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BRITISH GEOLOGICAL SURVEY

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OPEN FILE REPORT NO. 9

DATA ARISING FROM DRILLING INVESTIGATIONS OF THE KNOCK INTRUSION AT CLAYMIRES, NORTH-EAST SCOTLAND

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Geophysics	P G Greenwood, BSc B C Chacksfield, BSc A D Evans, BSc

This data package relates to work carried out by the British Geological Survey on behalf of the Department of Trade and Industry

Mineral Reconnaissance Programme Open File Report No.9.

Data arising from drilling investigations of the Knock intrusion, at Claymires, north-east Scotland.

Exploration Ventures Ltd (EVL) outlined two Cu-Ni sulphide zones of mineralisation on the complex sheared SE margin of the Knock intrusion, on the farms of Littlemill and Auchencrieve. Fletcher (1989) evaluated the mineralisation and its geological setting and presented new maps for the Huntly and Knock intrusions and a detailed map of the Littlemill-Auchencrieve area based on borehole sections. Fletcher and Rice (1989) presented a model for this mineralisation based on a primary magmatic origin with substantial modification by shear deformation and attendant hydrothermal alteration. Fletcher (1989) also reported precious metal data for a suite of samples from the two ore zones. Precious metal levels showed sporadic enrichment up to 575 ppb Pt+Pd+Au. They concluded there was potential for further precious metal enrichment in similar settings within/adjacent to other Caledonian mafic-ultramafic intrusions of the region.

MRP investigations were carried out to investigate the eastern margin of the Knock intrusion, along strike from the mineralisation at Littlemill-Auchencrieve, in areas not previously investigated in detail. The area has no bedrock exposure and the cover of glacial till is pervasive and locally more than 10 metres thick. Reconnaissance geophysical surveys were carried out along 7 traverses spaced at 200-300 m across the eastern contact zone of the intrusion and adjacent Dalradian metasediments. Several high-amplitude resistivity/ chargeability anomalies were defined by the survey. VLF-EM surveys were generally ineffective due to cultural interference. Magnetic surveys revealed generally little variation over the gabbroic rocks, though the gabbro-metasediment boundary was picked up by magnetic contrast in some places. The results of this survey are described in BGS Technical Report no. WK/90/7/C by P G Greenwood and B C Chacksfield.

Two IP anomalies were selected as worthy of investigation by drilling on account of their extent, amplitude and geological setting. A third anomaly on line 1800S was not drilled because it is close to an EVL borehole (HK8) in which no significant sulphide mineralisation was found.

The anomaly on line 650S consisted of chargeability values up to 80 mv/V (relative to background levels of 25 mv/V) and was some 200m in width across strike. Boreholes were drilled to investigate this anomaly at sites spaced 100m apart (boreholes 1,1A and 3). A second anomaly at the eastern end of line 350S was also investigated (borehole 2). IP measurements were made in the boreholes and magnetic measurements were made on core samples.

References.

Fletcher, T.A. 1989. The geology, mineralisation (Ni-Cu-PGE) and isotope systematics of Caledonian mafic intrusions near Huntly, north-east Scotland. PhD Thesis (unpubl) University of Aberdeen.

Fletcher, T.A. & Rice, C.M. 1989. Geology, mineralisation (Ni-Cu) and precious metal geochemistry of Caledonian Mafic and ultramafic intrusions near Huntly, north-east Scotland. Trans. I.M.M. (Sect.B. Appl. Earth Sci.) Vol. 98, 185-200.

This data set comprises:

1. Maps showing the location of the Claymires boreholes (Maps 1-3.).

2. Graphic logs of the Claymires boreholes 1-3.

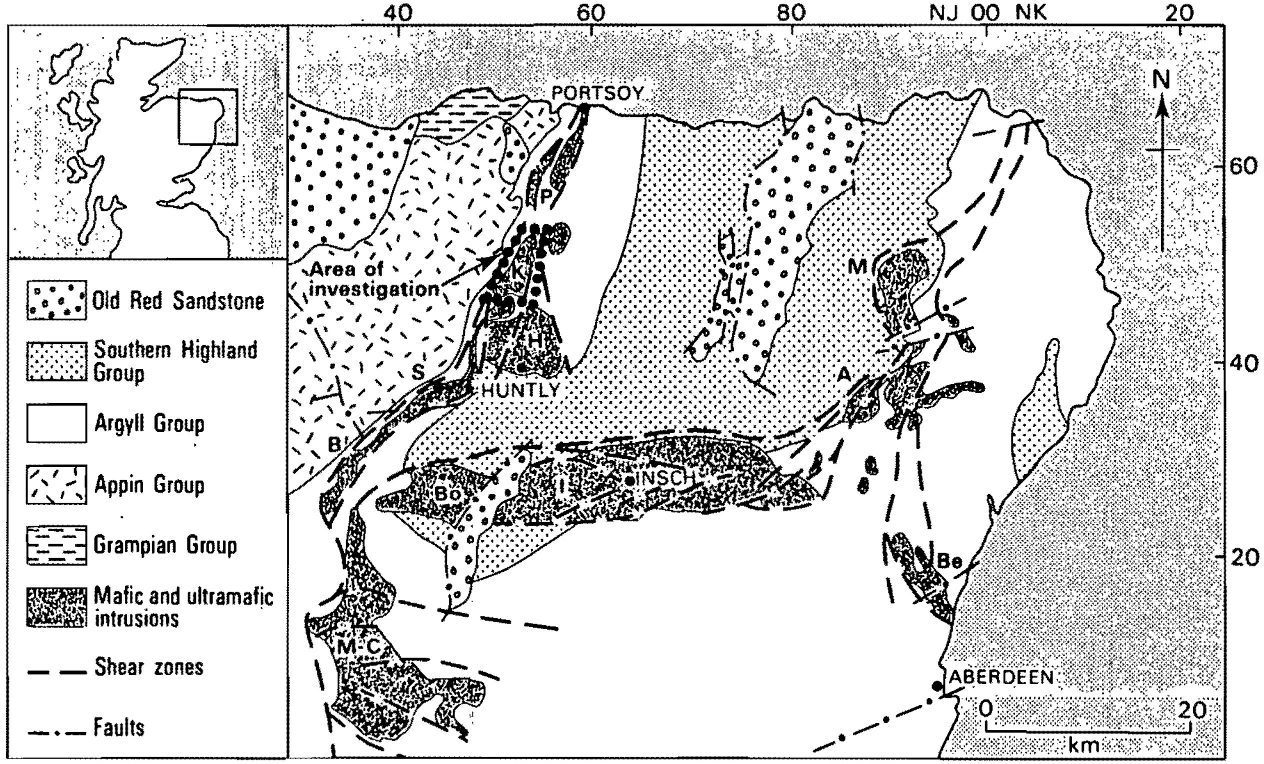
3. Full logs of the Claymires boreholes 1-3.

4. Trace element, PGE and Au determinations of 175 samples from Claymires boreholes 1-3.

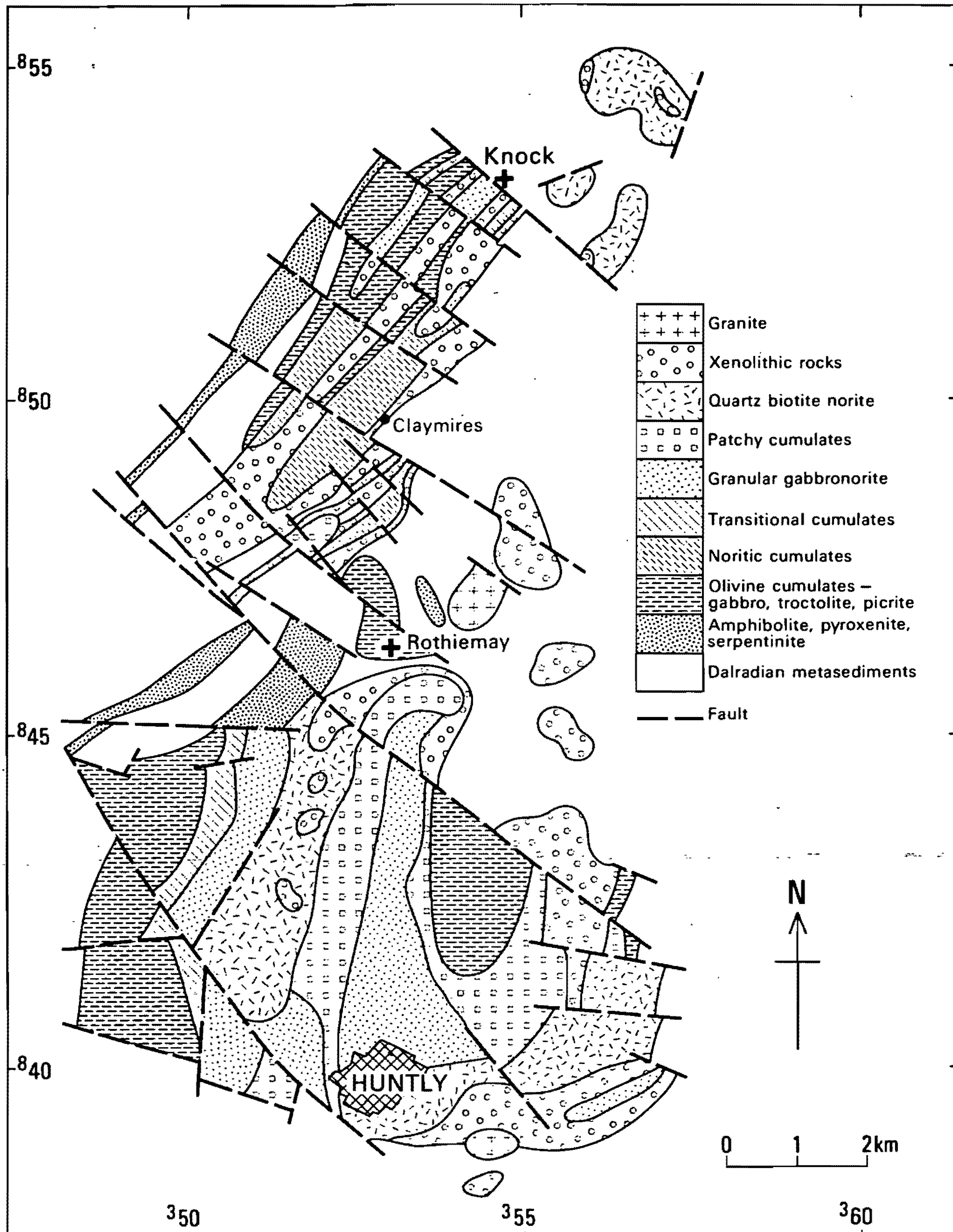
5. Technical Report WK/90/7/C (Regional Geophysics Group) on the geophysical investigations in the Claymires area.

6. Project note 92/6 (Engineering Geology & Geophysics Group) on IP and magnetic data from Claymires boreholes 1-3.

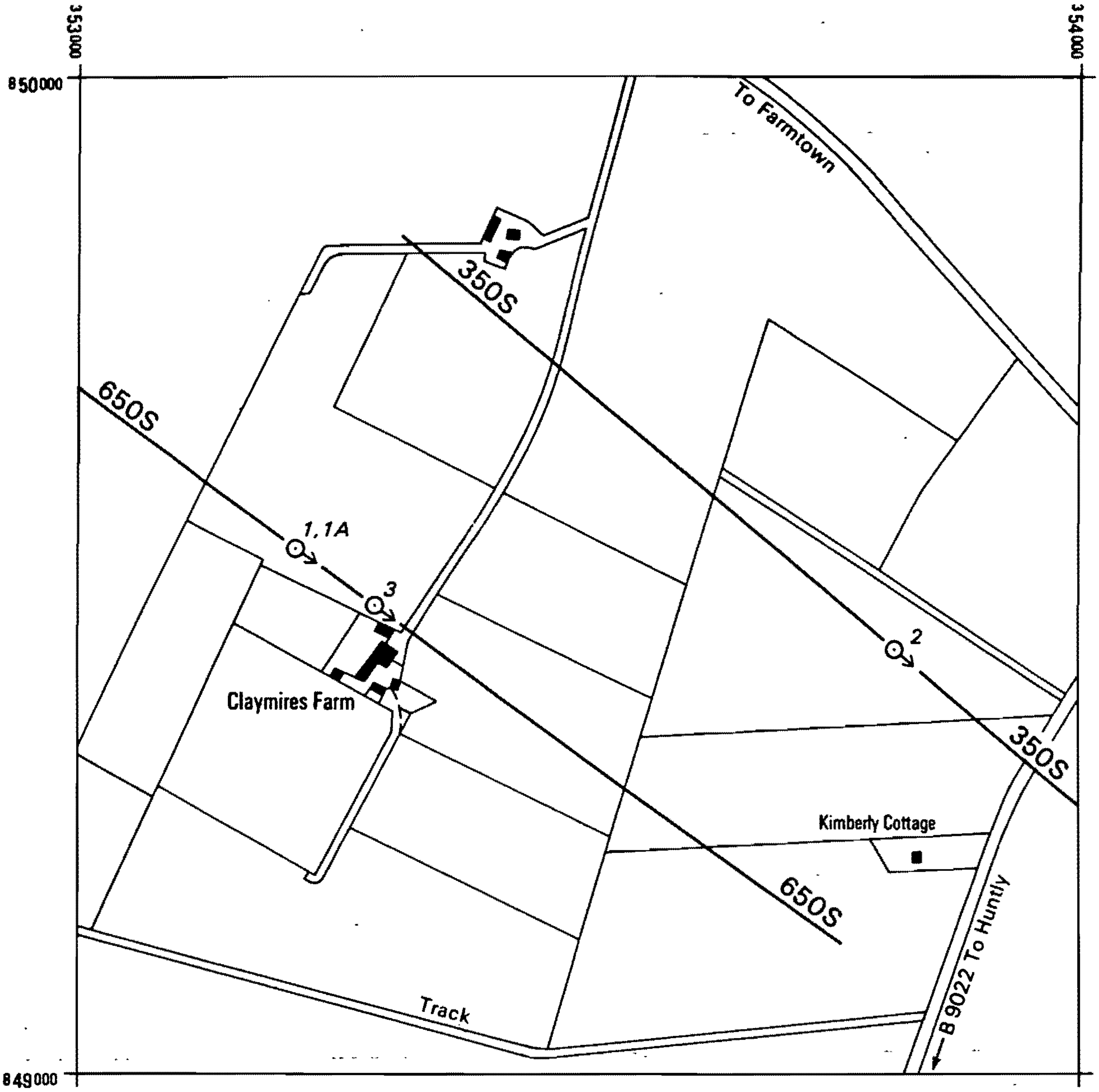
LOCATION MAPS



MAP 1. Location of the Knock area.



MAP 2. Simplified geological map of the Huntly-Knock Intrusion.



