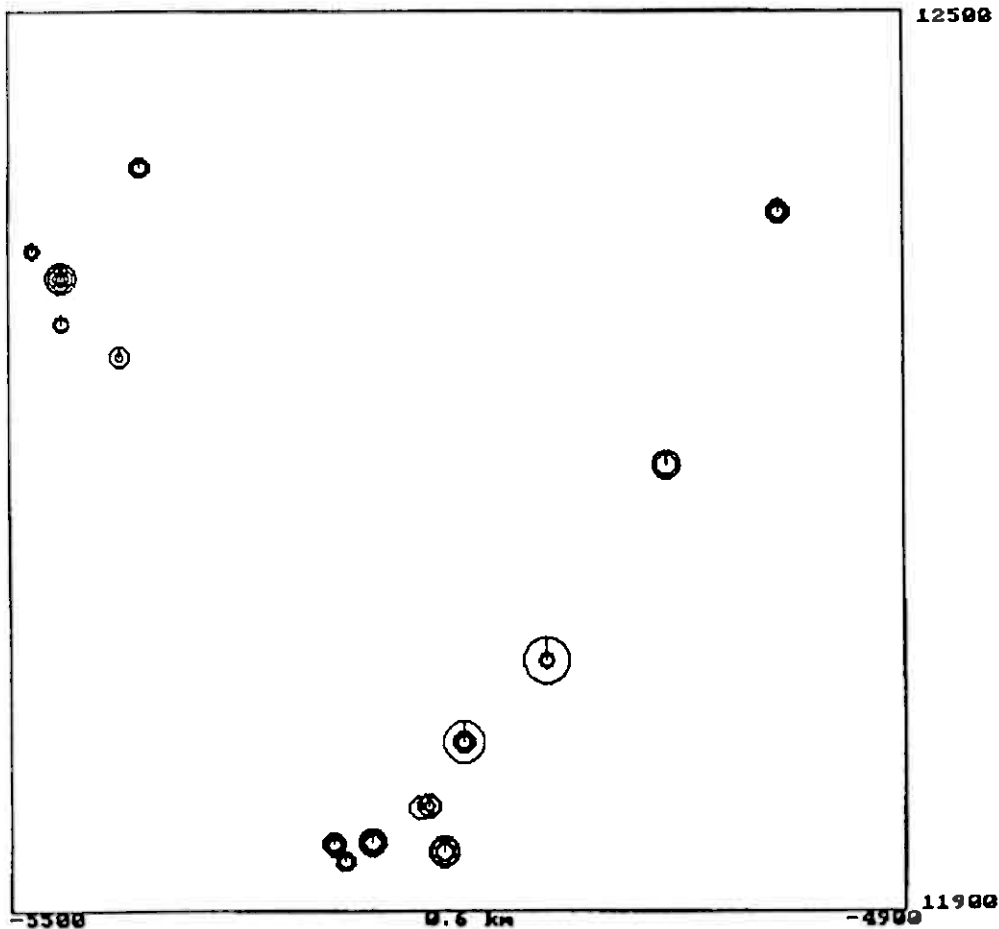
Bottom of pit 3 = 79 ppm

▲ Surface Ni-Cu boulders

TILL GEOCHEMISTRY, EXCAVATION PITS 1993 SOUTH PASVIK  
SP-18 and RÖMLINGSÅS BOULDER TRAIN AREA (PIT No)

Sample site in center  
Radius prop to values  
Scale 1:5000

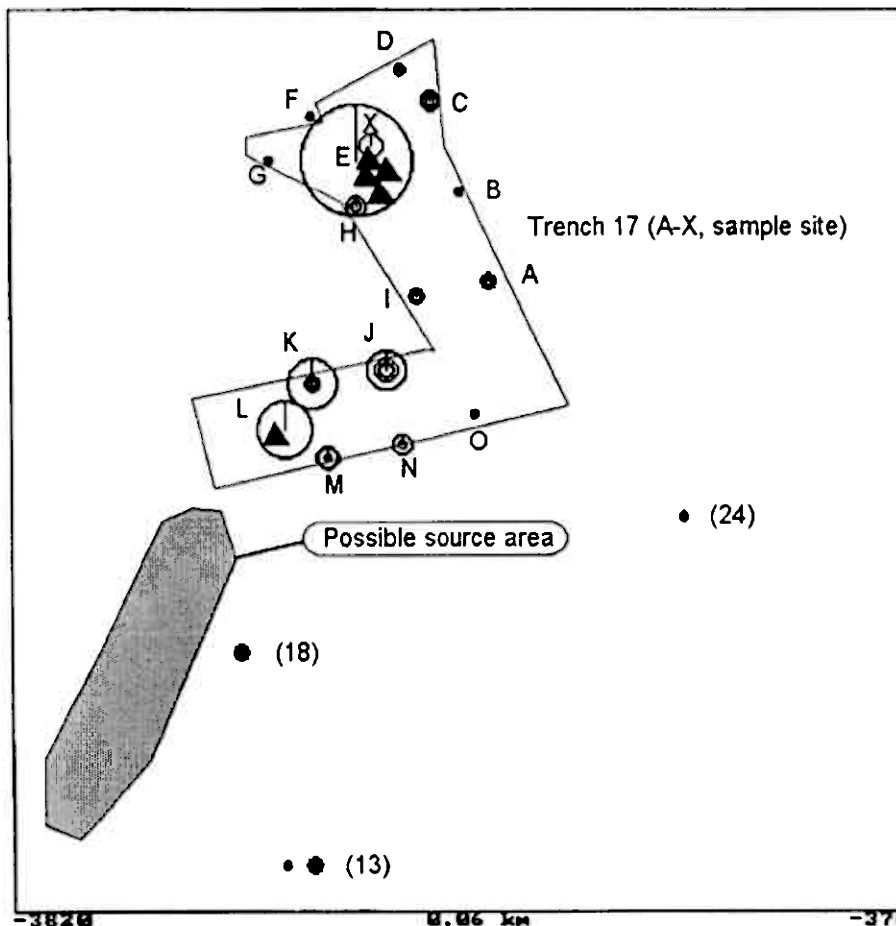
12500



Cu

Highest value = 113 ppm  
(in bottom of pit 3)

Bottom of pit 31 = 107 ppm



11050

Ni

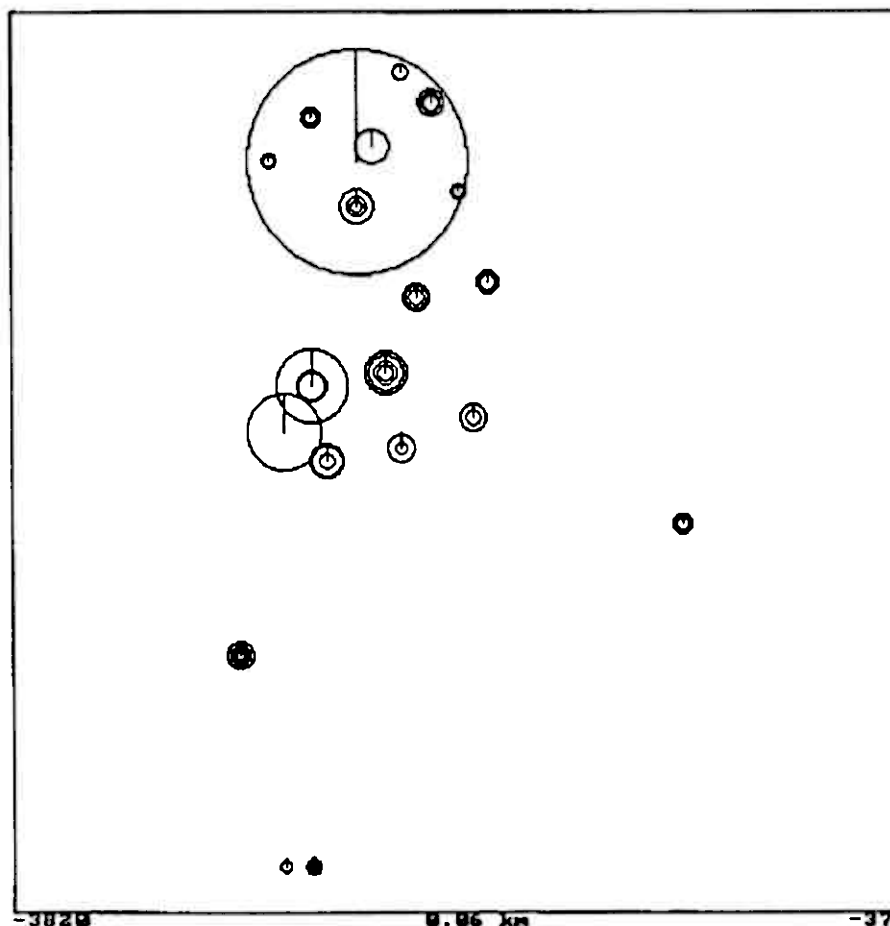
Highest value = 565 ppm

▲ New Ni-Cu boulders  
Subsurface, 2.5-3 m  
Top position in  
lower till. Covered  
by upper till and in  
superposition is  
sediments, mainly  
varvy silt