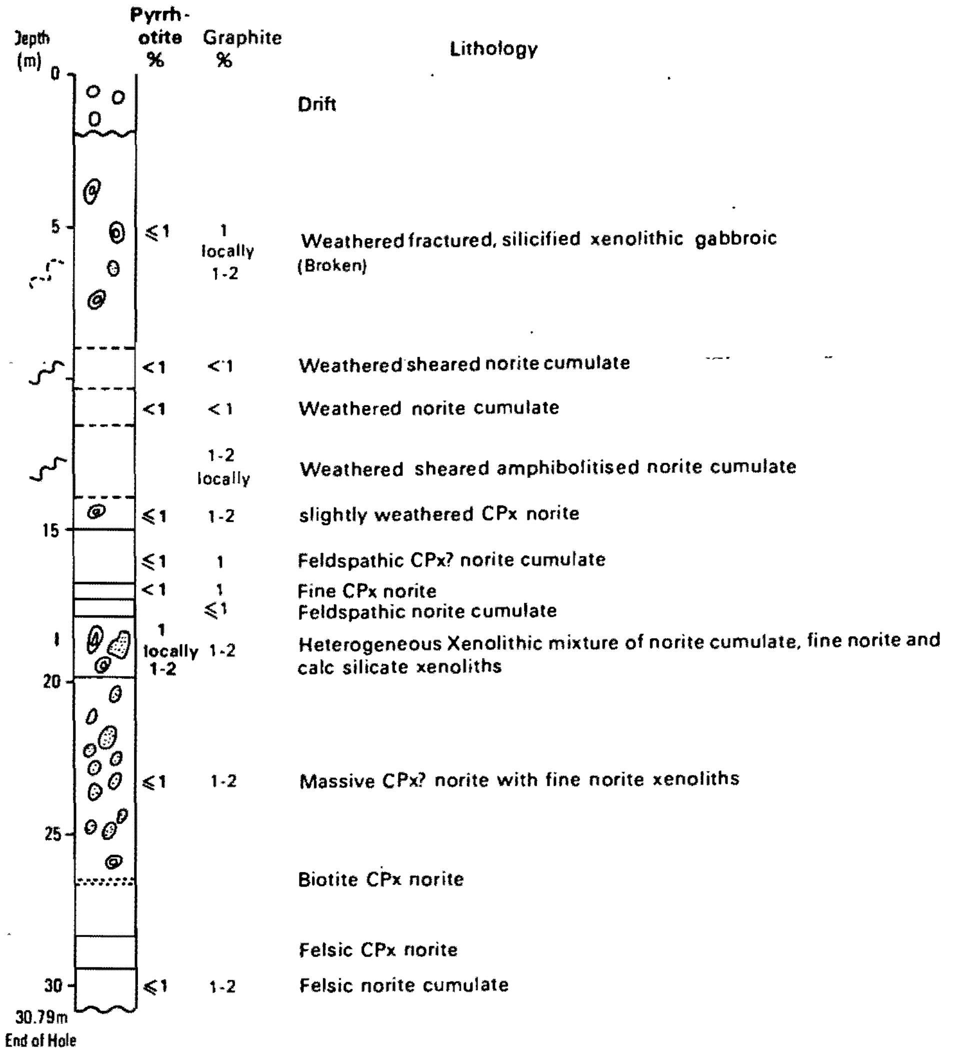
650S geophysical survey line

3 site of borehole

MAP 3. Detailed location of borehole sites and geophysical survey lines near Claymires Farm.

GRAPHIC LOGS

Fig 1. CLAYMIRES: BOREHOLE 1



KEY TO
BOREHOLES 1, 1A, 2 and 3

O	drift boulders
	calc silicate xenolith
	fine norite xenolith
I	Intrusive relationships
	Shearing
-----	broken contact
....	graduated igneous
———	sharp igneous
	vague fabric
	biotite
SP	shearplane/ fracture contact
	pyroxene rich xenolith
C	Igneous/ metased contact
× × × × ×	Brecciated zone + altered shearing
S94036	Thin section

Abbreviations:

CPx - Clinopyroxene

Occ - Occasionally

Fig 2. CLAYMIRES: BOREHOLE 1A

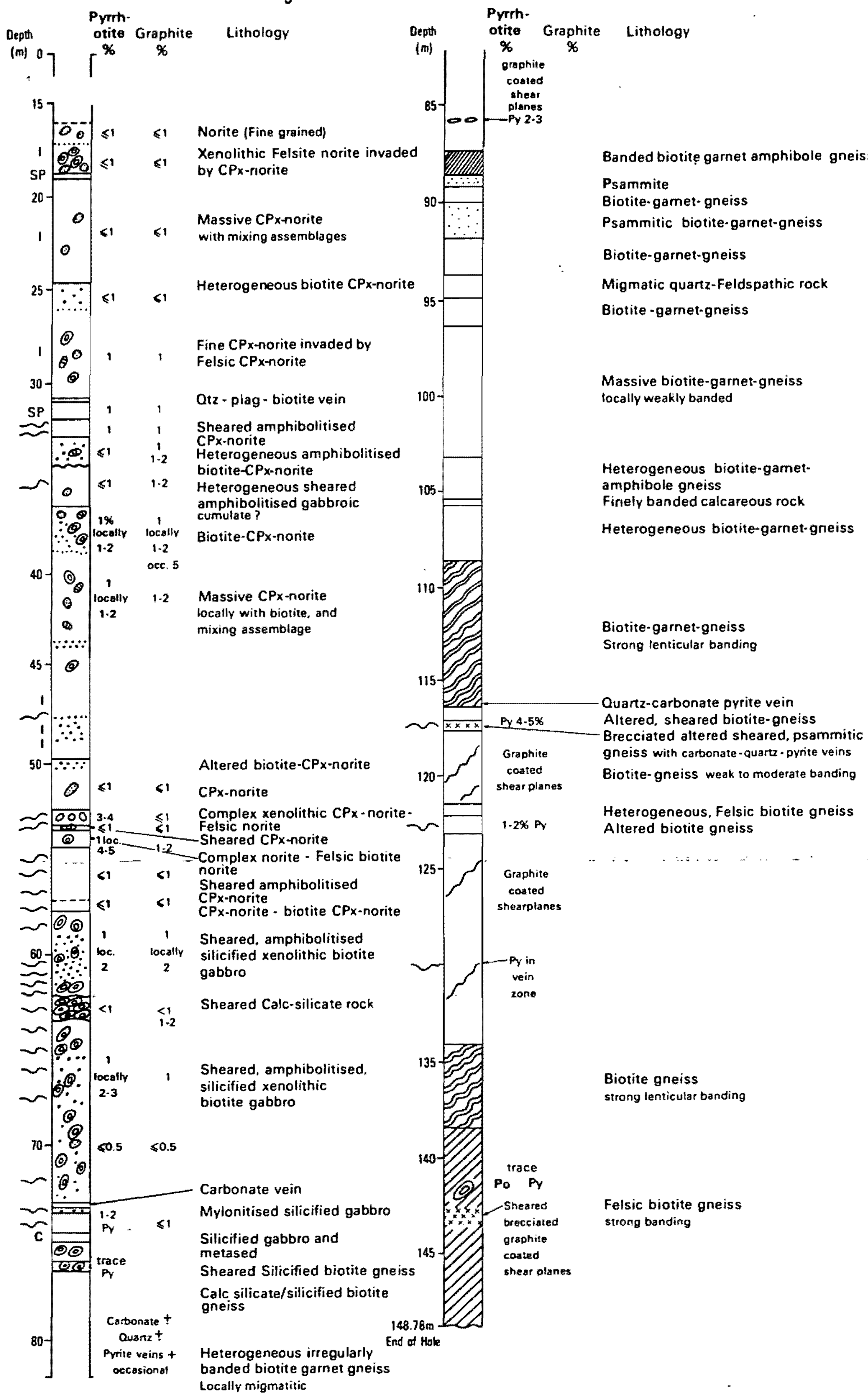


Fig 3. CLAYMIRES: BOREHOLE 2

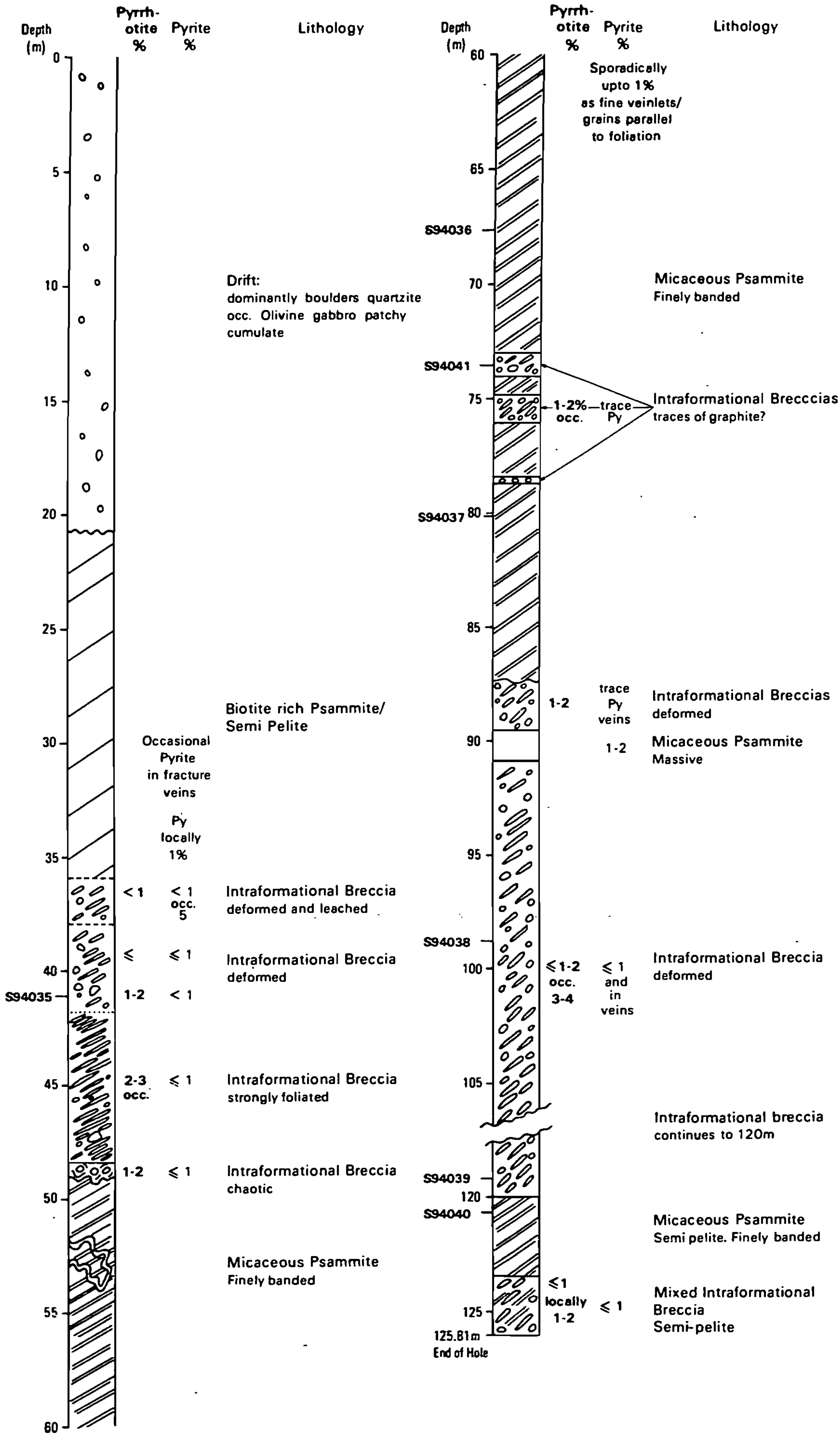
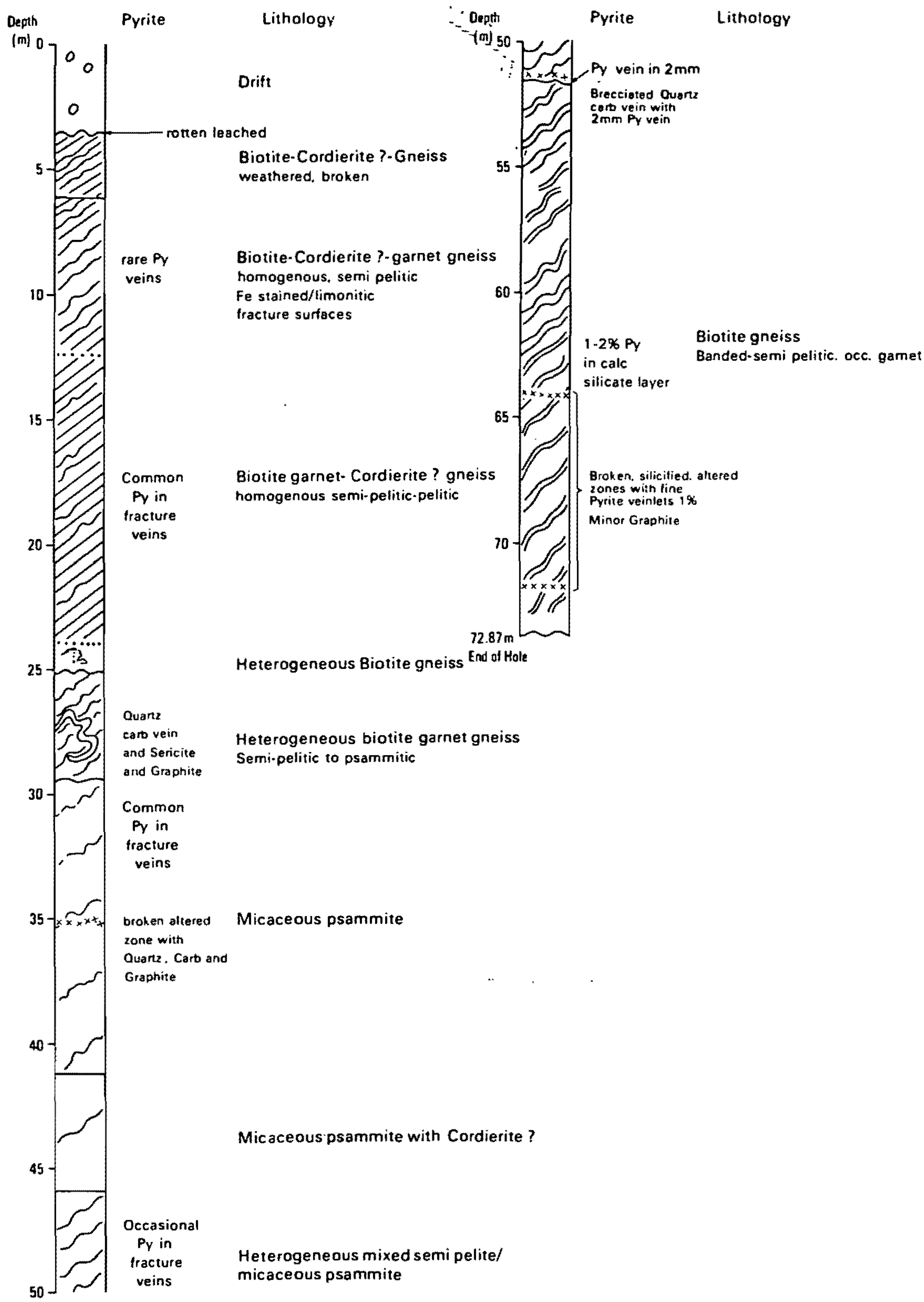


FIG 4. CLAYMIRES: BOREHOLE 3



FULL LOGS

CLAYMIRES BOREHOLE 1, FULL LOG

0-1.95m. **Overburden.** Rounded pebbles,

1.95-9.0m. **Highly silicified xenolithic gabbroic rock.** Very weathered and fractured fine grained cumulate type. Silicification varies from weak (e.g. 7.91, 8.2m) to intense (e.g. 8.5-9m). Locally a vague shear fabric defined by aligned graphite flashes may be discernible (e.g. 8.2). Rounded calcsilicate xenoliths (<100mm) represent sporadically up to 90% of the core, but the average is 10-15%. Fine norite xenolith and irregular quartz patches occur locally. The igneous component seems to be preferentially replaced by silica, probably introduced during or after shearing. Most surfaces are Fe-stained. Some carbonate veins. Pyrrhotite and graphite occur as fine disseminations and clouds. Sharp broken lower contact.

9.0- 10.3m. **Weathered sheared norite cumulate.** Fractured medium-fine grained norite cumulate with minor biotite and non-magnetic oxide. The latter occurs as fine disseminations, veins and clots. Strong shear and igneous lamination fabric (e.g. 9.22-10.3m). The deformation is probably superimposed on the igneous lamination. Fracture surfaces are Fe coated. Minor disseminated and blebby graphite occurs up to 1%.

10.3-11.45m. **Weathered norite cumulate.** Massive, medium grained, poorly foliated, norite cumulate. Biotite and oxide occur up to 1-2%. There are occasional calcsilicate xenoliths and feldspar, quartz and biotite veining. Good euhedral laths of orthopyroxene and more subhedral plagioclase occur. There is minor fine pyrrhotite and graphite (<1%).

11.45-13.97m. **Weathered sheared amphibolitised norite cumulate.** Medium grained, with minor biotite and fine oxide. Locally, calcsilicate xenoliths and shear fabric occur. At 13m there is a relict cumulate texture and a possible sheared igneous lamination. At 12.75m there is a 2-3mm thick mylonite zone parallel to the core axis. The core is more deformed and amphibolitised on one side of the mylonite zone. The fracture surfaces are Fe-stained. Occasional carbonate and quartz veining occur. Graphite present up to 1-2% from 13.60-13.70.

13.97-14.86m. **Slightly weathered clinopyroxene? norite.** Fairly fresh, leucocratic, fine grained norite with minor biotite (<1%). Felsic + biotite ± calcsilicate zones (e.g. 14.50-14.60). Graphite (1-2%) occurs as fine needles and patches. Pyrrhotite (≤1%) is present as fine blebs. The lower contact is marked by a fairly sharp increase in grain size and feldspar content and by a weathered feldspar-biotite vein.

14.86-16.75m. **Feldspathic clinopyroxene norite cumulate?.** Medium grained, slightly altered, with biotite (1-3%) and occasional quartz patches. At 16.70 there is a fine norite xenolith and a vague shear fabric defined by pyrrhotite veinlets. Between 15.45-15.60 there is a weathered coarse feldspar, biotite ± quartz vein. Pyrrhotite (≤1%) and graphite (1%) occur as fine disseminations and clouds. The lower 100mm of this section is enriched in both (up to 2%).

16.75-17.10m. **Fine clinopyroxene norite.** Fine grained norite with minor biotite. 1% graphite and <1% pyrrhotite.

17.10-17.72m. **Feldspathic norite cumulate.** Medium grained norite cumulate with minor biotite and a 5mm thick biotite-quartz vein with minor chlorite along margins (17.67m). Minor graphite.

17.72-19.80m. **Heterogenous xenolithic mixing zone.** Complex mixture of medium-fine noritic? cumulate, (up to 150mm sections). Fine norite (100mm) and a heterogenous felsic clinopyroxene - norite ± biotite with zoned calcsilicate xenoliths (e.g. 17.95), irregular felsic patches and veining (e.g. 19.40, 19.75). Fine grained noritic xenoliths occur occasionally. 19.10 represents an intrusive contact between medium-fine norite cumulates and felsic clinopyroxene norite. Graphite and pyrrhotite are common (as disseminations and blebs and even intergrown).

19.80-29.36m. **Massive clinopyroxene? norite with fine norite xenoliths.** Fine grained norite with minor biotite. It locally contains fine grained rounded norite xenoliths 5-100mm across. Calcsilicate xenoliths occur rarely. The section between 26.43 and 26.52m is a biotite-clinopyroxene norite. Between 28.24 and 29.36 the section becomes slightly more felsic with a vague lamination. Graphite and pyrrhotite are common but sporadic. Fairly sharp lower contact.

29.36-30.79m. **Felsic norite cumulate.** Slightly altered medium grained norite cumulate with rare fine norite xenoliths and calcsilicate xenoliths. At 29.87 there is a 4mm pegmatitic feldspar-quartz-biotite vein with chloritised biotite-rich margins and altered feldspars. Some hairline planar chloritic veins. Pyrrhotite (≤1%) is less common than graphite (1-2%). Both occur as fine disseminations and clouds.

CLAYMIRES BOREHOLE 1A, FULL LOG

BH1A starts at 16.41 because BH1 took a deflection at that depth. See BH1 for more information on section 0-16.14m.

16.14-17.45m. **Norite**. Slightly altered, massive, leucocratic, fine-medium grained norite with minor biotite, graphite and sulphide. Subhedral to anhedral plagioclase (up to 60-70%) and orthopyroxene (30-35%), interstitial biotite (2-3%) and oxide (≤1%). At 16.75m subhedral to euhedral laths of orthopyroxene and plagioclase occur. The general texture is subhedral granular in appearance with possible igneous lamination. This section is moderately fractured with chloritic/amphibolitic fill. Most fracture surfaces are Fe-stained. Xenoliths (1% of the section) are very fine grained (2-10mm) and predominantly of igneous nature. Quartz and calcsilicate xenoliths are rarer. Graphite (≤1%) occurs as fine disseminated flakes and it is uniformly distributed. Sulphides (≤1%) occur as fine interstitial grains. The lower contact is marked by an increase in xenolith content.

17,45-19.9m. **Xenolithic felsic norite invaded by clinopyroxene norite**. Weak to moderately fractured, heterogeneous mixture of fine grained felsic norite (containing calcsilicate xenoliths and very fine grained felsic norite xenoliths) and a slightly more mafic biotite-bearing altered clinopyroxene norite. The latter seems to invade the former, which gives the assemblage an heterogenous appearance. The contacts are sharp to diffuse, convoluted and irregular. Invaded and invasive units differ in grain size and pyroxene, feldspar and biotite contents. The assemblage suggests that the invaded unit had in part solidified. The felsic norite contains minor biotite and 'zoned' calcsilicate xenoliths and preserves a subhedral granular texture. In the more mafic clinopyroxene norite the pyroxenes appear to be slightly amphibolitised. Graphite (≤1%) occurs as fine disseminated flakes and patches, and is much finer in the more felsic norite. At 18.96m graphite ± sulphides form 'rich' patches. Sharp lower contact defined by Fe-stained fracture.

19.0-19.25m. **Heterogeneous plagioclase-biotite-rich unit**. Altered fine gabbro ± biotite section mixed with coarse leucocratic biotite and feldspar rich section. The latter contains minor mafic amphiboles or pyroxenes and it appears vaguely dioritic. Minor disseminated pyrrhotite (<0.5%) and traces of graphite. Sharp lower contact.

19.25-24.69m. **Massive clinopyroxene norite**. Massive, leucocratic, slightly altered, fine grained clinopyroxene norite with minor biotite (1-2%) and occasional fine noritic and calcsilicate xenoliths. Coarser feldspathic noritic patches and biotite-rich (5-8%) zones occur locally. Textures are of fine grained cumulate type. At the intervals between 22.10-22.40 and 23.24-24.69 there is a slightly heterogeneous clinopyroxene norite with subtle differences in grain size and pyroxene content and fine noritic xenoliths are present. This suggests the intrusion of one noritic unit by another. At 19.57 and 20.93m felsic veins ± biotite rich selvages and zones occur. Biotite-rich zones (21.70 m), irregular felsic areas (19.48m) and pyroxene-rich patches (21.95m) occur locally. Hairline chloritic fractures ± carbonate ± white felsic material occur locally and are Fe-stained. Graphite and sulphide (pyrrhotite) occur as fine disseminated grains (≤1%), with occasionally rich patches (e.g. 19.77m, pyrrhotite and 20.90m, graphite). The lower contact is very fine grained and bounded by an Fe-stained chloritic fracture.

24.69-26.02m. **Spotted heterogeneous biotite-clinopyroxene norite**. Slightly altered fine grained biotite-clinopyroxene norite. Fine grained cumulate type texture. There are possibly two norite types (mixed assemblage), as a medium grained amphibolitised feldspathic variant with irregular contacts is locally present. The dominant norite contains poikilitic to subophitic biotites, up to 5mm in size.

Biotite content (5-8%) decreases from 24.80-25.0m and markedly from below 25.90 with an accompanying decrease in grain size. At 25.33 there is a hairline amphibole-chlorite fracture vein with fine, dark green spinels? in the adjacent margins. Graphite (0.5-1%) and sulphide (0.5-1%) are common, though slightly sporadic, as very fine to fine grains, flakes and blebs.

26.02-30.87m. **Fine clinopyroxene norite invaded by coarser felsic variant.** Dominantly a slightly heterogeneous and amphibolitised clinopyroxene norite with 1-2% biotite, pyroxene-rich xenoliths (up to 40mm) and occasional calcsilicate xenoliths (up to 60mm) and noritic xenoliths (20mm). There are subtle variations in grain size, texture mineralogy and degrees of alteration in the section. Three variants have been recognised : i) the main host fine clinopyroxene norite, ii) felsic fine-medium grained clinopyroxene norite (28.35m) and iii) the altered clinopyroxene norite (26.50-26.90 and 30.8m). Possible 'intrusive textures' occur at 28.50 and 29.85m. Irregular coarse felsic ± quartz ± biotite ± amphibole veins (26.42m) and patches (27.55m) occur locally. Occasional hairline chloritic/amphibolitic? fracture veins ± altered margins and slickensides (30.28m) and irregular felsic non-carbonate fracture veins. Graphite (1-2%) occurs commonly as fine blebs (up to 3mm) and pyrrhotite occurs as irregular grains.

30.87-30.94m. **Massive quartz vein.** Fractured massive quartz with euhedral feldspar (up to 10mm) and biotite along the upper margin and chloritised biotite plates along the lower margin. The contacts with the host rock are sharp.

30.94-31.89m. **Fine clinopyroxene norite invaded by coarser felsic variant.** Similar to the section described in 26.02-30.87 but there is an increase in amphibolitisation towards 31.77m. The lower contact is a shear plane coated with chlorite/amphibole?.

31.89-32.70m. **Sheared amphibolitised clinopyroxene norite.** Heterogeneous, medium grained, amphibolitised clinopyroxene norite with a vague shear fabric. At 31.97m there is a hairline-3mm thick quartz chlorite vein with a 20mm thick crustiform lens of graphite and pyrrhotite. Both minerals occur as disseminations and represent 1% of the section. The lower contact is marked by a fairly sharp increase in biotite and pyroxene and by the presence of a chloritic fracture vein.

32.70-34.30m. **Heterogeneous amphibolitised biotite-clinopyroxene norite.** Moderately amphibolitised fine grained norite. Occasional pyroxene-rich xenoliths and coarse felsic patches occur (e.g. 34.10). Biotite makes up 2-8% of the section and pyroxene up to 30%. Locally an igneous lamination is present. The lower part of the section looks sheared and completely amphibolitised. Very fine chloritic vein with pyrite at 32.75m and 1-2mm quartz vein with 3mm pyrrhotite blebs and chloritised margins at 33.84.
Pyrrhotite and graphite occur up to 1 and 1-2% respectively.

34.30-36.40m. **Sheared amphibolitised heterogeneous gabbro.** From 34.30 to 35.45: completely amphibolitised medium-coarse felsic gabbro with minor biotite, relict cumulus texture? and fine noritic xenoliths. Shear fabric well developed below 34.70. There are 10-20mm mylonite zones with chloritic threads at 34.87m. 35.45-36.40 is a fine sheared amphibolitised gabbro with minor biotite, occasional felsic patches and pyroxene-rich xenoliths. This subsection is rich in graphite and pyrrhotite (up to 5%, locally).

36.40-38.80m. **Biotite-clinopyroxene norite.** Slightly heterogeneous, altered fine grained norite with locally a vague igneous lamination. Biotite forms about 5-8% of the section. Occasionally there are 15x60mm noritic xenoliths, 10-20mm rounded calcsilicate xenoliths, pyroxene-rich patches and quartz-feldspathic patches ± pyrrhotite (e.g. 38.25). Hairline veins with chlorite ± felsic ± pyrite ±

slickensides are common. Graphite and pyrrhotite occur up to 1% each. Diffuse irregular lower contact marked by a decrease in biotite content and grain size.

38.80-49.77m. **Massive clinopyroxene norite and locally biotite-clinopyroxene norite.** Slightly heterogeneous and altered fine clinopyroxene norite with minor biotite (1-3%) and locally medium-coarse biotite clinopyroxene norite. Some sections are probably quartz-bearing (e.g. 47.5-48.0). Subtle differences in grain size, mineralogy, alteration and the presence of fine noritic xenoliths indicate a potential mixed assemblage. Textures are subhedral to granular and locally there is a trace of igneous lamination (alignment of pyroxenes and plagioclase, e.g. 39.91m). The fabric is strongly developed around 49.50 and may have some shear component. A wavy shear zone occurs at 47.03m. Xenoliths, present on a minor scale (2-3%), may be divided into: pyroxene-rich (up to 40mm) e.g. 41.02-43.90, fine noritic, e.g. 41.02-43.90, minor calcsilicate (up to 15mm) e.g. 46.10 and rare fine felsic igneous?/metasediment types, e.g. 40.05. Feldspathic clinopyroxene norite patches and coarse feldspar - biotite ± quartz veins (up to 20mm, e.g. 45.62) occur sporadically. The section between 41.35 and 41.48m consists of a coarse pegmatitic feldspar-quartz vein with traces of chloritised biotite and muscovite and sharp biotite and amphibole-rich contacts. Chlorite ± carbonate ± pyrite fracture veins are common and in some places discontinuous. They occur in two sets. Graphite (1-7%) is common throughout as disseminated grains and flakes, generally fine grained but occasionally present as 3mm blebs. Enriched clouds (up to 10mm across) often with pyrrhotite occur sporadically, e.g. 43.39, 48.05 and 48.27 as do graphite ± pyrrhotite rich xenoliths and a graphite and biotite zone. Towards the base of the section the unit becomes fine grained and there is an increase in biotite and a sharp intrusive igneous? contact.

49.77-50.10m. **Altered biotite clinopyroxene norite.** fine grained with about 5-6% biotite (up to 3mm in size) occurring as poikilitic plates. From 49.85-50m there is a discrete zone of unaltered fine grained norite with a pyroxene-rich xenolith (mixed assemblage). There are occasional chloritic fractures and very fine pyrrhotite (<1%) and graphite(1%). Gradational lower contact with decrease in biotite content.

50.10-52.27m. **Clinopyroxene norite.** Slightly heterogeneous, with minor biotite and felsic patches. Between 50.10 and 51.53m there is a fine grained clinopyroxene norite with 35-40% pyroxene. Between 51.33 and 52.27 there is a fine felsic clinopyroxene norite with minor biotite, 25-30% pyroxene and increasing alteration towards the base. Both subsections have fine grained 'cumulate' type textures. Chlorite ± carbonate fractures are common (e.g. 51.03 and 51.93m). Pyrrhotite and graphite occur as disseminated flakes (≤1%), with occasional 1-2mm blebs, coarse irregular patches and enrichment-in xenoliths. Sharp igneous? lower contact.

52.27-53.08m. **Complex xenolithic contact zone.** Heterogeneous, fine grained, swirling mixture of altered clinopyroxene norite, biotite norite and felsic norite, containing abundant (up to 40mm in size) zoned felsic igneous/metasedimentary? xenoliths and mafic-rich (biotite + amphiboles?) xenoliths. The section contains numerous feldspar-biotite-quartz? veins and patches (up to 45mm thick). One of the veins defines the lower contact. Swirling fabric in norite at 53m. Sulphides (pyrrhotite, 3-4% and traces of pyrite) and graphite (≤1%) occur as disseminations.