TILL GEOCHEMISTRY, EXCAVATION PIT 1993 SOUTH PASVIK  
BLANKVANN AREA, CLOSE UP TRENCH 17 SCALE 1:500

10990

Radius prop to value  
Sample site in center



11050

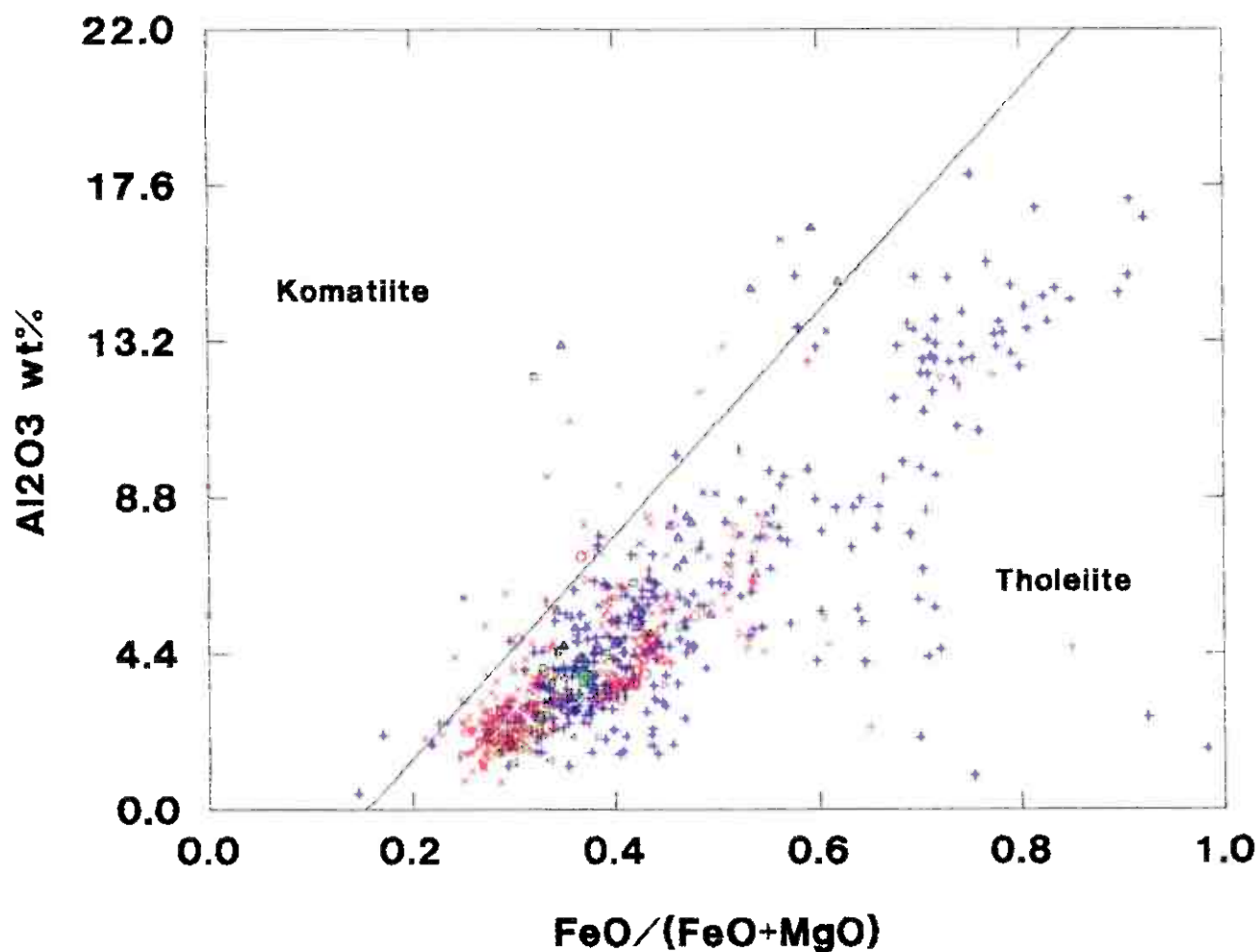
Cu

Highest value = 1127 ppm

Figure 8

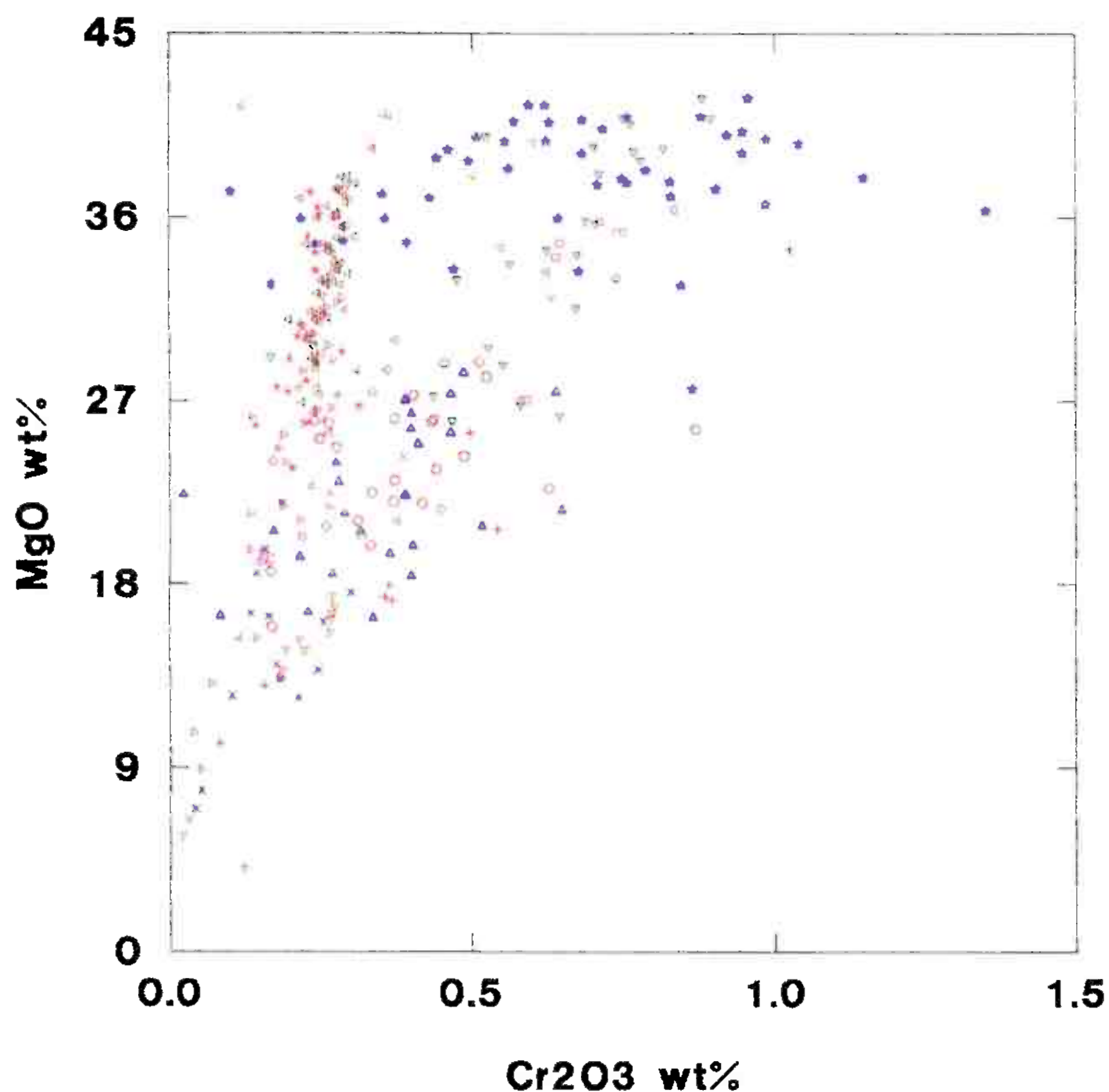


# ALLAR/PECH/S.PAS/PAS - $\text{FeO}/(\text{FeO}+\text{MgO})$ vs $\text{Al}_2\text{O}_3$



| LEGEND        |                  |              |
|---------------|------------------|--------------|
| <b>Pasvik</b> |                  |              |
| ▲ Type 1a     | ▲ Ultramafic     | × Allarechka |
| ■ Type 1b     | ▲ Alt Ultramafic | + Pechenga   |
| ● Type 2a     | ▼ Hornblendite   |              |
|               | × Hbl-Biot Sch   |              |
|               | + Min Meta-UM    |              |

# ALLARECHKA/S.PASVIK - Cr<sub>2</sub>O<sub>3</sub> vs MgO

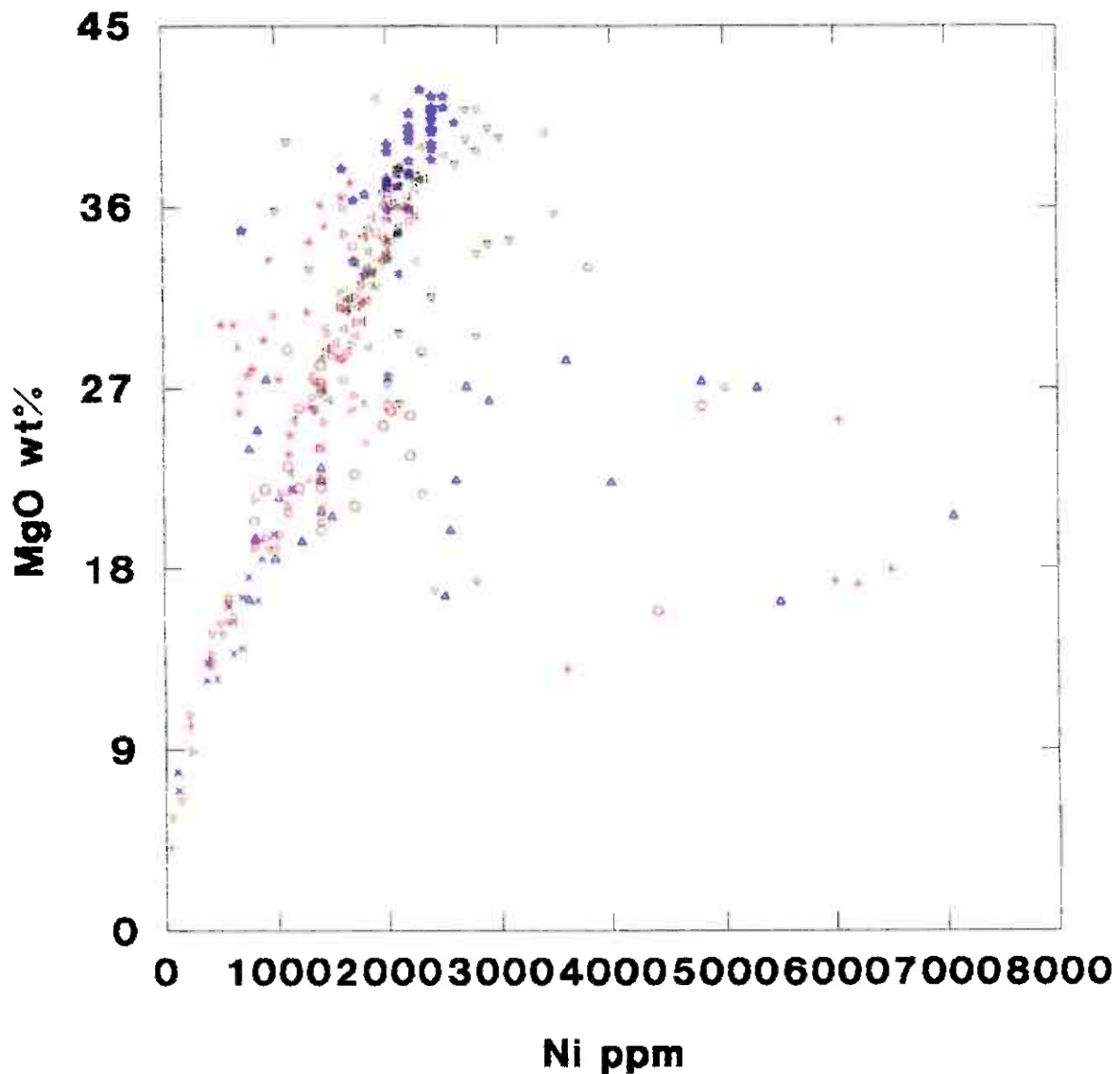


## ALLARECHKA SHOWINGS/DEPOSITS

|                |               |              |                     |
|----------------|---------------|--------------|---------------------|
| ● Allarechka   | ◀ Hihnajarvi  | ◆ Schizokaja | <b>South Pasvik</b> |
| × N. Territory | ▶ Annama      | ★ Kopus      | ◀ Ultramafic        |
| ▲ Vostok       | ◻ Veshjavr    | ● Vylgis     | ▶ Alt Ultramafic    |
| ▼ Akkim        | ◻ Alksoajv    | + Kyjedg     | ▼ Hornblendite      |
| ★ Veljaur      | ◻ Runnijoki   | ★ S. Pasvik  | × Hbl-Blot Sch      |
|                | ★ N Runnijoki |              | + Min Meta-UM       |