53.08-53.41m. **Laminated sheared? clinopyroxene norite.** Fine grained, felsic and slightly heterogeneous with occasional calcsilicate and fine norite xenoliths. There is a patch with coarse biotite and felsics. The 'lamination' appears swirly and sinuous locally and is sharply truncated at the base. Pyrrhotite and graphite (≤1%) occur as very fine grains to 1-2 mm patches, pyrrhotite also occurs in fractures together with chlorite. Sharp intrusive lower contact.

53.41-54.39m. **Complex norite-felsic biotite norite.** Fine grained norite with minor biotite showing a swirling fabric. It contains veins or xenoliths of felsic norite with biotite-rich margins. The core appears deformed at 54m and recrystallised at 54.30m. At 54.39 there is a mylonitic zone with feldspar and quartz augens and 'green xenoliths'. There are occasional chloritic + felsic + carbonate fractures and pyrrhotite and graphite are common as very fine grains (≤1% each).

54.39-56.96m. **Sheared amphibolitised clinopyroxene norite.** 54.39-55.24: very homogeneous and fine grained with altered recrystallised texture in the upper part. Between 54.68-54.71 pyrrhotite-rich patches (4-5%), disseminations and irregular veins occur. Over the whole interval pyrrhotite forms 1% of the total. Graphite occurs up to 1-2%. 55.24-56.60 is a fine grained, altered, felsic clinopyroxene norite, locally with a strong lamination/shear? fabric. Silicified zone between 55.59 and 55.79. There are occasional quartz-feldspar-chlorite ± pyrite veins. Sporadic pyrrhotite and graphite (≤1%).

56.86-57.55m. **Clinopyroxene norite-biotite clinopyroxene norite.** Fine grained, heterogenous with irregular 10-20mm coarse biotite patches, fine norite xenoliths and mixing textures. 'Laminated' igneous fabric. The upper part of the section is greener, finer grained and sheared towards the base (e.g. 57.47-57.55m). Pyrrhotite and graphite are common but sporadic (≤1%).

57.65-62.0m. **Complex sheared, amphibolitised, silicified xenolithic biotite gabbro.** 57.55-58.90: Silicified sheared gabbro with calcsilicate ± garnet and norite xenoliths and blue-white 'replacive' quartz. 58.90-59.72: Fine sheared biotite-rich gabbro with homogeneous granoblastic texture from 58.90-59.50 and stronger sheared fabric from 59.50-59.72. 59.72-61.19: Sheared mylonitic amphibolitised quartz+biotite-rich gabbro with 5-10% calcsilicate xenoliths. Both the gabbro and the xenoliths are sheared. 61.19-61.72: Complex heterogeneous calcsilicate-rich (70-80%) unit with interstitial areas and veins of sheared amphibolitised, silicified ± carbonated gabbro. 61.72-62.00: Sheared amphibolitised, silicified biotite-rich gabbro with occasional mafic-rich clots or xenoliths. Overall there are occasional carbonate, chloritic ± slickensides, chlorite ± felsic ± carbonate ± pyrite (e.g. 61.40m) fracture veins, generally ≤1mm. Graphite and pyrrhotite are common (1-2%).

62.00-63.22m. **Sheared calcsilicate unit.** Tightly packed 50x30mm xenoliths constitute up to 85% of core. Minor interstitial silicified/carbonated gabbro. There are fine breccia zones and moderately intense carbonate and chloritic fracture veining. Graphite and pyrrhotite occur up to 1%. There is some local enrichment of graphite (e.g. 62.80-63.22) up to 2%. The veining increases towards m 63. Below this the section becomes more brecciated.

63.22-72.95m. **Sheared, amphibolitised, silicified xenolithic biotite gabbro.** 63.22-65.27: Medium fine grained foliated quartz-bearing gabbro with sporadic calcsilicate xenoliths. The upper section is cataclastic. Mylonitic zone at 63.4m with graphite and pyrrhotite, cut by chloritic fracture with pyrite. 65.27-68.46: Heterogeneous fine grained, biotite-rich gabbro. Highly fractured by chlorite-carbonate ± biotite ± pyrite, chlorite ± pyrite ± pyrrhotite and quartz (+ green mineral) fracture veins. Locally broken. Sinuous strong foliation developed towards the base. Silicified and carbonated areas occur. 68.46-72.95: Heterogeneous medium grained gabbro with noritic areas depleted in biotite and occasional zoned calcsilicate ± garnet xenoliths, dark green igneous? xenoliths, biotite-rich zones and silicified areas (e.g. 69.60). Locally a strong shear fabric associated with a finer grain size develops. Amphibolitisation and silicification increase below 70m, with abundant quartz-rich patches. Overall, chloritic ± carbonate hairline (up to 3mm) fracture veins are common. Pyrrhotite (1% and occasionally 2-3%) and graphite (1%) occur sporadically.

72.95-73.08m. **Altered silicified gabbro adjacent to carbonate vein.** At 73m there is a 12mm irregular carbonate vein with coarse chloritic patches and fine graphite/carbonate/silica coliform zones studded with fine-medium euhedral pyrite. The vein contains sericitised/silicified/carbonated gabbro material as well as minor graphite and pyrite (up to 1mm) on either side. Pyrite also occurs in later chloritic fractures.

73.08-73.20m. **Sheared amphibolitised silicified biotite gabbro.** Contains minor fine norite? and calcsilicate xenoliths. Silicification increases towards 73.20. Sharp lower contact.

73.20-74.23m. **Mylonitised, intensely silicified gabbro.** Grey siliceous unit with foliation defined by <0.5mm amphiboles and mica laminae. Relict gabbroic texture at 73.70m. Pale yellow-green 1-2mm crystals at 73.37 (epidote?, grossularite?). Abundant white quartz veining (up to 30mm), often irregular and lenticular. Pyrite (1-2%) occurs commonly as blebs, lenses and veins following foliation. Pyrrhotite (1-2%) and graphite (≤1%) coat some fracture surfaces.

74.23-74.85m. **Intensely silicified gabbro?/metasediment? mixture.** Relict gabbroic texture with occasional calcsilicate remnants.

74.85-75.82m. **Sheared silicified biotite gneiss? with calcsilicate xenoliths.** Massive gneiss with some altered gabbro patches/xenoliths and occasional quartz (20mm), carbonate (<1mm) and chlorite ± pyrite (<0.5mm) veining. Minor fine pyrite (<1%) and graphite (<0.5%).

75.82-76.32m. **Heterogeneous calcsilicate/silicified biotite gneiss.** Swirly siliceous gneiss with abundant 50mm calcsilicate xenoliths and quartz-rich patches. Minor disseminated pyrite.

76.32-87.17m. **Heterogeneous irregularly banded biotite garnet gneiss.** Heterogeneous, felsic, medium grained biotite garnet gneiss. Locally migmatitic. Streaky to irregular lenticular foliation/banding defined by biotite and quartz-feldspar±biotite-rich layers. Occasionally there are some biotite-rich lenses and xenoliths up to 20mm. Garnets occur as 1-2mm euhedra in garnet-rich bands, 10-20mm irregular to subhedral poikilitic porphyroblasts, locally with 'roll' texture (e.g. 83.25m). 79.92-80.27: Pelitic, biotite-rich zone with a 50mm biotite-poor psammitic layer and 1-2mm psammitic cordierite? in biotite-rich zones. At 81.60 there are quartzose segregations and lenses parallel to foliation. 0.5-1mm thick carbonate ± pyrite (e.g. 76.87) and 0.5-3mm quartz ± amphibole veins are common. At 85.65 an irregular lenticular quartz-carbonate vein occurs, with pyrite lenses and patches and a 2 mm galena grain. The vein margins are sericitised.

87.17-87.77m. **Irregular banded biotite garnet gneiss.** Strongly foliated medium grained biotite-garnet gneiss with well defined banding (1-10mm thick). Occasionally there are migmatitic quartz-feldspar ± biotite patches and veining. At 87.27 there is a 5mm quartz-amphibole vein with abundant pyrite(2%), clay gouge and splays. At 87.62 there is an irregular 30-40mm brecciated quartz-carbonate-amphibole vein with euhedral and patchy pyrite (4-5%). It is very similar to vein at 85.65m but there are no traces of galena. Sericitisation occurs from 87.52 to 87.68.

87.77-88.35m. **Finely banded biotite-garnet-amphibole? gneiss.** Medium grained biotite-garnet-amphibole? gneiss with fine banding and foliation. Some irregular boudinaged quartzo-felspathic layers with calcsilicate component. At 87.93m there is an amphibole-quartz-pyrite fracture vein with slickensides.

88.35-88.94m. **Psammite.** Medium grained biotite-poor psammitic section with fine (<1mm) biotite layers every 2-5mm, and fine garnets. Biotite increases down section and locally biotite gneiss occurs (e.g. 88.63-88.74). Minor (<0.5mm) carbonate + pyrite fracture veins.

88.94-89.85m. **Poorly foliated and banded biotite-garnet.** Poorly foliated banded biotite garnet gneiss with occasionally well foliated bands. At 89.18 there are numerous quartz + carbonate ± amphibole? + pyrite veins, up to 2 mm thick, with splays.

89.05-90.07m. **Heterogeneous psammite.** Heterogeneous medium grained psammitic unit with garnets and occasionally <0.5mm biotite bands parallel to the core axis.

90.07-91.77m. **Heterogeneous psammitic biotite garnet gneiss.** Fine to medium-coarse quartz-feldspar-rich biotite-garnet-amphibole?-gneiss with irregular lenticular 1-3mm banding, better developed below 90.50m. Occasionally irregular migmatitic quartz-feldspar patches/veining occur. Secondary foliation or mylonitic zone are conspicuous from 91.30-91.77. The secondary foliation is parallel to the core axis and cross cuts the main foliation. There is also foliation/banding at 91.77 and some ptygmatic folded quartz-feldspar layers (e.g. 91.75). There are at least two phases of deformation.

91.77-93.62m. **Heterogeneous biotite garnet-rich gneiss.** Heterogeneous, locally massive, poorly foliated, biotite garnet gneiss with abundant fine garnets and xenoliths of finely banded psammitic material(up to 60mm) and irregular quartz-feldspar patches. Biotite-rich lenses (0.5x15mm) occur locally parallel to a weakly developed foliation. Migmatitic garnet-bearing quartz-feldspar patches develop locally.

93.62-94.82m. **Heterogeneous migmatitic quartzo-feldspathic section.** Heterogeneous migmatitic quartz-feldspar-rich areas, with garnets (up to 10mm), biotite, biotite-rich lenses, green mafic clots and xenoliths of finely banded psammitic material. Vague banding/foliation at 93.8m.

94.82-96.20m. **Banded biotite garnet gneiss.** Medium grained, slightly heterogeneous biotite garnet gneiss, locally with fine well defined banding/foliation. Locally refolded (e.g. 95.87m). Garnets up to 20mm. Ptygmatitic folding of quartzo-feldspathic layers. Between 95.05-95.07 there is an irregular carbonate/quartz? vein with pyrite-rich layers with crystals up to 20mm. Numerous carbonate ± amphibole ± pyrite fracture veins with slickensides.

96.20-103.02. **Vaguely foliated, poorly banded, massive 'equigranular' medium grained biotite garnet gneiss.** Ptygmatic folding at 100, 100.20m, associated with biotite(+cordierite)-rich and quartz-feldspar-garnet-rich layers (e.g. 99.95-100.33). Occasional garnet-rich layers (<10mm thick). Minor amphibole ± carbonate slickensided fracture veins and occasional planar (<0.5mm) yellow-green coloured veins ± pyrite. Amphibole+pyrite vein at 100.03m.

103.02-105.33m. **Heterogeneous biotite garnet amphibole gneiss locally banded/foliated.** Occasionally migmatitic with biotite-rich lenses in a felsic biotite-quartz-feldspar ground mass. 103.65m: sheared, brecciated, sericitised, quartz-carbonate? vein + amphibole? with clay gouge and graphitic shear planes. Sericitised margins up to 10mm on either side.

105.33-105.61. **Finely banded (1-60mm) calcareous carbonated/dolomitised unit.** The contacts and the banding are parallel and cross cut the foliation in the gneiss.

105.61-108.52m. **Heterogeneous, weakly banded/foliated biotite garnet gneiss.** Garnet-rich layers and migmatitic veining. Numerous carbonate veins (<2mm) around 107.6m.

108.52-116.25m. **Strongly banded/foliated streaky-lenticular biotite garnet amphibole? gneiss.** Garnet-rich quartzo-augens parallel to foliation at 110m. Extremely garnet-rich (25-30%) below 111m, as fine <0.5mm euhedra. Occasional psammitic? layers and migmatitic areas. Carbonate veins are common, quartz-carbonate-amphibole-pyrite veins are less common.

116.25-117.0m. **Altered (amphibolitised?) sheared quartz-feldspar-rich biotite gneiss.** Possible cross cutting shear fabric? at 116.85. Graphite coated ± clay gouge ± amphibole shear planes are present at 116.35 and 116.95. They are associated with carbonate-quartz-pyrite veins.

117.0-117.65m. **Complex, altered sheared carbonate-quartz-pyrite veined psammitic gneiss.** The vein is complex, brecciated and competent at 117.20m and leached and rotted at 117.42m. Graphite coated shears and clay gouge along margins. Pyrite (1-3%) is fine to coarse grained and occurs as disseminated crystals, elongated lenses and veins. The host gneiss is altered, amphibolitised (+silicified locally) up to 117.65m. Shear fabric is parallel to vein orientation. 117.25 is an autobrecciated pyrite-rich (4-5%) silicified portion of the vein, with a very complex multivein/brecciation history.

117.65-121.42. **Weakly to moderately well-banded biotite gneiss.** Minor garnet and migmatitic patches, 0.5-1mm thick carbonate veins and graphite coated shear planes are common. Complex (20-30mm) quartz-amphibole-pyrite vein with altered margins at 120.32m.

121.42-122.0m. **Slightly heterogeneous weakly to non-banded felsic biotite gneiss.** Increasingly altered and broken towards the base. Contains a number of graphite coated shear planes.

12.0-122.96m. **Highly altered (amphibolitised?) and veined biotite gneiss.** Leached quartz-carbonate-amphibole vein with clay gouge from 122.75-122.80. Margins to vein are altered and carbonated. Some graphite coated shear planes.

122.96-134.0m. **Weakly banded/foliated, slightly heterogeneous biotite gneiss.** Occasional garnets, psammitic layers and calcsilicate layers. 122.75-122.80 and 130.24: brecciated sheared quartz-carbonate-amphibole± pyrite vein zone with amphibolitic margins. Irregular carbonate veining (0.5-1mm) is common (e.g. 123.38m). Occasional graphite shear planes (e.g. 130.17). Pyrite and carbonate veining are later than shearing. Pyrite is possibly later than carbonate.

134.0-138.27m. **Biotite gneiss with strong lenticular foliation/banding (1-3mm).**

138.27-148.78m. **Fine-coarse well-banded felsic biotite gneiss.** Occasional finely-banded psammitic layers, 130mm calcsilicate xenoliths, refolded foliation, boudinage, quartzo-feldspathic layers and amphibole ± carbonate ± slickensided veins. 142.99-143.33: Highly altered sheared brecciated quartz-carbonate-amphibole zone with gouge and graphitic shear planes. Trace of pyrrhotite associated with calcsilicate xenoliths and pyrite with a quartzo-feldspathic patch at 142.0m.

CLAYMIRES BOREHOLE 2, FULL LOG

0-8.20m. **Overburden.**

8.20-20.77m. **Very poor recovery.** Boulders of medium-fine grained quartzite, sandy boulderclay and occasional olivine gabbro cumulate, hornfels and garnet-biotite norite.

20.77-35.99m. **Biotite-rich psammite/semipelite.** The core is extensively fractured and rubbly. Fine weakly foliated biotite-rich psammite/semipelite with 40-50% biotite and 40-50% quartz/feldspar?. Below 29m the core becomes more psammitic with the quartz/feldspar? fraction more abundant. Coarser quartz ± minor feldspar ± biotite layers occur locally (e.g. 26.90) and appear to be boudinaged. 21-26m: Slightly heterogeneous section, locally rich in muscovite porphyroblasts; 10mm lenses of muscovite, biotite a green-blue mineral and quartz, oriented parallel to the fabric (e.g. 23.40) and 10-20mm lenses of medium grained quartz and biotite (e.g. 23.40). Fracture surfaces are locally Fe stained. Sulphide is present mainly as pyrite in fracture veins but also as coatings on weakly schistose surfaces (e.g. 27.28m). The pyrite content varies from up to 1% (e.g. 34-35m) to <1% overall.

35.99-37.99m. **Intraformational breccia.** Highly fractured leached xenolithic rock with rounded to subangular and lensoidal clasts (1-15mm) of dominantly green calcsilicate material, minor grey limestone and quartzite in a fine grained biotite- and graphite-bearing pelitic matrix. Locally this matrix contains fine subhedral whitish crystals. Xenoliths form up to 85% of the core and are generally elongated and aligned in a strong fabric (e.g. 36m and 37.13m). Foliation is also defined by micaceous units, they often sweep around subrounded fragments. Many of the calcsilicate xenoliths are leached. Soft felsic ± chlorite + pyrite ± slickensiding fracture veins are numerous (e.g. 37.10) and range from hairline to 3mm in size. Pyrite (≤1%) is locally abundant (up to 5%) as fine-medium grained disseminated blebs and lenses parallel to foliation. Pyrrhotite (≤1%) is also common, generally as finer blebs. Sharp broken lower contact.

37.99-41.76m. **Sheared intraformational breccia.** As above, except that it is not leached or veined and the xenolithic material is locally flattened and produces a fine banding. Calcsilicate? (+ some quartzite?) subangular xenoliths (up to 50mm) to lensoidal layers dominate with minor pelite. Calcsilicate clasts and lenses are often zoned and constitute 35-70% of the core. The lenses appear to be breaking up locally and are covered by fine white tremolite crystals that also appear in the matrix defining foliation. Pyrrhotite has also picked out this fabric as veins and lenses. At 39.40m one angular pelitic fragment contains a fine folded foliation defined by pyrrhotite. This foliation is discordant to the main fabric. Strong foliation is present at 42.45m (defined by micaceous minerals and sulphide veins and lenses). Elsewhere the core is less deformed and more chaotic looking (e.g. 40.40m). Occasionally yellow-brown ± felsic hairline fracture surfaces occur. Graphite may be visible locally as fine grains. Pyrrhotite (2-3% and locally 1-2%) is common as fine lenses, blebs, veinlets, and as preferential replacements of certain xenoliths and lenses (e.g. 40.13, 40.72). Pyrite is less common than pyrrhotite and it often replaces quartz-felsic ± chlorite xenoliths (e.g. 40.10). A bleb of chalcopyrite is present at 39.40. Fairly sharp gradational lower contact.

41.76-48.17m. **Strongly foliated intraformational breccia.** As above, but rich (up to 80-85% of the rock) in strongly aligned lensoidal clasts. Subangular calcsilicate clasts (up to 50 mm) and pelitic clasts (up to 100mm) occur locally. Foliation seems to swirl around them (e.g. 40.70). An irregular 15mm patch occurs at 47.56m. Clasts are generally so flattened that they form a 'banded' texture (e.g. 43 and 45m). Pyrrhotite is conspicuous as up to 25x5mm lensoidal replacements (41.98m) and coarse rounded irregular replacements (e.g. 42.93, 42.43 and 42m). Finer blebs and lenses are common and fine replacements also occur locally (e.g. 47.69). Pyrrhotite occurs up to 2-3% and locally up to 5%. Pyrite is less common (≤1%) and occurs as lenses and blebs, often leached? and replacing pyrrhotite?. 2mm quartz veins and <1mm felsic ± chlorite ± pyrite veins occur locally. At 48.17m white ≤1mm staurolite? porphyroblasts are present in a pelitic clast. Graphite rich coatings on broken surfaces at 45.6m. Fairly sharp lower contact.

48.17-48.90m. **Chaotic intraformational breccia**. Complex, locally foliated unit of dominantly calcsilicate material, with occasionally large (100mm) zoned white carbonate ± graphite bearing calcsilicate clasts. Calcsilicate/carbonate matrix appears to make up most of the basal section. Green heterogeneous calcsilicate patch (70mm) with pale cream-green 15x3mm lath like crystals, pyroxene? quartz+pyrite+chlorite patches. Sulphide are common. Pyrrhotite (1-2%) occurs as blebs up to 7mm in size and pyrite(≤1%) replaces pyrrhotite locally. Irregular sharp convoluted lower contact over 110mm.

48.90-87.30m. **Finely banded micaceous psammite**. Similar to 20.77-36.0m except slightly more quartzo-feldspathic and psammitic (15-25% biotite). Fine micaceous psammite with fine 1-20mm vague banding and more discrete well defined banding below 69m. Locally massive. Quartz-feldspar ± biotite veins/layers occur sporadically and are often ptygmatically folded and boudinaged. Chloritic? porphyroblast-rich patches and 1-2 mm porphyroblasts occur locally (e.g. 68.0 and 79.84m). Some sections have extensive hairline to 5mm wide planar quartzo-feldspathic fracture veins with occasional pyrite. Intraformational breccia units with poorly sorted subangular to lensoidal calcsilicates occur locally. Also locally there are some quartzite? and minor dark grey pelitic clasts, within a biotite-rich semipelitic matrix. Contacts are sharp and generally foliated. The clasts range from 1 to 60mm. Pyrrhotite and minor pyrite appear to be restricted to the intraformational breccias up to 1-2%. At 74.15 minor pyrrhotite occurs below intraformational breccia. Pyrite is found sporadically up to 1% as very fine grains/veinlets parallel to the foliation, it appears to increase below 80m. 77.56-77.75m contains dark pelitic units and abundant fine to coarse patches of graphite (2-3%).

87.30-89.46m. **Sheared intraformational breccia**. Strongly foliated, dominantly with calcsilicate?/quartzite, brown quartzite, and calcsilicate (± graphite) clasts within a biotite-rich semipelitic matrix. The clast content is about 80%. Below 89.15 the clast content and size decrease and the core becomes a xenolithic micaceous psammite. Occasional hairline quartz-carbonate+pyrite veins (e.g. 88.45m). Pyrrhotite (1-2%) occurs as fine to coarse replacive blebs and veinlets and occasionally as very coarse 40x10mm lenses. Both lenses and veins are parallel to foliation. Gradational but sharp lower contact.

89.46-90.86m. **Massive micaceous psammite**. Fine grained psammite with 20-30% biotite?, and occasional coarser gritty layers and white porphyroblasts. <1mm quartz ± biotite veins and hairline quartz ± chlorite fracture veins. Fine diffuse banding is common throughout. The core has strong foliation on broken surface defined by biotite and fine pyrite veinlets and blebs. Pyrite occurs up to 2%.

90.86-119.72m. **Sheared intraformational breccia**. Generally strongly foliated, with a mixture of flattened subangular to lensoidal clasts of pelite, calcsilicates and quartzite. The section is locally banded and strongly sheared (e.g. 98.0-99.0m, 100m) with augens. Clasts vary from 1-100mm in size and they make up 45-55% of the core. Hairline to ≤1mm quartz ± carbonate ± pyrite fractures occur locally and are particularly common around 111.0m. 111.16-111.22m: Carbonate ± quartz breccia zone with 30% angular psammitic clasts and minor disseminated euhedral pyrite. Large carbonate patches occur locally (e.g. 115.5 and 114.5). Pyrrhotite is common throughout. 90.86-110.0m: Fine to very coarse blebs, lenses and fine veinlets of pyrrhotite (up to 1-2%), parallel to foliation and replacing clasts. At 110.0-119.72m there is slightly less pyrrhotite (≤1%). Pyrrhotite is occasionally tinted/oxidised. Pyrite is restricted to fracture veins. Interleaved complex lower contact over 70cm thick.

119.72-123.15m. **Banded micaceous psammite/semipelite**. Finely banded/foliated micaceous psammite studded with very fine white porphyroblasts (cordierite?) and slightly coarser porphyroblasts of chlorite? (≤5%). Both porphyroblasts disappear below 122.33m. Irregular folded 30mm quartz vein layer at 122.15. Planar quartz vein with 1-2% altered feldspar from 122.38-122.45. Hairline carbonate ± chlorite ± pyrite veins are common. 122.75-122.85: Intraformational breccia with semipelitic-pelitic and calcsilicate clasts in a semipelitic matrix. Pyrite (≤1%) occurs commonly as very fine blebs and veinlets parallel to foliation and as coarse blebs in the intraformational breccia. Fairly sharp lower contact.

123.15-125.81m. **Finely banded semipelite/intraformational breccia mixture**. Dominantly matrix supported, very fine grained, finely banded biotite-rich semipelite with 40cm section rich in strongly flattened clasts 35-45% of zoned calcsilicate? or pelitic calcsilicate and pelite. Elsewhere matrix contains 1-5% clasts or is barren. (e.g. 124.60-124.90m). 124.90-125.02: Complex quartzose vein, with biotite-rich wedges, chlorite patches and fine disseminations and veinlets of pyrite (≤1%) and pyrrhotite (≤1%, and locally 2%). Pyrrhotite commonly occurs as fine to coarse blebs, lenses and veinlets.

CLAYMIRES BOREHOLE 3, FULL LOG

0-3.73m. **Poor recovery**. Rounded pebbles of biotite gneiss (e.g. 3.0-3.73m).

3.73-4m. **Weathered biotite gneiss.**

4.0-6.29m. **Highly weathered biotite-cordierite? gneiss.** Cordierite crystals are generally ≤1mm, but locally they form augens. Wrap around foliation at 4.85m. Foliation is well developed and it is defined by lenticular biotite and elongated quartz grains. No sulphides have been observed.

6.29-12.45m. **Biotite-cordierite?-garnet gneiss.** As above, but with 1-8% garnet. There is a very fine pyrite vein (<0.5mm) at 9.27m.

12.45-24.0m. **Homogeneous biotite-garnet-cordierite? gneiss.** Homogeneous Semipelitic with pelitic and psammitic units at 17.0 and 17.4m, respectively. Weak to moderate foliation. Cordierite content decreases down section. Minor pyrite in veins.

24.0-25.06m. **Heterogeneous biotite gneiss.** Poorly foliated, with biotite-rich semipelitic and quartz-psammitic areas.

25.06-29.44m. **Heterogeneous biotite garnet gneiss.** Semipelitic to psammitic biotite-garnet gneiss showing weak to moderate foliation. Abundant quartz ± carbonate fracture coatings.

29.44-41.20m. **Micaceous psammite/psammitic gneiss.** Medium grained, generally foliated. Pyrite only found in veins together with quartz, carbonate and a green chloritic mineral.

41.2-45-95m. **Micaceous psammite with cordierite?.** Fine grained massive micaceous psammite, with some biotite-rich layers. Cordierite is locally present as fine porphyroblasts.

45.95-51.48m. **Semipelitic to micaceous psammitic gneiss.** Weak to moderately foliated, with local quartz-rich areas. Carbonate and quartz fractures are common.

51.48-72.87m. **Banded semipelitic biotite gneiss.** Well foliated, it contains micaceous psammite units up to 30cm thick and occasional calcsilicate bands. Garnets occur rarely. The foliation becomes less distinct below 62m. Pyrite (1-2%) occurs both disseminated and in veinlets, within an irregular layer of calcsilicate 20mm thick. 1-2mm carbonate veins ± pyrite and quartz-chloritic fractures ± pyrite are common (e.g. 52.55mm). At depths 63.97 and 71.55 there are altered silicified zones with hairline quartz-carbonate-pyrite veins. Graphite occurs as coatings on some surfaces.

TRACE ELEMENT, PGE and Au ANALYSES

BRITISH GEOLOGICAL SURVEY
Mineral Reconnaissance Programme

Claymires Drillcore Data - Borehole 1

Sample Reference	Top Depth	Bottom Depth	Zn (ppm)	As (ppm)	Sr (ppm)	Mo (ppm)	Ag (ppm)	Sb (ppm)	Ba (ppm)	Pb (ppm)	Bi (ppm)
PGD2492	1.95	3.98	70	4.0	107	8.0	2.000	1.0	30	0	0.0
PGD2493	3.98	6.06	56	3.0	89	5.0	1.000	1.0	40	3	2.0
PGD2494	6.06	7.91	76	15.0	117	7.0	1.000	1.0	63	3	0.0
PGD2495	7.91	9.00	77	2.0	110	6.0	2.000	1.0	93	2	0.0
PGD2496	9.00	10.30	118	2.0	245	5.0	4.000	0.0	99	1	0.0
PGD2497	10.30	11.45	99	0.0	266	1.0	4.000	1.0	103	1	1.0
PGD2498	11.45	12.15	117	0.0	216	3.0	3.000	1.0	105	4	0.0
PGD2499	12.15	13.97	94	0.0	239	2.0	3.000	1.0	121	3	0.0
PGD2500	13.97	14.86	116	6.0	262	1.0	4.000	0.0	108	5	0.0
PGD2501	14.86	15.45	105	10.0	282	3.0	3.000	0.0	110	7	0.0
PGD2502	15.45	15.60	78	2.0	257	4.0	3.000	0.0	138	8	0.0
PGD2503	15.60	16.75	110	2.0	271	1.0	3.000	0.0	109	3	0.0
PGD2504	16.75	17.10	115	0.0	266	4.0	4.000	0.0	100	3	0.0
PGD2505	17.10	17.72	106	2.0	271	2.0	3.000	0.0	110	6	1.0
PGD2506	17.72	18.48	91	2.0	176	7.0	2.000	0.0	95	3	0.0
PGD2507	18.48	19.47	109	1.0	267	4.0	2.000	0.0	125	6	0.0

Claymires Drillcore Data - Borehole 1

Sample Reference	Top Depth	Bottom Depth	Ca (ppm)	Ti (ppm)	V (ppm)	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)
PGD2492	1.95	3.98	34300	1350	148	580	1430	45900	32	327	34
PGD2493	3.98	6.06	28200	1160	110	702	1120	38700	31	283	38
PGD2494	6.06	7.91	47300	2170	112	498	1510	45300	27	263	48
PGD2495	7.91	9.00	34600	2170	104	335	1080	47200	27	182	39
PGD2496	9.00	10.30	44100	11650	181	234	1550	80300	27	177	32
PGD2497	10.30	11.45	48700	12530	152	129	1270	65400	21	79	24
PGD2498	11.45	12.15	44200	10320	173	306	1480	78300	31	187	56
PGD2499	12.15	13.97	35700	9870	167	156	1110	70800	24	197	45
PGD2500	13.97	14.86	51300	11020	168	181	1510	77600	29	126	62
PGD2501	14.86	15.45	53700	10720	155	144	1330	68700	27	116	48
PGD2502	15.45	15.60	39100	8030	110	111	1020	51600	17	54	20
PGD2503	15.60	16.75	52200	9820	157	133	1400	74100	27	82	32
PGD2504	16.75	17.10	51600	10850	167	155	1470	77500	26	77	35
PGD2505	17.10	17.72	53600	13640	174	144	1310	71200	27	83	28
PGD2506	17.72	18.48	40100	7630	136	328	1310	62300	25	119	52
PGD2507	18.48	19.47	47000	11750	172	187	1380	69900	27	90	42