Figure 10

# ALLARECHKA/S.PASVIK - Ni vs MgO



## ALLARECHKA SHOWINGS/DEPOSITS

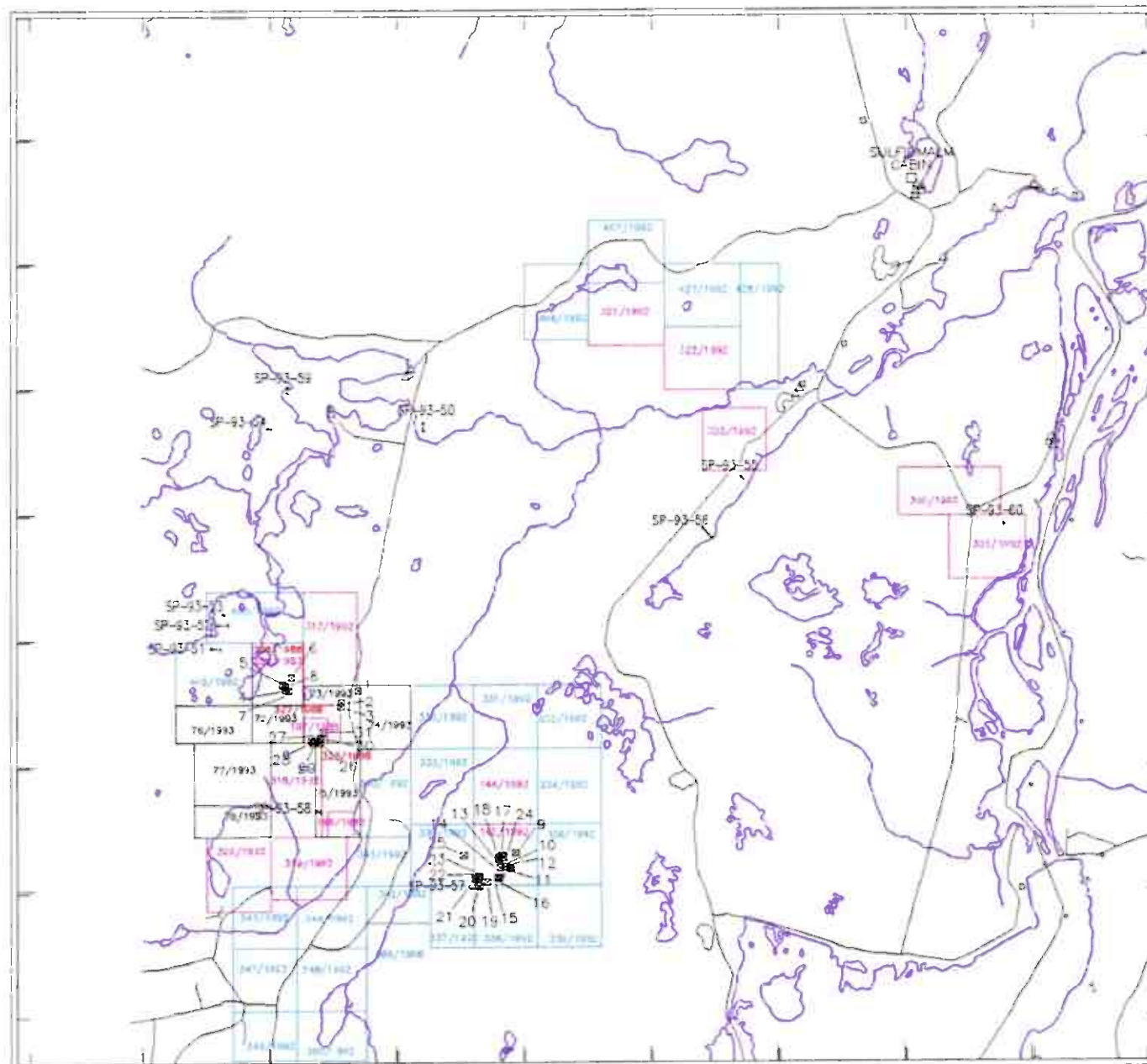
|                |               |              |                     |
|----------------|---------------|--------------|---------------------|
| ● Allarechka   | ◀ Hihnajarvi  | ◆ Schizokaja | <b>South Pasvik</b> |
| × N. Territory | ▶ Annama      | ◆ Kopus      | ◀ Ultramafic        |
| ▲ Vostok       | ■ Veshjavr    | ● Vylgis     | ▶ Alt Ultramafic    |
| ▼ Akkim        | ⊕ Alksoajv    | ⊕ Kyjedg     | ▼ Hornblendite      |
| ✱ Veljaur      | ✱ Runnijoki   | ✱ S. Pasvik  | × Hbl-Biot Sch      |
|                | ◆ N Runnijoki |              | ⊕ Min Meta-UM       |

Figure 11

# LEGEND

## CLAIM OWNERSHIP

- 419/1992 Sulfidmalm, 1992
- 74/1993 Sulfidmalm, 1993
- 322/1992 Krelvi
- 328/1988 Pasvik Fiske
- Forsvann Nature Reserve
- SP-93-50 (DDH COLLAR)
- 17 EXCAVATED TRENCH #17



|                               |                    |                       |                    |
|-------------------------------|--------------------|-----------------------|--------------------|
| A/S SULFIDMALM                |                    | Kristiansund, Norway  |                    |
|                               |                    | Whistler, Nova Scotia |                    |
| RÖMLINGASEN                   |                    |                       |                    |
| Claims, Drilling and Trenches |                    |                       |                    |
| Scale 1:50,000                |                    | NORTH                 |                    |
| Date of issue: October 1993   | Drawn by: S. J. H. | Checked by: S. J. H.  | Figure No: 015-906 |
| Original on 2000 map          | Date: 1993         | Drawn by: S. J. H.    | Figure No: 015-906 |
| Drawn by: S. J. H.            | Date: 1993         | Drawn by: S. J. H.    | Figure No: 015-906 |
| Drawn by: S. J. H.            | Date: 1993         | Drawn by: S. J. H.    | Figure No: 015-906 |

# **APPENDIX 1**

**1993 Summary Drill Logs and Sections**

## **SUMMARY LOG AND DESCRIPTION**

**SP-93-50**

**LOCATION:** 584200E, 7672740N, elevation 100m

**AZIMUTH:** 180° **DIP:** -60°

**TOTAL DEPTH:** 134.80m

**STARTED:** 2 July 1993 **COMPLETED:** 6 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** Test weakly magnetic broken up formational conductor within granite gneiss - sediment transition zone.

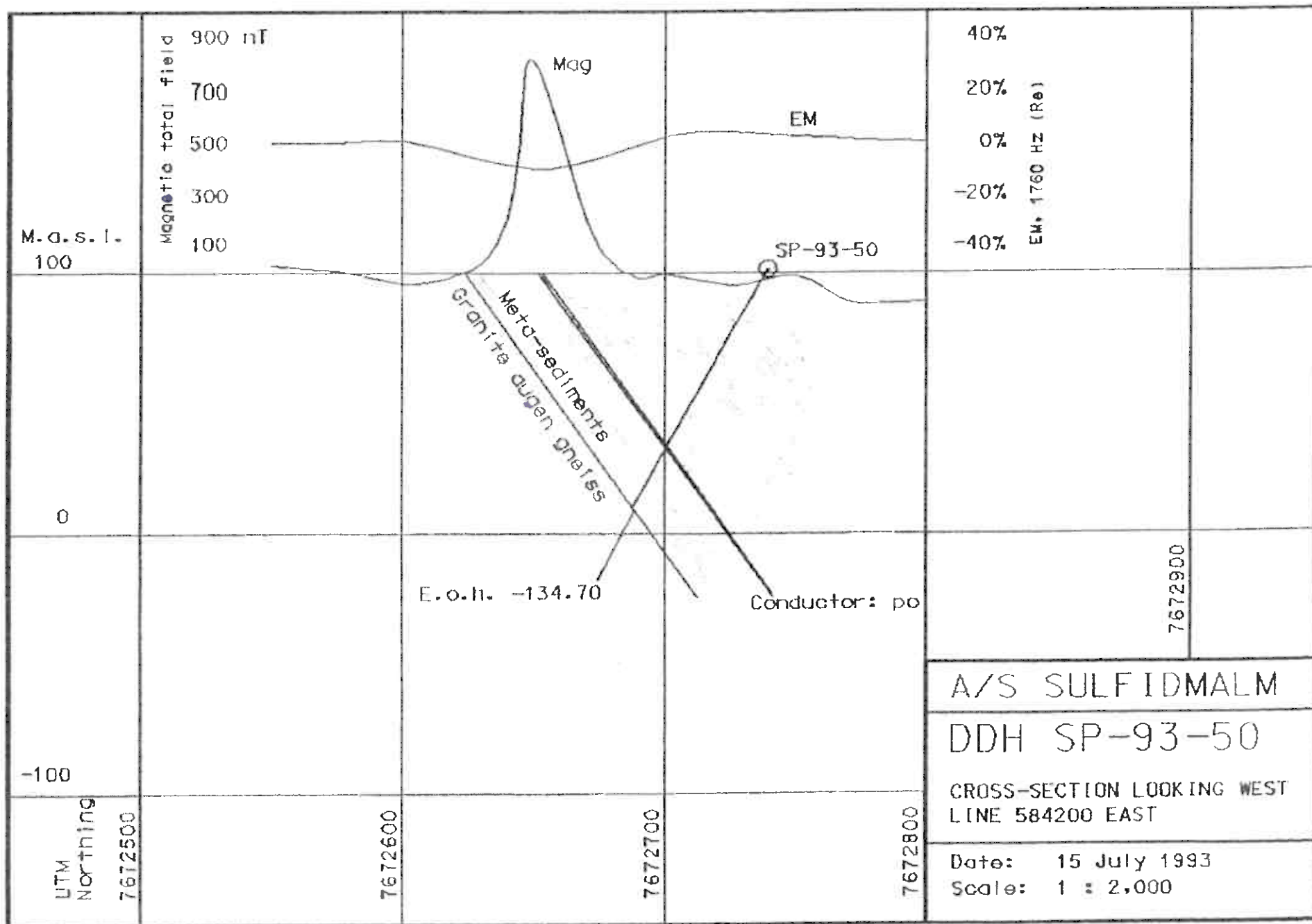
**RESULTS:** Hole intersected 35% pyrrhotite in quartz - rich sediment.

**DIRECT DRILLING COST:** 43,542 NOK

### **SUMMARY LOG:**

|                  |  |
|------------------|--|
| 0.00 - 3.40m     | Overburden                               |
| 3.40 - 23.45m    | Pelitic metasediment                     |
| 23.45 - 78.95m   | Mafic Semi - pelite                      |
| 78.95 - 87.40m   | Amphibolite Schist                       |
| 78.15 - 78.95    | Mineralized metasediment, 35% pyrrhotite |
| 87.40 - 104.40m  | Amphibolite Gneiss                       |
| 104.40 - 105.40m | Hornblende - Biotite Schist              |
| 105.40 - 134.70m | Quartzo - feldspathic gneiss             |

Geochemical or Assay Samples 2; Whole rock Samples: 4.



## SUMMARY LOG AND DESCRIPTION

SP-93-51

**LOCATION:** 582530E, 7670950N, elevation 100m

**AZIMUTH:** 090°      **DIP:** -60°

**TOTAL DEPTH:** 154.70

**STARTED:** 6 July 1993      **COMPLETED:** 8 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test west dipping conductor on strike from magnetic anomaly. Inferred massive sulphide remobilized from ultramafic body.

**RESULTS:** Hole intersected weakly mineralized and locally graphitic sediments followed by granite gneiss. A thin ultramafic body occurs in the granite gneiss.