Claymires Drillcore Data - Borehole 1

Sample Reference	Top Depth	Bottom Depth	Rh (ppm)	Pd (ppm)	Pt (ppm)	Au (ppm)
PGD2492	1.95	3.98	0.002	0.003	0.002	0.006
PGD2493	3.98	6.06	0.002	0.002	0.002	0.006
PGD2494	6.06	7.91	0.002	0.002	0.001	0.004
PGD2495	7.91	9.00	0.002	0.002	0.001	0.002
PGD2496	9.00	10.30	0.002	0.002	0.001	0.001
PGD2497	10.30	11.45	0.002	0.002	0.001	0.006
PGD2498	11.45	12.15	0.002	0.002	0.001	0.002
PGD2499	12.15	13.97	0.002	0.002	0.002	0.003
PGD2500	13.97	14.86	0.002	0.002	0.001	0.025
PGD2501	14.86	15.45	0.002	0.002	0.001	0.015
PGD2502	15.45	15.60	0.002	0.002	0.002	0.002
PGD2503	15.60	16.75	0.002	0.002	0.001	0.001
PGD2504	16.75	17.10	0.002	0.002	0.001	0.001
PGD2505	17.10	17.72	0.002	0.002	0.001	0.001
PGD2506	17.72	18.48	0.002	0.002	0.001	0.004
PGD2507	18.48	19.47	0.002	0.002	0.001	0.004

Claymires Drillcore Data - Borehole 1A

Sample Reference	Top Depth	Bottom Depth	Zn (ppm)	As (ppm)	Sr (ppm)	Mo (ppm)	Ag (ppm)	Sb (ppm)	Ba (ppm)	Pb (ppm)	Bi (ppm)
PGD2401	16.41	17.45	121	2.0	260	5.0	4.000	0.0	102	7	0.0
PGD2402	17.45	18.18	101	2.0	189	6.0	2.000	0.0	79	3	0.0
PGD2403	18.18	19.00	90	1.0	173	6.0	3.000	0.0	72	7	0.0
PGD2404	19.00	19.25	81	3.0	289	2.0	2.000	1.0	200	9	1.0
PGD2405	19.25	20.05	118	1.0	262	2.0	4.000	0.0	122	7	0.0
PGD2406	20.05	21.01	115	0.0	263	2.0	4.000	1.0	113	7	0.0
PGD2407	21.01	21.92	121	0.0	250	5.0	4.000	0.0	115	3	0.0
PGD2408	21.92	23.05	128	1.0	249	5.0	3.000	0.0	115	7	0.0
PGD2409	23.05	24.00	127	0.0	246	5.0	4.000	0.0	117	4	0.0
PGD2410	24.00	24.69	114	0.0	270	5.0	4.000	0.0	116	7	0.0
PGD2411	24.69	26.02	113	4.0	250	5.0	4.000	0.0	124	4	1.0
PGD2412	26.02	26.41	124	3.0	242	3.0	4.000	1.0	94	2	1.0
PGD2413	26.41	26.63	101	4.0	233	4.0	3.000	2.0	127	7	0.0
PGD2414	26.63	28.07	119	3.0	253	5.0	3.000	0.0	120	6	0.0
PGD2415	28.07	29.07	126	1.0	234	5.0	4.000	0.0	108	1	1.0
PGD2416	29.07	30.06	122	3.0	249	3.0	4.000	0.0	115	4	0.0
PGD2417	30.06	30.87	125	0.0	254	2.0	5.000	0.0	116	3	0.0
PGD2418	30.87	30.94	7	5.0	70	15.0	0.000	2.0	29	1	0.0
PGD2419	30.94	31.89	117	0.0	254	3.0	3.000	0.0	118	4	0.0
PGD2420	31.89	32.70	115	1.0	257	4.0	3.000	0.0	97	4	0.0
PGD2421	32.70	33.29	129	0.0	224	5.0	4.000	1.0	137	1	0.0
PGD2422	33.29	34.30	91	4.0	294	4.0	3.000	0.0	93	10	0.0
PGD2423	34.30	35.45	134	2.0	222	3.0	3.000	0.0	107	6	0.0
PGD2424	35.45	36.40	129	3.0	217	6.0	4.000	0.0	93	5	0.0
PGD2425	36.40	37.82	124	2.0	233	4.0	3.000	0.0	97	4	1.0
PGD2426	37.82	38.80	129	2.0	220	6.0	4.000	0.0	105	3	0.0
PGD2427	38.80	40.17	122	1.0	243	2.0	3.000	2.0	105	4	1.0
PGD2428	40.17	41.35	130	0.0	224	3.0	5.000	0.0	108	3	0.0
PGD2429	41.35	41.48	3	3.0	162	4.0	0.000	2.0	446	55	0.0
PGD2430	41.48	43.06	128	0.0	231	4.0	4.000	0.0	102	5	0.0
PGD2431	43.06	44.18	124	0.0	226	5.0	4.000	0.0	94	5	0.0
PGD2432	44.18	45.03	125	0.0	237	6.0	3.000	0.0	94	2	0.0
PGD2433	45.03	46.04	126	1.0	237	3.0	4.000	0.0	95	4	0.0
PGD2434	46.04	47.45	125	1.0	229	5.0	3.000	0.0	83	6	0.0
PGD2435	47.45	48.89	124	0.0	224	6.0	4.000	0.0	90	3	1.0
PGD2436	48.89	49.77	121	0.0	232	2.0	4.000	1.0	98	9	1.0
PGD2437	49.77	50.10	121	0.0	231	5.0	3.000	0.0	91	4	0.0
PGD2438	50.10	51.33	124	0.0	233	6.0	4.000	1.0	78	5	0.0
PGD2439	51.33	52.27	121	1.0	238	2.0	4.000	0.0	78	5	0.0
PGD2440	52.27	53.08	148	7.0	159	6.0	4.000	0.0	104	3	0.0
PGD2441	53.08	53.41	112	0.0	252	4.0	3.000	0.0	83	8	1.0
PGD2442	53.41	54.30	122	1.0	223	5.0	3.000	0.0	137	6	0.0
PGD2443	54.30	54.55	114	0.0	197	3.0	5.000	0.0	126	6	0.0
PGD2444	54.55	54.84	109	0.0	251	6.0	4.000	1.0	75	8	0.0
PGD2445	54.84	55.97	116	0.0	209	7.0	3.000	0.0	71	4	2.0
PGD2446	55.97	56.86	124	0.0	268	6.0	4.000	0.0	101	5	0.0
PGD2447	56.86	57.55	124	1.0	257	2.0	3.000	0.0	97	7	0.0
PGD2448	57.55	58.90	77	5.0	124	11.0	2.000	1.0	80	4	0.0

BRITISH GEOLOGICAL SURVEY
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Claymires Drillcore Data - Borehole 1A

Sample Reference	Top Depth	Bottom Depth	Zn (ppm)	As (ppm)	Sr (ppm)	Mo (ppm)	Ag (ppm)	Sb (ppm)	Ba (ppm)	Pb (ppm)	Bi (ppm)
PGD2449	58.90	59.72	94	3.0	208	4.0	3.000	1.0	178	9	0.0
PGD2450	59.72	61.19	104	1.0	221	7.0	3.000	0.0	223	11	0.0
PGD2451	61.19	61.72	79	11.0	166	7.0	3.000	0.0	290	4	1.0
PGD2452	61.72	62.00	117	0.0	227	10.0	3.000	0.0	332	11	0.0
PGD2453	62.00	63.00	49	1.0	197	6.0	3.000	0.0	296	9	1.0
PGD2454	63.00	63.22	59	6.0	143	7.0	2.000	0.0	163	2	0.0
PGD2455	63.22	64.30	91	0.0	203	5.0	2.000	0.0	164	11	1.0
PGD2456	64.30	65.25	93	1.0	202	7.0	2.000	0.0	172	10	0.0
PGD2457	65.25	66.53	78	2.0	198	4.0	1.000	0.0	196	9	0.0
PGD2458	66.53	67.60	99	0.0	202	4.0	3.000	0.0	193	7	1.0
PGD2459	67.60	68.46	95	3.0	214	5.0	3.000	0.0	170	5	0.0
PGD2460	68.46	69.80	72	2.0	173	8.0	3.000	2.0	196	10	0.0
PGD2461	69.80	70.81	84	2.0	219	6.0	2.000	2.0	213	10	0.0
PGD2462	70.81	71.95	72	2.0	228	5.0	3.000	0.0	225	10	1.0
PGD2463	71.95	72.95	71	0.0	230	4.0	1.000	0.0	260	10	0.0
PGD2464	72.95	73.08	66	0.0	183	7.0	2.000	0.0	465	12	0.0
PGD2465	73.08	73.20	65	0.0	217	8.0	3.000	0.0	379	13	1.0
PGD2466	73.20	74.23	43	10.0	38	12.0	0.000	3.0	146	3	0.0
PGD2467	74.23	74.85	43	1.0	87	20.0	1.000	6.0	260	3	0.0
PGD2468	74.85	75.82	47	2.0	78	14.0	0.000	0.0	298	6	0.0
PGD2469	75.82	76.32	58	382.0	124	10.0	2.000	2.0	170	0	0.0
PGD2470	76.32	77.05	85	1.0	119	9.0	2.000	0.0	422	12	0.0
PGD2471	77.05	78.25	104	0.0	122	9.0	2.000	2.0	434	18	1.0
PGD2472	78.25	79.25	74	3.0	127	10.0	1.000	1.0	356	13	1.0
PGD2473	79.25	79.92	106	0.0	126	7.0	2.000	0.0	513	13	1.0
PGD2474	79.92	80.27	99	1.0	178	10.0	3.000	0.0	334	15	0.0
PGD2475	80.27	81.10	111	2.0	118	9.0	2.000	1.0	492	16	0.0
PGD2476	85.60	85.73	67	6.0	93	10.0	2.000	2.0	296	13	0.0
PGD2477	88.35	88.63	76	4.0	205	9.0	1.000	0.0	289	12	0.0
PGD2478	89.34	89.71	103	4.0	140	7.0	3.000	0.0	550	16	0.0
PGD2479	90.07	90.72	95	5.0	145	10.0	3.000	0.0	462	21	1.0
PGD2480	96.20	96.98	104	4.0	119	8.0	2.000	0.0	460	20	0.0
PGD2481	99.95	100.33	106	4.0	194	5.0	1.000	1.0	413	23	0.0
PGD2482	104.00	104.60	98	1.0	132	7.0	1.000	1.0	526	26	0.0
PGD2483	105.33	105.61	57	0.0	500	2.0	1.000	0.0	1127	15	0.0
PGD2484	108.95	109.44	100	0.0	138	11.0	2.000	1.0	364	16	0.0
PGD2485	109.50	110.00	97	1.0	142	6.0	2.000	2.0	438	15	0.0
PGD2486	115.06	115.47	87	0.0	109	9.0	2.000	0.0	230	14	0.0
PGD2487	116.77	117.48	83	10.0	87	6.0	1.000	0.0	429	21	0.0
PGD2488	122.61	122.96	89	13.0	90	7.0	2.000	1.0	390	10	0.0
PGD2489	125.40	125.80	116	0.0	102	8.0	2.000	0.0	589	21	1.0
PGD2490	137.00	137.63	124	0.0	107	4.0	2.000	1.0	348	18	1.0
PGD2491	146.00	146.65	109	2.0	124	8.0	2.000	2.0	495	14	1.0

BRITISH GEOLOGICAL SURVEY
Mineral Reconnaissance Programme

Claymires Drillcore Data - Borehole 1A

Sample Reference	Top Depth	Bottom Depth	Ca (ppm)	Ti (ppm)	V (ppm)	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)
PGD2401	16.41	17.45	51700	12940	183	200	1500	78700	28	109	40
PGD2402	17.45	18.18	37900	8860	150	310	1300	64900	26	121	48
PGD2403	18.18	19.00	32300	6810	136	365	1190	59100	23	141	48
PGD2404	19.00	19.25	42000	10290	120	141	1020	53200	23	93	49
PGD2405	19.25	20.05	50600	14450	195	155	1430	77600	25	75	43
PGD2406	20.05	21.01	50900	15350	174	122	1370	74600	24	59	36
PGD2407	21.01	21.92	49000	13160	183	193	1460	79500	29	97	52
PGD2408	21.92	23.05	48900	12850	197	188	1500	83100	30	96	56
PGD2409	23.05	24.00	48400	12370	195	203	1500	82300	28	85	49
PGD2410	24.00	24.69	52200	13440	176	167	1360	74100	27	81	46
PGD2411	24.69	26.02	44600	11140	176	203	1380	73200	25	76	36
PGD2412	26.02	26.41	45400	12250	194	204	1580	83500	30	93	52
PGD2413	26.41	26.63	42600	10890	159	191	1190	67400	26	72	45
PGD2414	26.63	28.07	47800	12370	191	182	1390	78100	28	80	60
PGD2415	28.07	29.07	47000	12820	187	220	1510	85000	31	106	66
PGD2416	29.07	30.06	46700	12880	188	178	1490	80800	28	87	58
PGD2417	30.06	30.87	49200	13470	203	209	1490	81500	26	88	44
PGD2418	30.87	30.94	7500	1000	19	253	70	6600	2	9	4
PGD2419	30.94	31.89	47100	13630	194	186	1400	76100	26	77	39
PGD2420	31.89	32.70	46500	12130	181	204	1400	75000	25	80	43
PGD2421	32.70	33.29	44600	11100	191	359	1500	79900	29	150	55
PGD2422	33.29	34.30	50900	14430	172	177	1100	57800	21	91	31
PGD2423	34.30	35.45	38600	9920	189	420	1690	90200	33	184	57
PGD2424	35.45	36.40	39900	8380	175	357	1760	86900	32	173	65
PGD2425	36.40	37.82	45600	11390	175	271	1510	79500	30	127	55
PGD2426	37.82	38.80	46200	8580	173	337	1610	85100	32	144	57
PGD2427	38.80	40.17	49300	13280	194	187	1440	80000	31	87	45
PGD2428	40.17	41.35	46100	11420	191	245	1510	84300	30	105	51
PGD2429	41.35	41.48	11100	150	3	64	40	2100	1	2	1
PGD2430	41.48	43.06	46600	11890	199	232	1490	83700	32	108	51
PGD2431	43.06	44.18	46000	11420	193	240	1480	83300	31	99	44
PGD2432	44.18	45.03	46600	11610	195	223	1410	81300	30	108	51
PGD2433	45.03	46.04	48400	12460	205	218	1460	84300	31	101	47
PGD2434	46.04	47.45	46200	11730	206	221	1460	84200	31	105	49
PGD2435	47.45	48.89	43200	11670	198	229	1520	84500	31	96	45
PGD2436	48.89	49.77	48300	9290	172	241	1500	80600	27	94	40
PGD2437	49.77	50.10	45200	9630	174	272	1470	77400	28	98	43
PGD2438	50.10	51.33	46400	10860	180	238	1550	81500	30	96	47
PGD2439	51.33	52.27	46500	11490	186	221	1560	80800	29	101	51
PGD2440	52.27	53.08	32800	4970	181	665	2130	105800	44	255	140
PGD2441	53.08	53.41	46800	11800	177	200	1480	74800	28	85	48
PGD2442	53.41	54.30	38800	7200	180	367	1730	79200	31	138	63
PGD2443	54.30	54.55	42500	9620	216	347	1660	84900	34	120	56
PGD2444	54.55	54.84	44300	9340	175	202	1560	78700	39	201	139
PGD2445	54.84	55.97	38900	6960	143	293	1520	72500	26	94	43
PGD2446	55.97	56.86	49800	14120	141	140	1490	78000	23	56	37
PGD2447	56.86	57.55	46000	11600	184	233	1460	77500	27	97	31
PGD2448	57.55	58.90	32300	2790	131	492	1300	47800	21	147	50