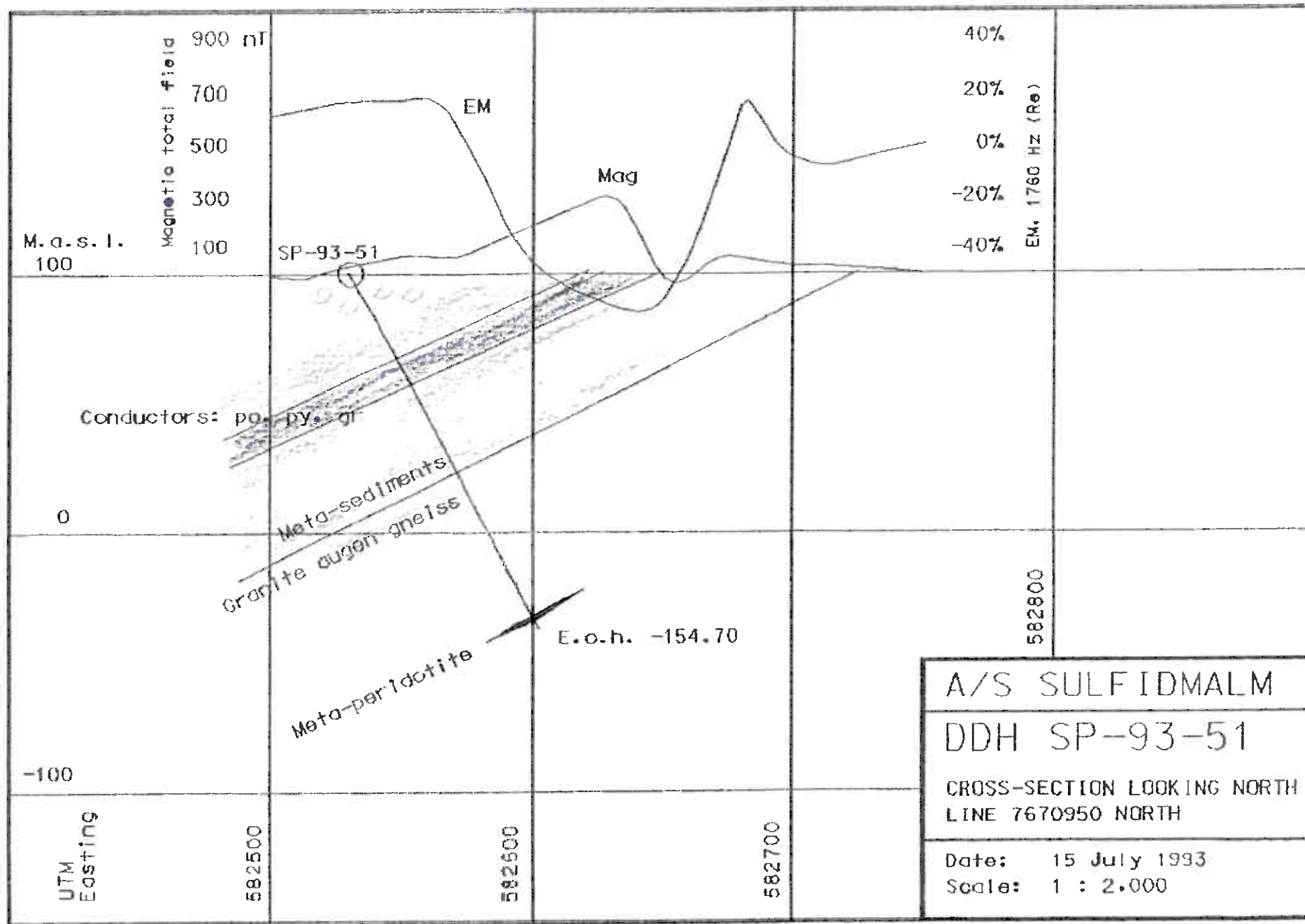
**DIRECT DRILLING COST:** 48,366 NOK

### SUMMARY LOG:

|                  |  |
|------------------|--|
| 0.00 - 9.00m     | Overburden   |
| 9.00 - 88.75m    | Mixed Mafic metawacke and Psammitic metasediments, minor sulphides and carbonaceous zones and pelitic sediments. |
| 88.75 - 149.40m  | Granite Augen Gneiss   |
| 149.40 - 151.70m | Metaperidotite   |
| 151.70 - 154.70m | Granite Augen Gneiss   |
| 154.70           | END OF HOLE  |

Geochemical or Assay samples: 0; Whole rock Samples: 10.





## SUMMARY LOG AND DESCRIPTION

SP-93-52

**LOCATION:** 582580E, 7671140N, elevation 98m

**AZIMUTH:** 090°      **DIP:** -60°

**TOTAL DEPTH:** 170.10

**STARTED:** 9 July 1993      **COMPLETED:** 11 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test inferred weakly conductive edge of inferred mineralized ultramafic within sediments.

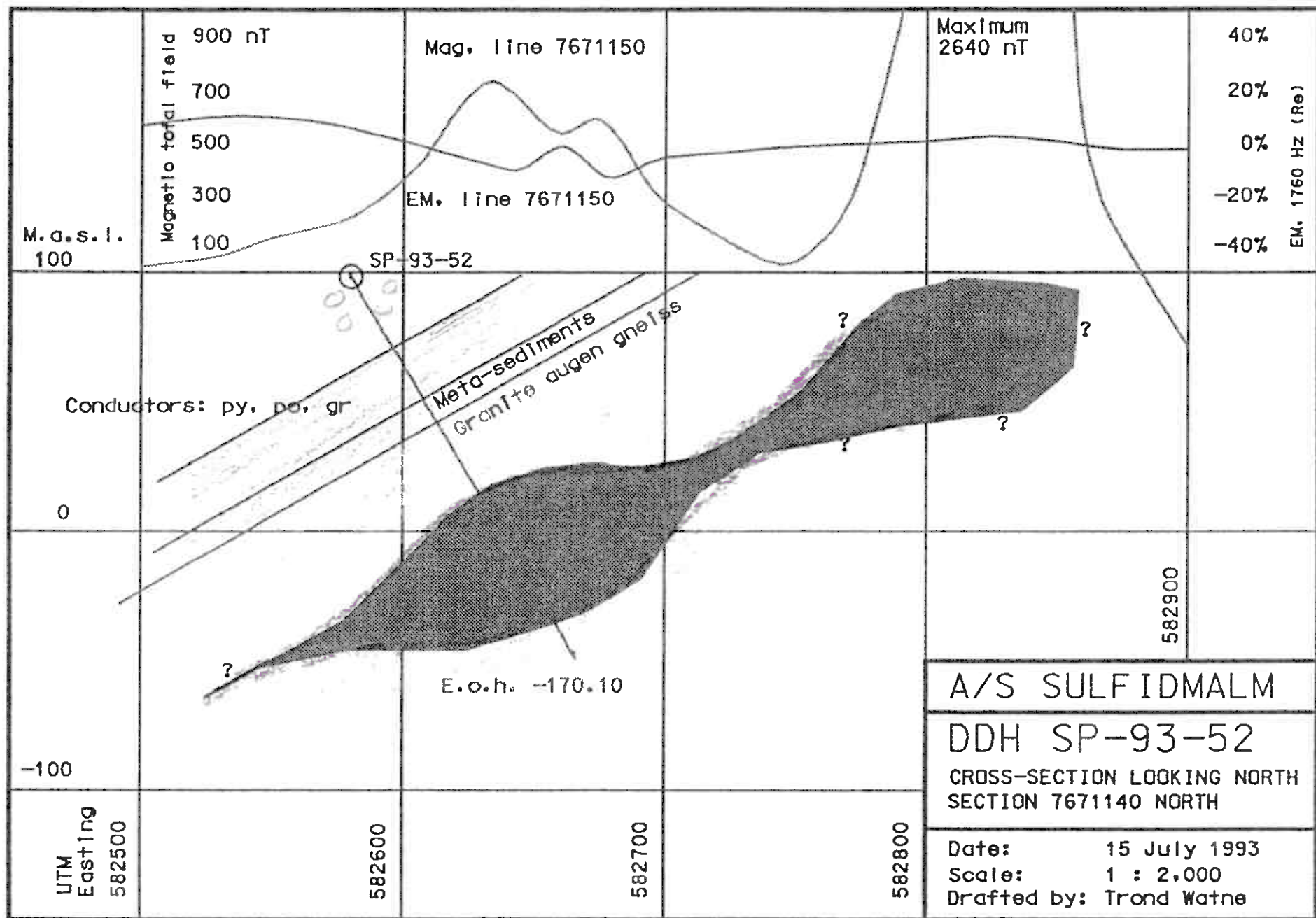
**RESULTS:** Weakly mineralized sediments define the conductors. These are followed by Granite Augen Gneiss which hosts ultramafic. Weak copper mineralization at upper contact (1806 ppm Cu). Rest of unit is barren.

**DIRECT DRILLING COST:** 52,650 NOK

### SUMMARY LOG:

|                  |   |
|------------------|---|
| 0.00 - 6.00m     | Overburden  |
| 6.00 - 24.30m    | Mafic semi - pelitic sediment                                     |
| 24.30 - 31.90m   | Pegmatite   |
| 31.40 - 54.50m   | Mixed metasediments. Minor chalcopryrite in quartz vein at 43.60m |
| 54.50 - 59.80m   | Granite Augen Gneiss  |
| 59.80 - 64.55m   | Metagabbro (1806 ppm Cu in "1% disseminated cpy")                 |
| 64.55 - 94.75m   | Granite Augen Gneiss  |
| 94.75 - 97.50m   | Metagabbro  |
| 97.50 - 154.15m  | Metaperidotite  |
| 154.15 - 157.70m | Granite Augen Gneiss  |
| 157.70 - 159.80m | Metaperidotite  |
| 159.80 - 170.10m | Granite Augen Gneiss  |
| 170.10           | END OF HOLE   |

Geochemical or Assay samples 2; Whole rock Samples: 17.



## **SUMMARY LOG AND DESCRIPTION**

**SP-93-53**

**LOCATION:** 582625E, 7671225N, elevation 105m

**AZIMUTH:** 090°      **DIP:** -80°

**TOTAL DEPTH:** 160.40

**STARTED:** 12 July 1993      **COMPLETED:** 14 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** Based upon results in SP-93-52, hole is to probe ultramafic body at depth and continue drilling to postulated lower sediment below gneiss.

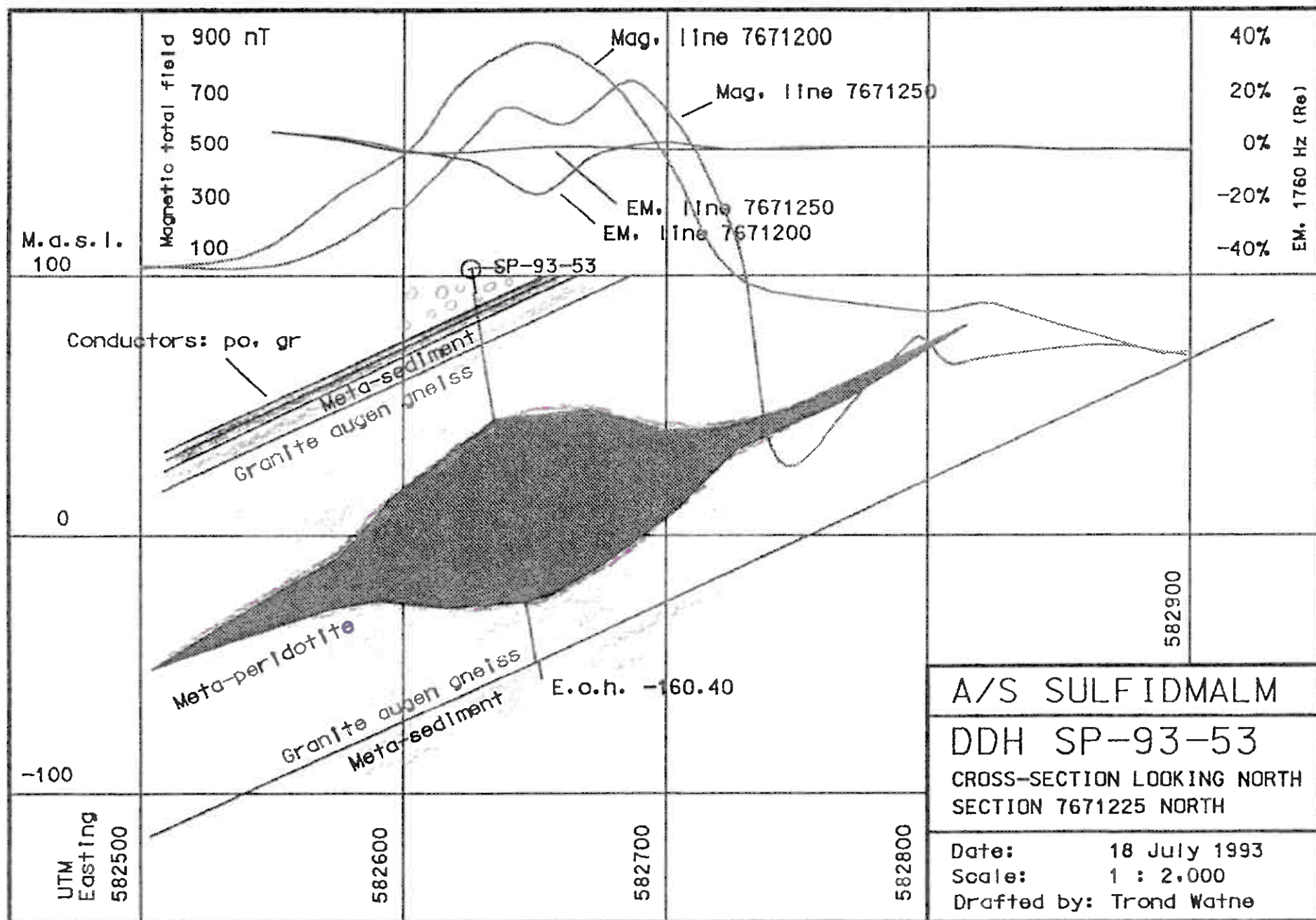
**RESULTS:** Intersected GAG - hosted ultramafic from 58.90 to 130.45 and lower metasediment at 153.0m. No mineral.

**DIRECT DRILLING COST:** 49,642 NOK

### **SUMMARY LOG:**

|                  |  |
|------------------|--|
| 0.00 - 8.70m     | Overburden                                       |
| 8.70 - 30.95m    | Mixed psammitic, pelitic and wacke metasediments |
| 30.95 - 59.00m   | Granite Augen Gneiss                             |
| 59.00 - 130.40m  | Metaperidotite                                   |
| 130.40 - 153.80m | Granite Augen Gneiss                             |
| 153.80 - 160.40m | Semi pelite                                      |
| 160.40           | END OF HOLE                                      |

Geochemical or Assay samples 0; Whole rock Samples: 17.



## SUMMARY LOG AND DESCRIPTION

SP-93-54

**LOCATION:** 582975E, 7672700N, elevation 105m

**AZIMUTH:** 090° **DIP:** -70°

**TOTAL DEPTH:** 140.15

**STARTED:** 15 July 1993 **COMPLETED:** 17 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test inferred ultramafic body and probe through to lower sediments for possible hidden sulphide mineralization.

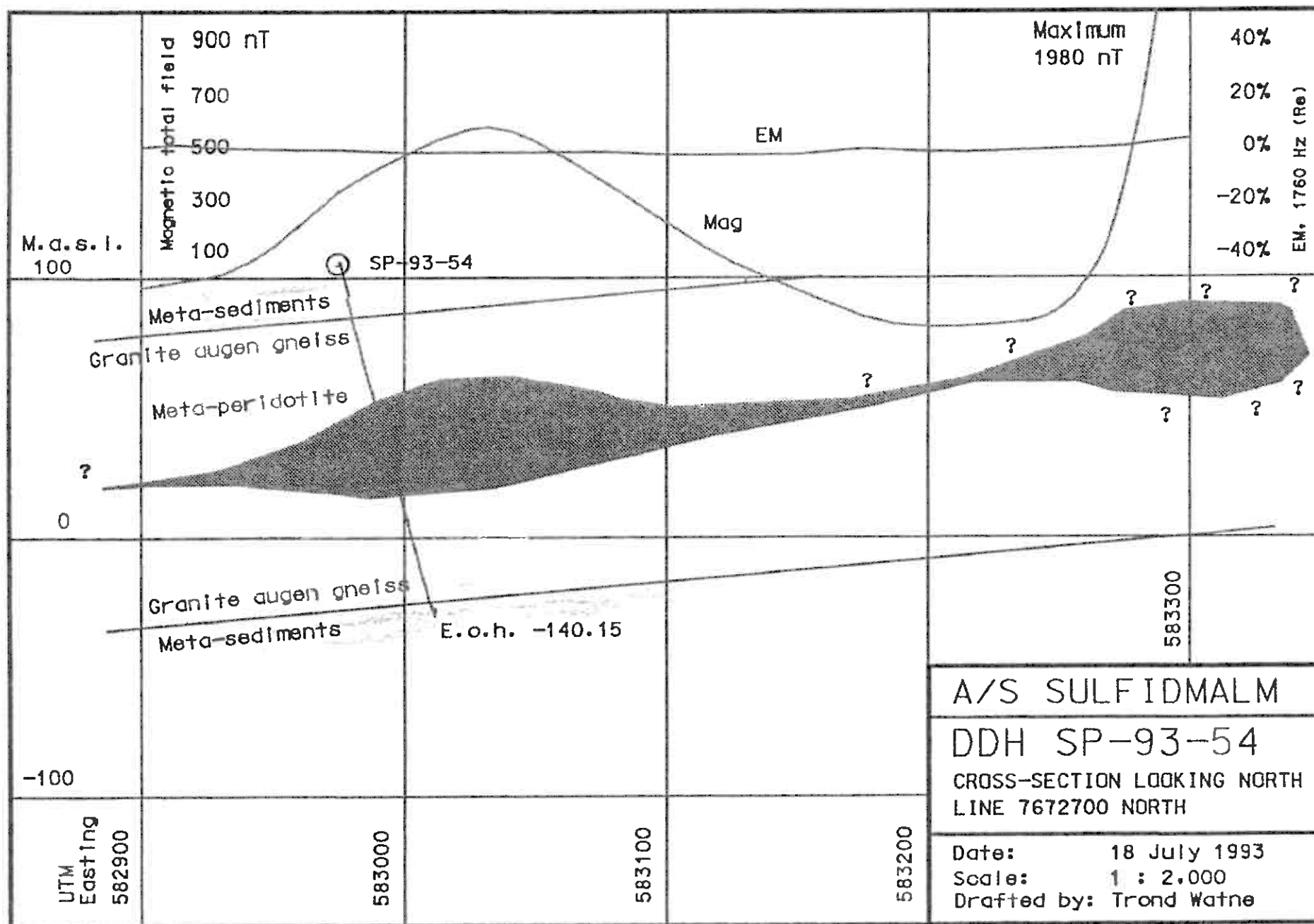
**RESULTS:** GAG - hosted ultramafic, 54.50 to 88.65. Mixed ultramafic - Granite Augen Gneiss to 103.1. Remobilized sulphide (3224 ppm Ni, 4712 ppm Cu) related to biotite remobilizate at ultramafic contact.

**DIRECT DRILLING COST:** 45,207 NOK

### SUMMARY LOG:

|                  |   |
|------------------|---|
| 0.00 - 13.55m    | Overburden  |
| 13.55 - 21.10m   | Mafic metawacke   |
| 21.10 - 54.60m   | Granite Augen Gneiss  |
| 54.60 - 88.40m   | Metaperidotite  |
| 88.40 - 134.45m  | Granite Augen Gneiss  |
| 89.95 - 103.10m  | Biotitized ultramafic, minor remobilized sulphides related to quartz vein, biotite. 101.40 - 101.60 3224 ppm Ni, 4712 ppm Cu. |
| 134.45 - 136.55m | Amphibolite Gneiss  |
| 136.55 - 140.15m | Mafic Metawacke   |
| 140.15m          | END OF HOLE   |

Geochemical or Assay samples 2; Whole rock Samples: 14.



**SUMMARY LOG AND DESCRIPTION**  
**SP-93-55**

**LOCATION:** 586705E, 7672300N, elevation 60m

**AZIMUTH:** 135°      **DIP:** -65°

**TOTAL DEPTH:** 303.40

**STARTED:** 19 July 1993      **COMPLETED:** 22 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test inferred deep gabbroic plug. The northwest contact zone has a broad area of conductivity which compares to a mineralized cap to a gabbroic to ultramafic intrusive. Best response is at low frequencies.

**RESULTS:** Weakly mineralized sediments define the conductivity and magnetics. These are interpreted to be roof pendants or part of downfaulted country rock cap.