Claymires Drillcore Data - Borehole 1A

Sample Reference	Top Depth	Bottom Depth	Ca (ppm)	Ti (ppm)	V (ppm)	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)
PGD2449	58.90	59.72	54800	4340	137	280	1300	52800	25	55	18
PGD2450	59.72	61.19	45400	7440	157	234	1380	58500	21	72	71
PGD2451	61.19	61.72	76300	1740	94	354	1750	36200	16	142	38
PGD2452	61.72	62.00	35600	7740	143	358	1390	61400	23	132	69
PGD2453	62.00	63.00	92100	960	56	288	1260	26200	10	99	30
PGD2454	63.00	63.22	91800	1180	69	366	1360	32600	14	147	38
PGD2455	63.22	64.30	47700	6160	124	222	1490	57700	22	67	36
PGD2456	64.30	65.25	30800	6720	128	220	1140	57300	23	60	37
PGD2457	65.25	66.53	33800	5840	123	213	1030	51600	24	79	45
PGD2458	66.53	67.60	37300	8100	154	222	1190	63400	25	59	41
PGD2459	67.60	68.46	37700	7560	150	205	1270	60800	22	54	42
PGD2460	68.46	69.80	36600	4940	113	252	1060	51600	24	70	49
PGD2461	69.80	70.81	40400	6070	126	190	1200	55900	25	66	30
PGD2462	70.81	71.95	40000	5270	111	195	1130	49400	21	49	20
PGD2463	71.95	72.95	45600	5860	121	174	1250	52700	24	59	21
PGD2464	72.95	73.08	70200	4350	108	168	1040	41700	12	44	18
PGD2465	73.08	73.20	37400	4950	109	196	1150	46900	23	62	17
PGD2466	73.20	74.23	24700	1980	90	373	610	34400	22	119	88
PGD2467	74.23	74.85	25800	1920	108	478	790	26700	10	63	46
PGD2468	74.85	75.82	17600	2070	109	396	880	29800	14	68	64
PGD2469	75.82	76.32	54400	1400	66	753	1980	33600	33	412	52
PGD2470	76.32	77.05	14100	3950	121	295	830	48900	19	91	49
PGD2471	77.05	78.25	8200	5230	145	299	740	58800	24	112	40
PGD2472	78.25	79.25	10300	3670	105	318	590	41900	18	82	54
PGD2473	79.25	79.92	7500	5170	149	315	740	59500	23	100	17
PGD2474	79.92	80.27	15900	4750	145	297	1010	53600	21	85	94
PGD2475	80.27	81.10	7100	5360	170	285	760	62300	23	86	26
PGD2476	85.60	85.73	12300	4720	148	307	540	59200	20	71	39
PGD2477	88.35	88.63	18800	3880	113	275	990	42600	15	56	134
PGD2478	89.34	89.71	8000	4740	148	230	730	54800	19	66	36
PGD2479	90.07	90.72	9200	3860	137	233	1010	45500	16	47	45
PGD2480	96.20	96.98	7700	3890	162	188	890	48000	16	36	35
PGD2481	99.95	100.33	12000	4040	142	147	900	43400	16	36	52
PGD2482	104.00	104.60	7800	3350	148	183	940	44200	13	30	33
PGD2483	105.33	105.61	13200	4030	70	87	1160	29300	12	33	15
PGD2484	108.95	109.44	10400	3810	154	201	1190	47900	17	36	80
PGD2485	109.50	110.00	13500	3650	146	188	1430	47600	14	33	40
PGD2486	115.06	115.47	7700	4050	105	187	4180	59900	23	32	3
PGD2487	116.77	117.48	25900	3910	128	198	910	48500	15	57	24
PGD2488	122.61	122.96	13900	4620	146	222	640	55500	18	68	35
PGD2489	125.40	125.80	5600	5220	165	217	1000	61800	21	77	42
PGD2490	137.00	137.63	8400	4940	157	177	700	57100	19	68	32
PGD2491	146.00	146.65	8100	4760	146	223	730	54800	20	72	29

Claymires Drillcore Data - Borehole 1A

Sample Reference	Top Depth	Bottom Depth	Rh (ppm)	Pd (ppm)	Pt (ppm)	Au (ppm)
PGD2401	16.41	17.45	0.002	0.002	0.002	0.003
PGD2402	17.45	18.18	0.002	0.002	0.005	0.004
PGD2403	18.18	19.00	0.002	0.003	0.001	0.003
PGD2404	19.00	19.25	0.002	0.008	0.007	0.008
PGD2405	19.25	20.05	0.003	0.003	0.002	0.002
PGD2406	20.05	21.01	0.003	0.002	0.002	0.002
PGD2407	21.01	21.92	0.003	0.004	0.002	0.002
PGD2408	21.92	23.05	0.002	0.002	0.005	0.013
PGD2409	23.05	24.00	0.002	0.002	0.001	0.002
PGD2410	24.00	24.69	0.002	0.002	0.002	0.002
PGD2411	24.69	26.02	0.002	0.002	0.001	0.003
PGD2412	26.02	26.41	0.002	0.002	0.002	0.002
PGD2413	26.41	26.63	0.002	0.002	0.001	0.001
PGD2414	26.63	28.07	0.003	0.004	0.002	0.003
PGD2415	28.07	29.07	0.002	0.004	0.002	0.003
PGD2416	29.07	30.06	0.002	0.003	0.001	0.003
PGD2417	30.06	30.87	0.002	0.003	0.001	0.001
PGD2418	30.87	30.94	0.002	0.002	0.001	0.001
PGD2419	30.94	31.89	0.002	0.002	0.001	0.002
PGD2420	31.89	32.70	0.002	0.002	0.001	0.002
PGD2421	32.70	33.29	0.003	0.002	0.003	0.003
PGD2422	33.29	34.30	0.002	0.003	0.001	0.002
PGD2423	34.30	35.45	0.002	0.004	0.003	0.003
PGD2424	35.45	36.40	0.003	0.004	0.001	0.002
PGD2425	36.40	37.82	0.002	0.004	0.002	0.003
PGD2426	37.82	38.80	0.002	0.002	0.002	0.003
PGD2427	38.80	40.17	0.002	0.002	0.001	0.002
PGD2428	40.17	41.35	0.002	0.003	0.002	0.002
PGD2429	41.35	41.48	0.002	0.002	0.001	0.001
PGD2430	41.48	43.06	0.002	0.003	0.002	0.003
PGD2431	43.06	44.18	0.002	0.003	0.002	0.002
PGD2432	44.18	45.03	0.002	0.002	0.001	0.002
PGD2433	45.03	46.04	0.002	0.002	0.001	0.002
PGD2434	46.04	47.45	0.003	0.004	0.002	0.003
PGD2435	47.45	48.89	0.002	0.002	0.001	0.002
PGD2436	48.89	49.77	0.002	0.002	0.001	0.002
PGD2437	49.77	50.10	0.002	0.002	0.001	0.004
PGD2438	50.10	51.33	0.002	0.002	0.002	0.003
PGD2439	51.33	52.27	0.002	0.002	0.001	0.003
PGD2440	52.27	53.08	0.002	0.002	0.002	0.005
PGD2441	53.08	53.41	0.002	0.002	0.001	0.003
PGD2442	53.41	54.30	0.002	0.002	0.001	0.003
PGD2443	54.30	54.55	0.002	0.002	0.003	0.006
PGD2444	54.55	54.84	0.002	0.003	0.001	0.002
PGD2445	54.84	55.97	0.002	0.002	0.002	0.002
PGD2446	55.97	56.86	0.002	0.002	0.001	0.002
PGD2447	56.86	57.55	0.002	0.004	0.002	0.004
PGD2448	57.55	58.90	0.002	0.002	0.001	0.001

Claymires Drillcore Data - Borehole 1A

Sample Reference	Top Depth	Bottom Depth	Rh (ppm)	Pd (ppm)	Pt (ppm)	Au (ppm)
PGD2449	58.90	59.72	0.002	0.002	0.001	0.002
PGD2450	59.72	61.19	0.002	0.002	0.001	0.003
PGD2451	61.19	61.72	0.002	0.002	0.001	0.004
PGD2452	61.72	62.00	0.002	0.002	0.001	0.003
PGD2453	62.00	63.00	0.002	0.002	0.001	0.004
PGD2454	63.00	63.22	0.002	0.002	0.002	0.005
PGD2455	63.22	64.30	0.002	0.003	0.002	0.003
PGD2456	64.30	65.25	0.003	0.002	0.001	0.001
PGD2457	65.25	66.53	0.002	0.002	0.001	0.002
PGD2458	66.53	67.60	0.002	0.002	0.001	0.002
PGD2459	67.60	68.46	0.002	0.002	0.001	0.002
PGD2460	68.46	69.80	0.002	0.002	0.001	0.005
PGD2461	69.80	70.81	0.002	0.002	0.001	0.001
PGD2462	70.81	71.95	0.002	0.002	0.001	0.002
PGD2463	71.95	72.95	0.002	0.002	0.001	0.001
PGD2464	72.95	73.08	0.002	0.002	0.001	0.001
PGD2465	73.08	73.20	0.002	0.002	0.001	0.001
PGD2466	73.20	74.23	0.002	0.002	0.001	0.001
PGD2467	74.23	74.85	0.002	0.002	0.001	0.001
PGD2468	74.85	75.82	0.002	0.002	0.001	0.002
PGD2469	75.82	76.32	0.002	0.002	0.001	0.060
PGD2470	76.32	77.05	0.002	0.002	0.001	0.003
PGD2471	77.05	78.25	0.002	0.004	0.001	0.002
PGD2472	78.25	79.25	0.002	0.002	0.001	0.001
PGD2473	79.25	79.92	0.002	0.003	0.001	0.001
PGD2474	79.92	80.27	0.002	0.004	0.003	0.001
PGD2475	80.27	81.10	0.002	0.003	0.001	0.001
PGD2476	85.60	85.73	0.002	0.003	0.003	0.003
PGD2477	88.35	88.63	0.002	0.005	0.003	0.003
PGD2478	89.34	89.71	0.002	0.004	0.002	0.002
PGD2479	90.07	90.72	0.002	0.004	0.002	0.002
PGD2480	96.20	96.98	0.003	0.007	0.002	0.003
PGD2481	99.95	100.33	0.002	0.004	0.003	0.002
PGD2482	104.00	104.60	0.002	0.005	0.002	0.003
PGD2483	105.33	105.61	0.002	0.002	0.001	0.001
PGD2484	108.95	109.44	0.002	0.003	0.002	0.001
PGD2485	109.50	110.00	0.002	0.004	0.002	0.002
PGD2486	115.06	115.47	0.002	0.004	0.001	0.008
PGD2487	116.77	117.48	0.002	0.003	0.002	0.002
PGD2488	122.61	122.96	0.002	0.002	0.002	0.001
PGD2489	125.40	125.80	0.002	0.004	0.002	0.002
PGD2490	137.00	137.63	0.002	0.003	0.001	0.006
PGD2491	146.00	146.65	0.002	0.002	0.001	0.002

BRITISH GEOLOGICAL SURVEY
Mineral Reconnaissance Programme

Claymires Drillcore Data - Borehole 2

Sample Reference	Top Depth	Bottom Depth	Zn (ppm)	As (ppm)	Sr (ppm)	Mo (ppm)	Ag (ppm)	Sb (ppm)	Ba (ppm)	Pb (ppm)	Bi (ppm)
PGD2508	20.77	22.07	120	0.0	86	2.0	2.000	1.0	507	25	0.0
PGD2509	23.00	23.48	122	2.0	103	2.0	1.000	1.0	491	21	1.0
PGD2510	25.00	26.00	113	0.0	93	1.0	1.000	0.0	383	18	0.0
PGD2511	35.03	35.99	113	4.0	98	9.0	1.000	0.0	409	15	0.0
PGD2512	35.99	36.70	131	7.0	173	18.0	2.000	0.0	448	22	0.0
PGD2513	36.70	37.99	145	11.0	175	14.0	2.000	0.0	404	19	0.0
PGD2514	37.99	39.09	131	4.0	210	21.0	3.000	0.0	367	21	0.0
PGD2515	39.09	39.96	113	1.0	173	29.0	2.000	1.0	344	15	0.0
PGD2516	39.96	41.25	100	2.0	283	16.0	3.000	0.0	464	25	0.0
PGD2517	41.25	42.19	116	1.0	185	21.0	3.000	0.0	335	16	0.0
PGD2518	42.19	43.18	122	3.0	176	19.0	3.000	0.0	288	13	2.0
PGD2519	43.18	44.24	120	3.0	183	17.0	2.000	2.0	343	15	0.0
PGD2520	44.24	45.26	123	1.0	198	15.0	2.000	2.0	383	20	1.0
PGD2521	45.26	46.19	133	4.0	174	12.0	3.000	0.0	374	20	1.0
PGD2522	46.19	47.17	126	3.0	189	14.0	2.000	0.0	368	21	0.0
PGD2523	47.17	48.17	122	2.0	221	18.0	3.000	0.0	389	20	0.0
PGD2524	48.17	48.90	121	5.0	314	13.0	4.000	1.0	292	12	0.0
PGD2525	48.90	49.66	110	2.0	162	7.0	2.000	0.0	466	18	0.0
PGD2526	52.53	53.06	108	2.0	131	5.0	2.000	0.0	257	13	0.0
PGD2527	63.66	64.72	99	4.0	114	7.0	1.000	0.0	432	14	1.0
PGD2528	72.55	73.10	95	4.0	113	7.0	1.000	0.0	386	16	0.0
PGD2529	73.10	74.09	103	2.0	279	16.0	2.000	0.0	340	16	1.0
PGD2530	77.56	77.75	95	4.0	285	17.0	2.000	0.0	442	0	1.0
PGD2531	79.29	80.14	130	2.0	87	13.0	1.000	0.0	445	18	0.0
PGD2532	85.90	87.30	103	0.0	163	12.0	2.000	0.0	487	13	0.0
PGD2533	87.30	88.20	115	0.0	108	9.0	1.000	0.0	472	17	0.0
PGD2534	88.20	89.46	118	1.0	118	15.0	3.000	0.0	398	19	1.0
PGD2535	89.46	90.08	119	1.0	101	10.0	2.000	0.0	468	19	1.0
PGD2536	90.86	92.22	121	0.0	171	9.0	3.000	0.0	428	18	0.0
PGD2537	92.22	93.30	103	2.0	163	13.0	2.000	0.0	359	14	0.0
PGD2538	93.30	93.85	99	2.0	116	6.0	3.000	2.0	453	14	0.0
PGD2539	93.85	94.83	115	2.0	173	10.0	3.000	0.0	421	20	0.0
PGD2540	95.67	96.71	133	2.0	157	14.0	3.000	2.0	380	19	1.0
PGD2541	96.71	97.90	102	2.0	211	8.0	2.000	0.0	342	12	1.0
PGD2542	97.90	98.22	84	1.0	342	5.0	2.000	0.0	581	28	0.0
PGD2543	98.22	99.35	119	1.0	193	15.0	2.000	0.0	353	18	0.0
PGD2544	99.35	100.59	103	2.0	171	9.0	3.000	0.0	409	16	0.0
PGD2545	100.59	101.99	107	12.0	203	16.0	3.000	0.0	326	15	0.0
PGD2546	101.99	103.08	117	0.0	214	13.0	3.000	0.0	406	19	0.0
PGD2547	103.08	104.03	965	1.0	184	14.0	3.000	1.0	358	22	1.0
PGD2548	104.03	104.98	108	1.0	201	11.0	2.000	1.0	313	17	1.0
PGD2549	104.98	105.97	110	1.0	232	14.0	3.000	0.0	291	15	1.0
PGD2550	105.97	106.92	105	2.0	235	20.0	3.000	0.0	296	17	0.0
PGD2551	106.92	107.90	115	1.0	213	14.0	4.000	0.0	297	15	0.0
PGD2552	107.90	108.48	114	5.0	227	14.0	3.000	0.0	310	17	1.0
PGD2553	108.48	108.88	111	3.0	243	19.0	3.000	0.0	277	12	0.0
PGD2554	108.88	109.87	116	3.0	208	14.0	3.000	1.0	316	18	1.0
PGD2555	109.87	110.85	103	2.0	186	13.0	3.000	0.0	316	15	0.0