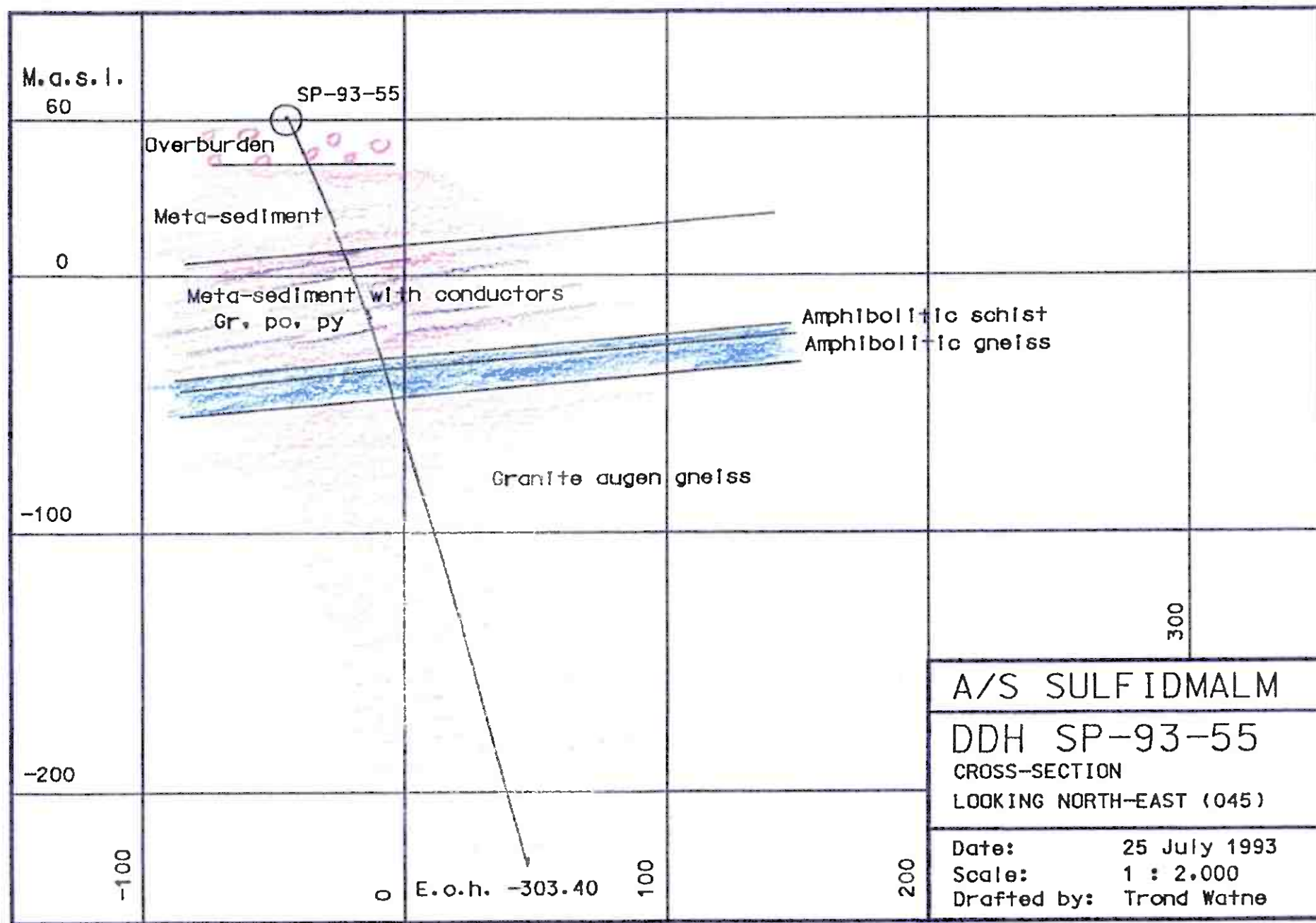
**DIRECT DRILLING COST:** 94,855 NOK

**SUMMARY LOG:**

|                  |   |
|------------------|---|
| 0.00 - 19.90m    | Overburden  |
| 19.90 - 46.05m   | Semi - pelitic sediment                                   |
| 46.05 - 99.05m   | Mafic metawacke, locally graphitic and weakly mineralized |
| 99.05 - 103.75m  | Amphibolite Schist  |
| 103.75 - 116.92m | Amphibolite Gneiss  |
| 116.92 - 303.40m | Granite Augen Gneiss                                      |
| 303.40           | END OF HOLE   |

Geochemical or Assay samples 2; Whole rock Samples: 1.





## SUMMARY LOG AND DESCRIPTION

**SP-93-56**

**LOCATION:** 586400E, 7671900N, elevation 60m

**AZIMUTH:** 135°      **DIP:** -55°

**TOTAL DEPTH:** 200.50

**STARTED:** 22 July 1993    **COMPLETED:** 26 July 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test outer weakly conductive and magnetic edge of inferred deep seated plug. This hole is approximately 500 metres from Hole 55, in outer magnetic rim.

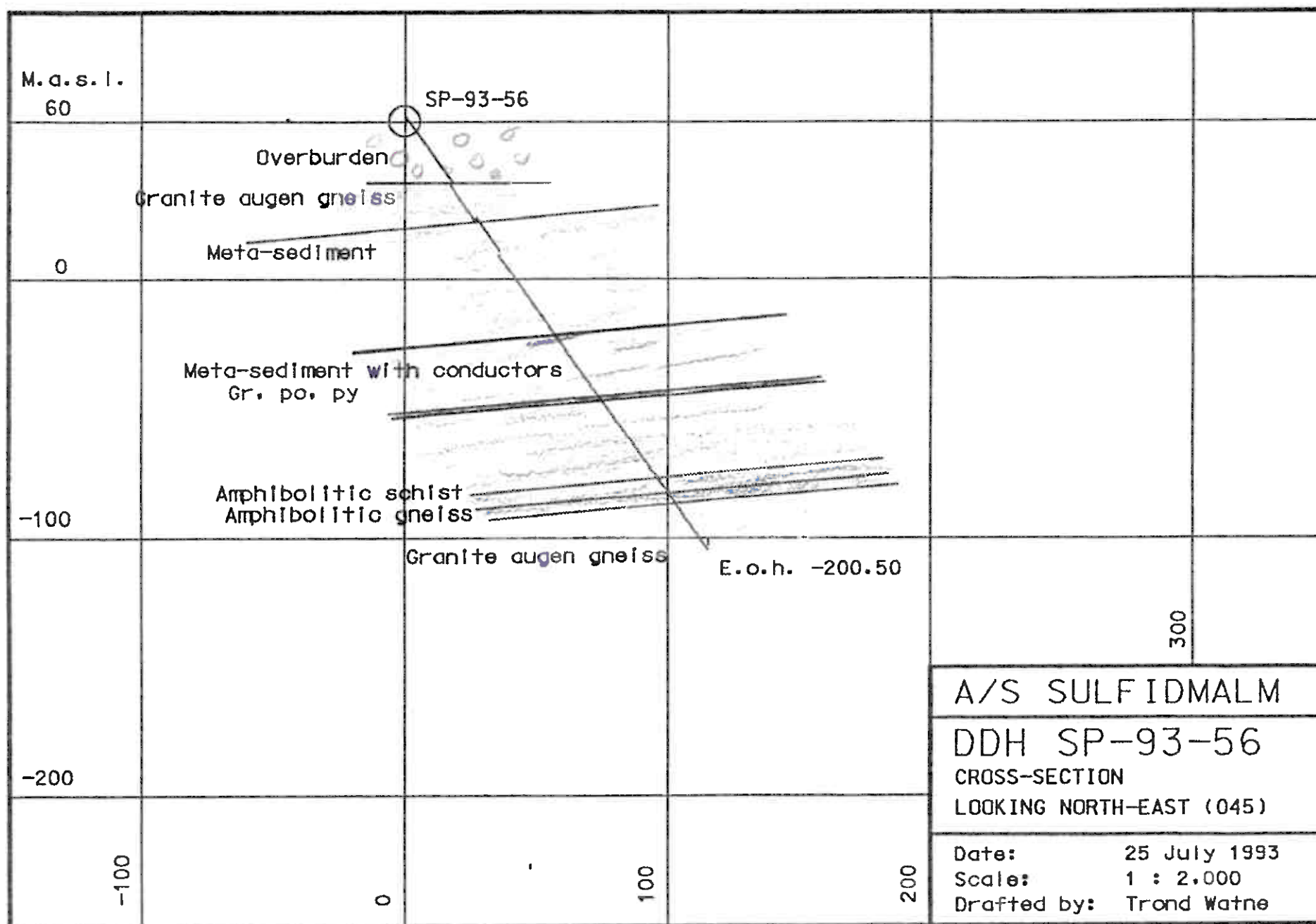
**RESULTS:** Sediments define the conductors, as in Hole 55. The stronger magnetic response is attributed to strongly magnetic gabbro within the gneisses.

**DIRECT DRILLING COST:** 66,145 NOK

### SUMMARY LOG:

|                  |   |
|------------------|---|
| 0.00 - 29.90m    | Overburden                                      |
| 29.90 - 46.45m   | Granite Augen Gneiss, mag susc up to 0.39       |
| 46.45 - 61.65m   | Semi Pelite                                     |
| 61.65 - 167.55m  | Mafic metawacke, locally graphitic, mineralized |
| 167.55 - 173.65m | Amphibolite Schist                              |
| 173.65 - 178.15m | Amphibolite Gneiss                              |
| 178.15 - 200.50m | Granite Augen Gneiss                            |
| 200.50           | END OF HOLE                                     |

Geochemical or Assay samples 1; Whole rock Samples: 1.



## SUMMARY LOG AND DESCRIPTION

**SP-93-57**

**LOCATION:** 584575E, 7669025N, elevation 102m

**AZIMUTH:** 090°      **DIP:** -70°

**TOTAL DEPTH:** 203.65m

**STARTED:** 30 July 1993      **COMPLETED:** 3 August 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test inferred downplunge source of mineralized blocks on Blankvann claims, in Pit 17 excavated in July.

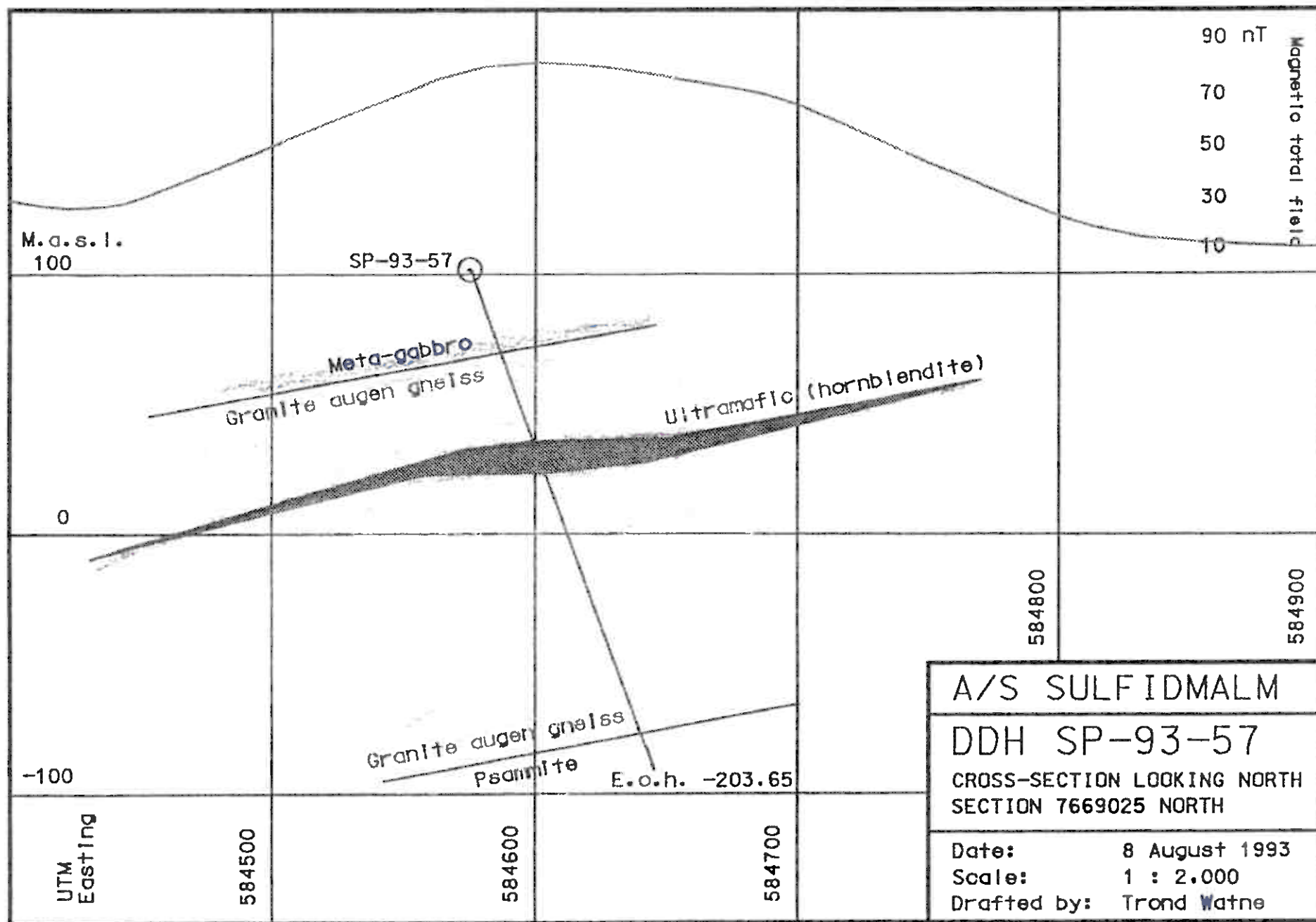
**RESULTS:** Weakly mineralized ultramafic (trace chalcopyrite and pyrrhotite) from 70.0 to 83.5. Granite gneiss to 191.0, sediments to EOH.

**DIRECT DRILLING COST:** 62,496 NOK

### SUMMARY LOG:

|                  |   |
|------------------|---|
| 0.00 - 15.55m    | Overburden  |
| 15.55 - 32.15m   | Amphibolite Gneiss                                  |
| 32.15 - 32.40m   | Granite Augen Gneiss                                |
| 32.40 - 34.15m   | Metagabbro  |
| 34.15 - 70.30m   | Granite Augen Gneiss                                |
| 70.30 - 83.75m   | Hornblendite minor mineralization; 119 - 303 ppm Cu |
| 83.75 - 190.55m  | Granite Augen Gneiss                                |
| 190.55 - 194.55m | Amphibolite Gneiss                                  |
| 194.55 - 202.45m | Mixed metasediments                                 |
| 202.45 - 203.65m | Pegmatite   |
| 203.65m          | END OF HOLE   |

Geochemical or Assay samples 0; Whole rock Samples: 5.



## SUMMARY LOG AND DESCRIPTION

**SP-93-58**

**LOCATION:** 583360E, 7669650N, elevation 100m

**AZIMUTH:** 090°      **DIP:** -80°

**TOTAL DEPTH:** 135.10

**STARTED:** 4 August, 1993 **COMPLETED:** 6 August, 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test possible Rømlingsås boulder source. Hole to penetrate into lower sediments below ultramafic.

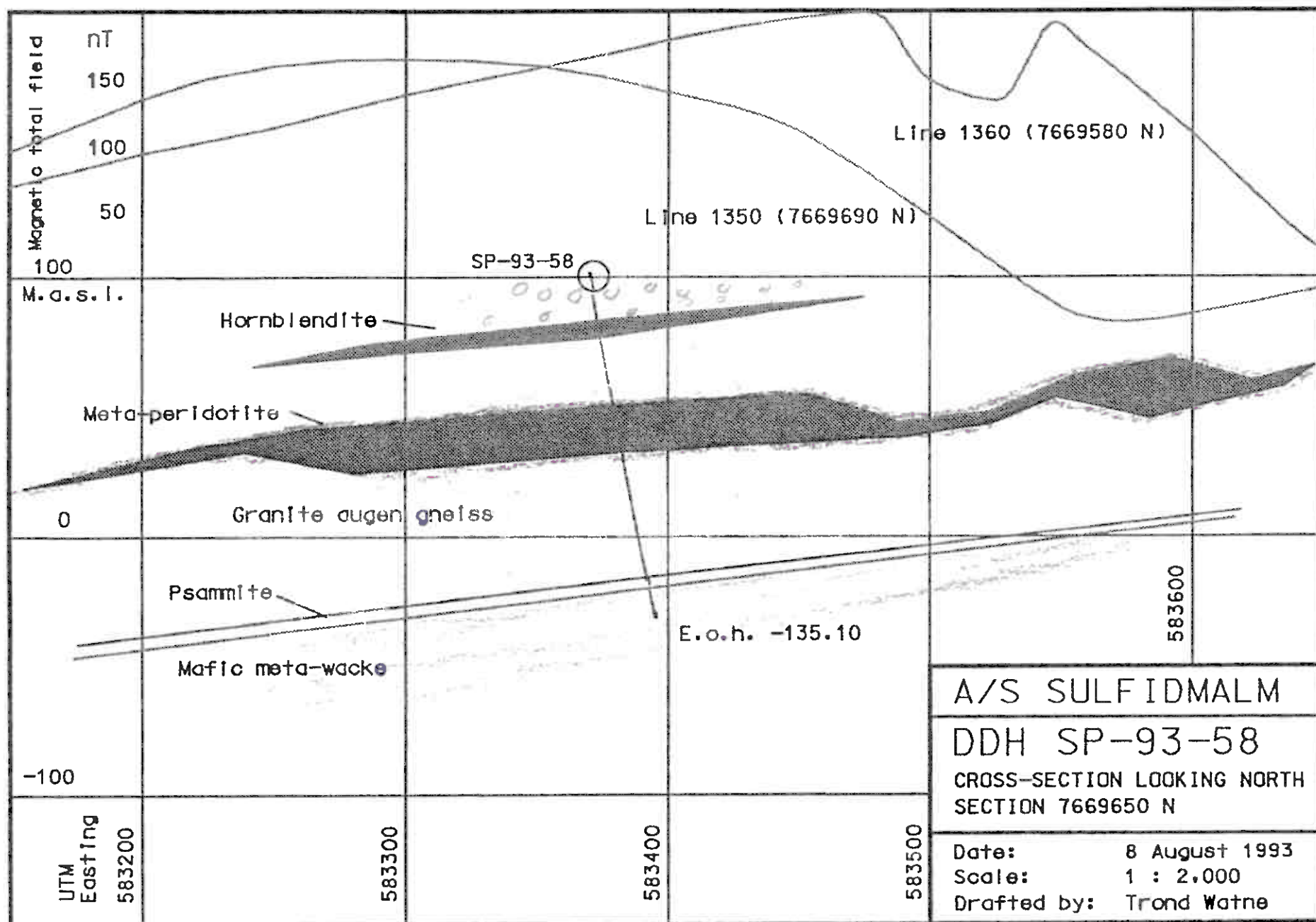
**RESULTS:** Unmineralized ultramafic from 17.0 to 20.6 and 50.2 to 68.8, both within granite gneiss. Sediments at 118.7 to end of hole.

**DIRECT DRILLING COST:** 41,506 NOK

### SUMMARY LOG:

|                  |   |
|------------------|---|
| 0.00 - 7.10m     | Overburden                                  |
| 7.10 - 17.10m    | Granite Augen Gneiss                        |
| 17.10 - 23.85m   | Hornblendite, with 2 metre - wide pegmatite |
| 23.85 - 50.20m   | Granite Augen Gneiss                        |
| 50.20 - 68.90m   | Metaperidotite                              |
| 68.90 - 118.40m  | Granite Augen Gneiss                        |
| 118.40 - 122.13m | Semi pelite                                 |
| 122.13 - 133.07m | Mafic metawacke                             |
| 133.07 - 135.10m | Semi pelite                                 |
| 135.10           | END OF HOLE                                 |

Geochemical or Assay samples 0; Whole rock Samples: 8.



## SUMMARY LOG AND DESCRIPTION

SP-93-59

**LOCATION:** 583139E, 7673030N, elevation 97m

**AZIMUTH:** 180° **DIP:** -70°

**TOTAL DEPTH:** 162.50

**STARTED:** 8 August, 1993 **COMPLETED:** 11 August, 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test possible mineralization in inferred anticlinal fold hinge as a follow up to hole 54.

**RESULTS:** Metasediments with pegmatite to 71.70, mainly granite gneiss with hornblendite to end of hole. No evidence of continuous ultramafic body or mineralization.

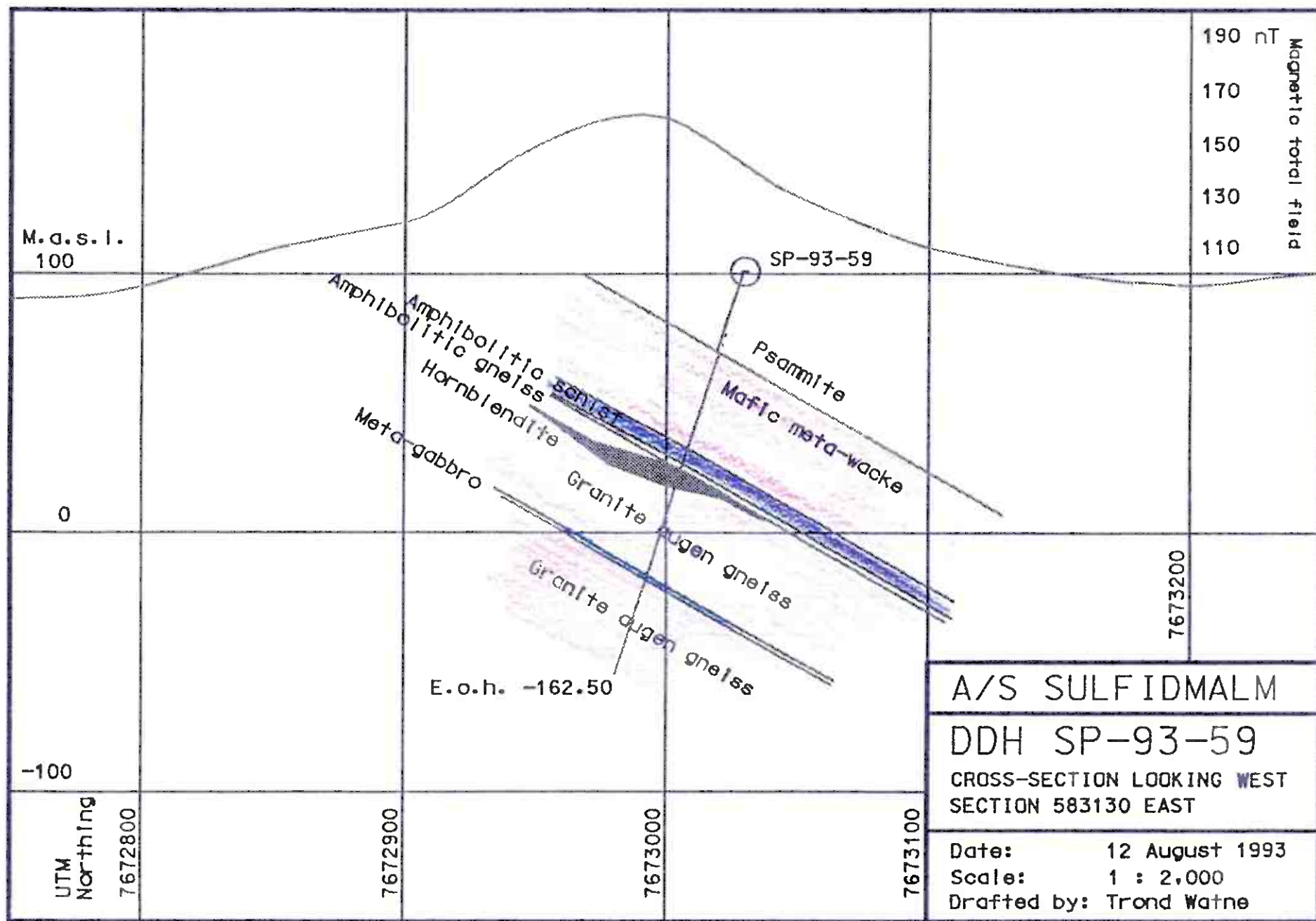
**DIRECT DRILLING COST:** 66,396 NOK

### SUMMARY LOG:

|                  |  |
|------------------|--|
| 0.00 - 20.30m    | Overburden   |
| 20.30 - 71.45m   | Mixed metasediments  |
| 71.45 - 77.40m   | Amphibole Schist transition from mafic metawacke to metagabbro                     |
| 77.40 - 79.60m   | Meta gabbro  |
| 79.60 - 86.98m   | Hornblendite, weakly mineralized (206 - 220 ppm Cu over 10 to 20 cm point samples) |
| 86.98 - 121.52m  | Granite Augen Gneiss   |
| 121.52 - 124.45m | Metagabbro   |
| 124.45 - 162.50m | Granite Augen Gneiss   |
| 162.50           | END OF HOLE  |

Geochemical or Assay samples 0; Whole rock Samples: 5.





## SUMMARY LOG AND DESCRIPTION

**SP-93-60**

**LOCATION:** 588772E, 7671925N, elevation 60m

**AZIMUTH:** 150°      **DIP:** -75°

**TOTAL DEPTH:** 206.40

**STARTED:** 12 August 1993 **COMPLETED:** 16 August, 1993

**LOGGED BY:** Trond Watne, Daryl Hodges

**PURPOSE:** To test Russian MPP target. Estimated target is flat lying conductor at depth of 180 metres, proximal to magnetic ultramafic bodies.

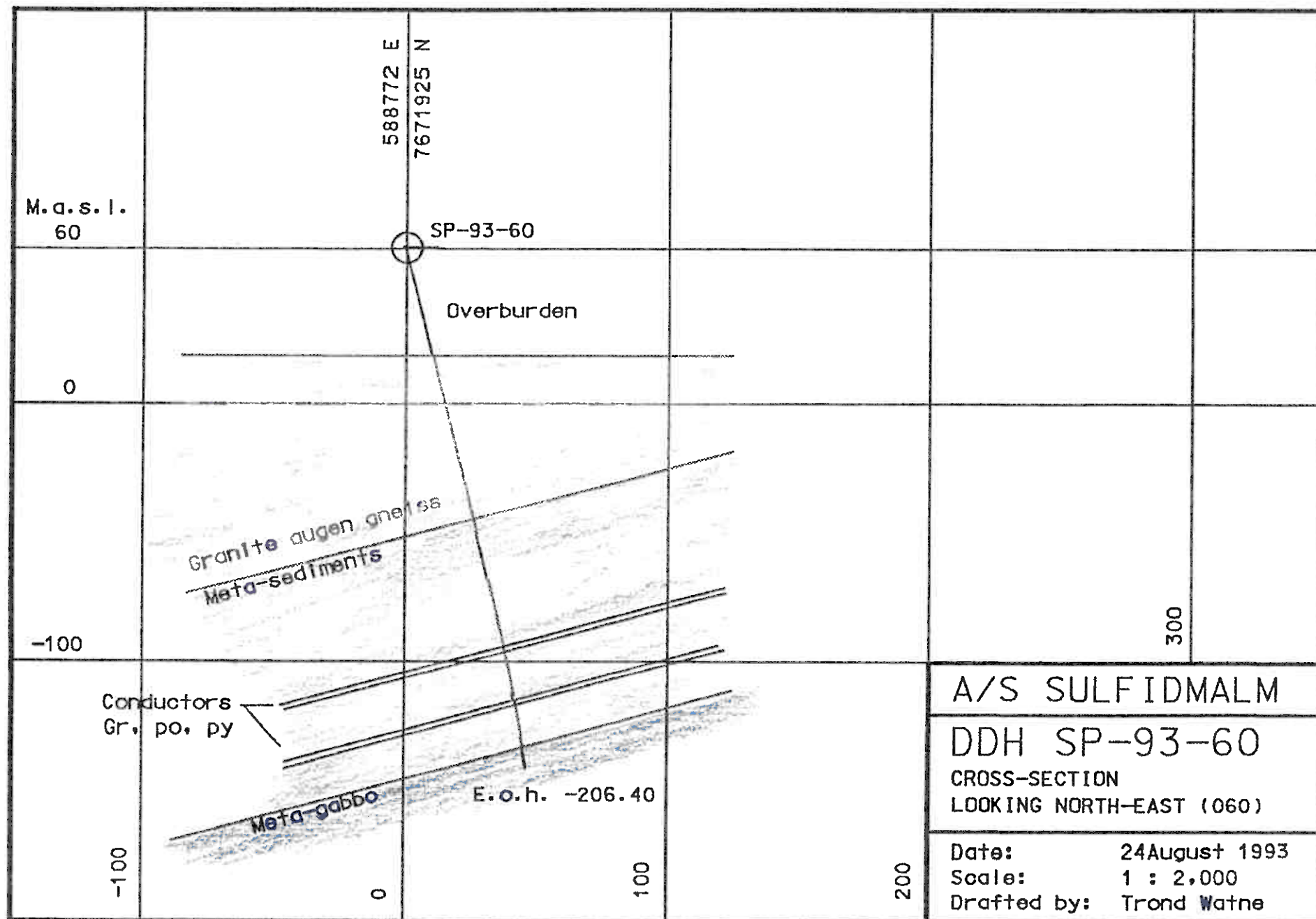
**RESULTS:** Mineralized sediments define the conductors at depths of 160.50 and 181.70 metres. Sediments contain up to 30% pyrrhotite.

**DIRECT DRILLING COST:** 132,056 NOK

### SUMMARY LOG:

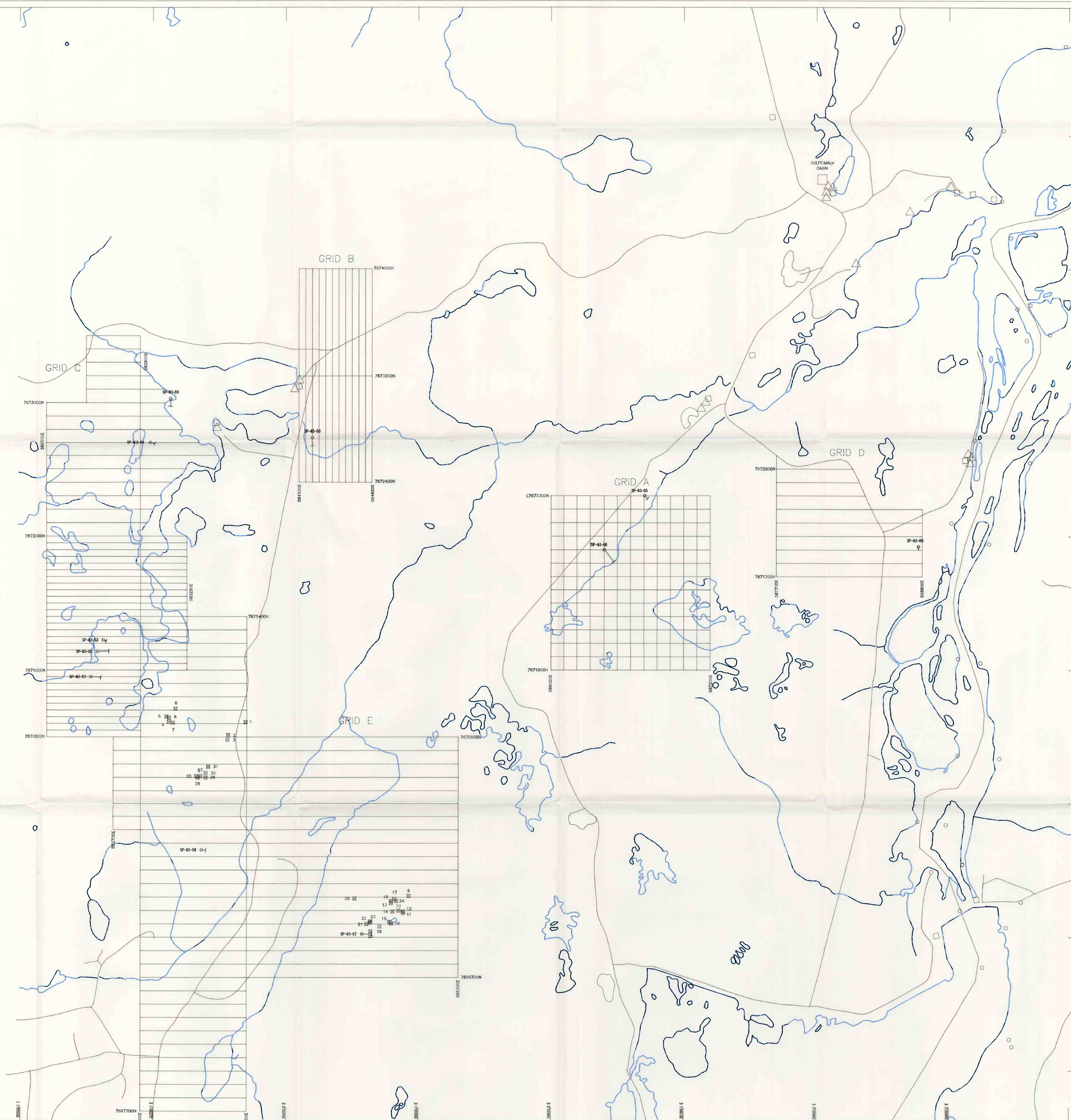
|                  |  |
|------------------|--|
| 0.00 - 43.00m    | Overburden   |
| 43.00 - 108.30m  | Granite Augen Gneiss   |
| 108.30 - 158.45m | Mixed metasediments  |
| 158.45 - 160.65m | Graphitic, mineralized laminated psammite  |
| 160.65 - 177.75m | Mafic metawacke  |
| 177.75 - 179.50m | Metagabbro (1806 ppm Cu in "1% disseminated cpy")  |
| 179.50 - 181.65m | Mineralized semi pelite, up to 20% pyrrhotite  |
| 181.65 - 193.20m | Mafic metawacke  |
| 193.20 - 206.40m | Amphibolite schist to gneiss, becomes more gneissic downhole, predictably approaching Granite - Augen Gneiss |
| 206.40           | END OF HOLE  |

Geochemical or Assay samples 2; Whole rock Samples: 1.





## LEGEND



Q SP-93-50 (DDH COLLAR)

GRID LINES

☒ 17 EXCAVATED TRENCH #17



 A/S SULFIDMALM Kristiansand, Norway  
Windsor, Nova Scotia

## ROMLINGASEN

## Drilling, Trenches and Grids

0 200 400 600 800 1000 metres

SCALE 1:10,000

|  |             |            |
|--|-------------|------------|
| Date of Work: Summer 1993                        | Claims:     | NORWAY     |
| Original by: D Hodges      Date:                 | 015-906     | FIGURE NO: |
| Revised by:                      Date:           | Project No. | 1a         |
| Drawn by: B Fisher              Date: March 1984 | N.T.S. No.  |            |
| Approved by: D Hodges        Date:               | Map Number: |            |

10



LEGEND

CLAIM OWNERSHIP

419/1992 Sulfidmalm, 1992

74/1993 Sulfidmalm, 1993

322/1992 Kreivi


328/1988 Pasvik Fiske

Forsvann Nature Reserve

SP-93-50 (DDH COLLAR)

GRID LINES

17 EXCAVATED TRENCH #17

|   |  |   |  |
|---|--|---|--|
|  |  | A/S SULFIDMALM Kristiansand, Norway<br>Windsor, Nova Scotia |  |
| ROMLINGASEN   |  |   |  |
| Claims, Drilling and Trenches   |  |   |  |
| 0 200 400 600 800 1000<br>metres  |  | SCALE 1:10,000  |  |
| Date of Work: Summer 1993   |  | Claims: _____   |  |
| Original by: D. Hodges  |  | Date: _____   |  |
| Revised by: _____   |  | Date: _____   |  |
| Drawn by: B. Flaher   |  | Date: March 1994  |  |
| Approved by: D. Hodges  |  | Date: _____   |  |
| Project No. 015-906   |  | N.T.S. No. _____  |  |
| Map Number: _____   |  | FIGURE NO: 1  |  |