Claymires Drillcore Data - Borehole 2

Sample Reference	Top Depth	Bottom Depth	Zn (ppm)	As (ppm)	Sr (ppm)	Mo (ppm)	Ag (ppm)	Sb (ppm)	Ba (ppm)	Pb (ppm)	Bi (ppm)
PGD2556	110.85	111.14	89	2.0	98	4.0	1.000	0.0	436	25	0.0
PGD2557	111.14	111.25	82	1.0	109	6.0	1.000	0.0	197	9	1.0
PGD2558	111.25	111.95	107	14.0	116	7.0	2.000	0.0	332	14	0.0
PGD2559	111.95	112.92	64	34.0	165	7.0	2.000	1.0	349	14	0.0
PGD2560	112.92	114.23	105	6.0	184	10.0	2.000	0.0	349	14	0.0
PGD2561	114.23	115.46	89	5.0	212	8.0	4.000	1.0	343	14	1.0
PGD2562	115.46	116.32	85	3.0	283	10.0	4.000	0.0	315	16	0.0
PGD2563	116.32	117.35	103	4.0	233	12.0	3.000	0.0	321	13	0.0
PGD2564	117.35	118.47	79	3.0	201	5.0	3.000	0.0	387	12	0.0
PGD2565	118.47	119.00	92	3.0	194	9.0	3.000	1.0	335	13	0.0
PGD2566	119.00	119.72	100	5.0	264	8.0	3.000	0.0	340	13	0.0
PGD2567	119.72	120.64	112	5.0	96	9.0	2.000	2.0	350	16	0.0
PGD2568	121.72	122.11	111	4.0	85	6.0	2.000	1.0	396	20	0.0
PGD2569	123.15	123.62	101	5.0	218	13.0	2.000	1.0	294	14	0.0
PGD2570	123.62	124.57	108	0.0	191	8.0	3.000	1.0	377	12	0.0
PGD2571	124.57	124.90	102	3.0	143	6.0	2.000	2.0	393	21	0.0
PGD2572	124.90	125.02	112	3.0	171	9.0	2.000	3.0	251	13	1.0
PGD2573	125.02	125.81	121	4.0	136	9.0	1.000	1.0	361	19	0.0
PGD2574	94.83	95.67	114	3.0	167	21.0	2.000	0.0	396	19	0.0

Claymires Drillcore Data - Borehole 2

Sample Reference	Top Depth	Bottom Depth	Ca (ppm)	Ti (ppm)	V (ppm)	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)
PGD2508	20.77	22.07	9100	4160	172	109	1130	44000	20	45	44
PGD2509	23.00	23.48	10800	4060	168	130	1140	44200	22	48	44
PGD2510	25.00	26.00	8600	3990	180	104	1010	42000	14	32	47
PGD2511	35.03	35.99	11200	3750	168	121	1020	43300	22	54	45
PGD2512	35.99	36.70	19100	2320	236	112	940	34800	23	57	86
PGD2513	36.70	37.99	24200	2390	241	135	1070	27800	23	56	73
PGD2514	37.99	39.09	43900	2100	190	186	1600	32400	13	37	72
PGD2515	39.09	39.96	34600	1890	196	178	1390	32400	12	33	70
PGD2516	39.96	41.25	52300	1960	160	129	1690	31400	12	33	55
PGD2517	41.25	42.19	44700	1800	169	156	1580	39300	11	34	87
PGD2518	42.19	43.18	47400	1760	176	133	1540	40600	11	33	98
PGD2519	43.18	44.24	43900	1880	169	157	1550	31900	12	30	66
PGD2520	44.24	45.26	39700	2030	177	138	1310	31300	12	32	64
PGD2521	45.26	46.19	37300	2020	177	124	1330	34700	14	37	76
PGD2522	46.19	47.17	43200	1890	163	136	1420	29800	11	27	62
PGD2523	47.17	48.17	47700	1840	157	142	1820	34200	13	34	70
PGD2524	48.17	48.90	89500	1830	130	125	2120	32000	9	30	55
PGD2525	48.90	49.66	19200	3450	157	157	870	39300	12	30	56
PGD2526	52.53	53.06	14900	3580	163	145	1010	43100	14	35	43
PGD2527	63.66	64.72	11200	3650	150	141	1220	44400	15	35	42
PGD2528	72.55	73.10	15400	3680	135	140	1130	42300	14	30	34
PGD2529	73.10	74.09	73900	2050	136	126	1900	30100	10	29	41
PGD2530	77.56	77.75	72400	1990	103	201	2630	34500	9	27	55
PGD2531	79.29	80.14	10500	3230	217	214	1370	39300	14	31	63
PGD2532	85.90	87.30	44400	2480	123	156	2370	32900	11	25	45
PGD2533	87.30	88.20	17600	3330	186	198	1180	40200	14	33	59
PGD2534	88.20	89.46	27700	2450	173	170	1950	36300	12	29	71
PGD2535	89.46	90.08	17900	3180	171	167	1390	37400	13	28	64
PGD2536	90.86	92.22	37800	2500	163	110	1330	34100	12	31	67
PGD2537	92.22	93.30	49600	1960	161	120	1320	29600	11	26	62
PGD2538	93.30	93.85	19300	3120	134	150	880	38300	14	28	52
PGD2539	93.85	94.83	41600	2470	177	119	1290	32200	12	29	67
PGD2540	95.67	96.71	38000	2010	182	124	1310	32000	12	30	70
PGD2541	96.71	97.90	77600	1670	121	76	1070	23900	7	25	39
PGD2542	97.90	98.22	67600	2090	113	62	1040	26200	9	29	108
PGD2543	98.22	99.35	49300	2130	177	123	1430	35900	13	34	89
PGD2544	99.35	100.59	49300	2350	130	97	1150	30000	10	25	52
PGD2545	100.59	101.99	64400	1920	137	90	1730	31900	10	29	57
PGD2546	101.99	103.08	63200	1900	151	104	2060	30300	10	29	62
PGD2547	103.08	104.03	56300	1910	141	104	2160	31700	12	27	58
PGD2548	104.03	104.98	73000	1790	136	85	1980	25900	10	25	50
PGD2549	104.98	105.97	79000	1660	139	83	2010	30000	9	28	61
PGD2550	105.97	106.92	68200	1760	144	98	1940	31200	9	27	74
PGD2551	106.92	107.90	64700	1840	155	100	1860	27200	10	26	58
PGD2552	107.90	108.48	75200	1790	162	97	1910	28500	11	30	56
PGD2553	108.48	108.88	78700	1780	127	93	1880	37800	9	29	74
PGD2554	108.88	109.87	66500	1920	163	106	1780	30800	11	31	59
PGD2555	109.87	110.85	58500	2020	152	111	2160	32400	11	31	55

Claymires Drillcore Data - Borehole 2

Sample Reference	Top Depth	Bottom Depth	Ca (ppm)	Ti (ppm)	V (ppm)	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)
PGD2556	110.85	111.14	19600	3730	166	125	1420	44100	14	35	56
PGD2557	111.14	111.25	37500	2970	146	83	1310	38100	14	31	35
PGD2558	111.25	111.95	22600	3400	172	130	1590	42000	14	34	45
PGD2559	111.95	112.92	38700	2540	62	137	3140	40700	15	26	47
PGD2560	112.92	114.23	63200	2340	144	88	1580	30200	11	28	50
PGD2561	114.23	115.46	97700	1710	109	61	1790	26200	8	24	49
PGD2562	115.46	116.32	111700	1590	102	55	1750	22100	7	22	42
PGD2563	116.32	117.35	79000	2000	135	97	1430	27800	10	26	51
PGD2564	117.35	118.47	91800	2270	82	68	1120	25800	8	20	36
PGD2565	118.47	119.00	62100	2150	128	94	1530	31500	12	29	62
PGD2566	119.00	119.72	72300	2140	130	90	1320	28500	9	25	51
PGD2567	119.72	120.64	12900	3510	177	147	1250	40900	14	29	56
PGD2568	121.72	122.11	9800	3810	185	150	1120	45700	15	35	59
PGD2569	123.15	123.62	74900	2000	128	103	2260	33100	9	27	51
PGD2570	123.62	124.57	45600	2720	150	113	1750	35600	12	31	55
PGD2571	124.57	124.90	32100	3250	162	115	1450	38200	12	31	57
PGD2572	124.90	125.02	24600	3430	190	182	1460	43200	16	40	67
PGD2573	125.02	125.81	28400	2960	180	133	1400	37800	13	33	68
PGD2574	94.83	95.67	32200	2190	210	127	1350	43700	14	41	91

Claymires Drillcore Data - Borehole 2

Sample Reference	Top Depth	Bottom Depth	Rh (ppm)	Pd (ppm)	Pt (ppm)	Au (ppm)
PGD2508	20.77	22.07	0.002	0.004	0.003	0.001
PGD2509	23.00	23.48	0.002	0.003	0.001	0.001
PGD2510	25.00	26.00	0.002	0.003	0.001	0.001
PGD2511	35.03	35.99	0.002	0.004	0.002	0.001
PGD2512	35.99	36.70	0.002	0.007	0.003	0.002
PGD2513	36.70	37.99	0.002	0.007	0.003	0.001
PGD2514	37.99	39.09	0.002	0.006	0.001	0.001
PGD2515	39.09	39.96	0.002	0.007	0.003	0.001
PGD2516	39.96	41.25	0.002	0.007	0.002	0.001
PGD2517	41.25	42.19	0.002	0.006	0.002	0.002
PGD2518	42.19	43.18	0.002	0.006	0.003	0.004
PGD2519	43.18	44.24	0.002	0.007	0.003	0.002
PGD2520	44.24	45.26	0.002	0.007	0.003	0.002
PGD2521	45.26	46.19	0.002	0.006	0.003	0.002
PGD2522	46.19	47.17	0.002	0.006	0.002	0.002
PGD2523	47.17	48.17	0.002	0.006	0.003	0.001
PGD2524	48.17	48.90	0.002	0.005	0.001	0.001
PGD2525	48.90	49.66	0.002	0.007	0.006	0.006
PGD2526	52.53	53.06	0.002	0.004	0.001	0.001
PGD2527	63.66	64.72	0.002	0.004	0.002	0.001
PGD2528	72.55	73.10	0.002	0.005	0.001	0.002
PGD2529	73.10	74.09	0.002	0.005	0.002	0.001
PGD2530	77.56	77.75	0.002	0.005	0.002	0.006
PGD2531	79.29	80.14	0.002	0.005	0.001	0.004
PGD2532	85.90	87.30	0.002	0.005	0.002	0.006
PGD2533	87.30	88.20	0.002	0.004	0.001	0.005
PGD2534	88.20	89.46	0.002	0.006	0.002	0.005
PGD2535	89.46	90.08	0.002	0.007	0.002	0.004
PGD2536	90.86	92.22	0.002	0.006	0.002	0.001
PGD2537	92.22	93.30	0.002	0.006	0.001	0.001
PGD2538	93.30	93.85	0.002	0.002	0.003	0.002
PGD2539	93.85	94.83	0.002	0.006	0.004	0.001
PGD2540	95.67	96.71	0.002	0.005	0.005	0.001
PGD2541	96.71	97.90	0.002	0.003	0.003	0.001
PGD2542	97.90	98.22	0.002	0.004	0.002	0.001
PGD2543	98.22	99.35	0.002	0.007	0.004	0.008
PGD2544	99.35	100.59	0.002	0.003	0.003	0.007
PGD2545	100.59	101.99	0.002	0.005	0.003	0.011
PGD2546	101.99	103.08	0.002	0.005	0.004	0.004
PGD2547	103.08	104.03	0.002	0.003	0.004	0.004
PGD2548	104.03	104.98	0.002	0.003	0.004	0.004
PGD2549	104.98	105.97	0.002	0.003	0.003	0.003
PGD2550	105.97	106.92	0.002	0.004	0.002	0.004
PGD2551	106.92	107.90	0.002	0.004	0.003	0.007
PGD2552	107.90	108.48	0.002	0.005	0.003	0.005
PGD2553	108.48	108.88	0.002	0.003	0.003	0.005
PGD2554	108.88	109.87	0.002	0.004	0.003	0.005
PGD2555	109.87	110.85	0.002	0.002	0.002	0.006

Claymires Drillcore Data - Borehole 2

Sample Reference	Top Depth	Bottom Depth	Rh (ppm)	Pd (ppm)	Pt (ppm)	Au (ppm)
PGD2556	110.85	111.14	0.002	0.003	0.001	0.007
PGD2557	111.14	111.25	0.002	0.006	0.006	0.009
PGD2558	111.25	111.95	0.002	0.003	0.003	0.006
PGD2559	111.95	112.92	0.002	0.002	0.002	0.005
PGD2560	112.92	114.23	0.002	0.002	0.002	0.006
PGD2561	114.23	115.46	0.002	0.002	0.002	0.006
PGD2562	115.46	116.32	0.002	0.003	0.001	0.002
PGD2563	116.32	117.35	0.002	0.003	0.002	0.006
PGD2564	117.35	118.47	0.002	0.002	0.001	0.004
PGD2565	118.47	119.00	0.002	0.002	0.002	0.004
PGD2566	119.00	119.72	0.002	0.003	0.002	0.006
PGD2567	119.72	120.64	0.002	0.003	0.002	0.007
PGD2568	121.72	122.11	0.002	0.003	0.001	0.005
PGD2569	123.15	123.62	0.002	0.002	0.002	0.008
PGD2570	123.62	124.57	0.002	0.003	0.002	0.006
PGD2571	124.57	124.90	0.002	0.002	0.003	0.007
PGD2572	124.90	125.02	0.002	0.004	0.002	0.006
PGD2573	125.02	125.81	0.002	0.005	0.004	0.008
PGD2574	94.83	95.67	0.002	0.006	0.003	0.006

Claymires Drillcore Data - Borehole 3

Sample Reference	Top Depth	Bottom Depth	Ca (ppm)	Ti (ppm)	V (ppm)	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)
PGD2575	63.97	64.02	25600	3730	121	209	720	43900	16	63	49
PGD2576	71.55	71.70	12300	4530	139	230	730	55300	20	74	67

GEOPHYSICAL TECHNICAL REPORT

GEOPHYSICAL SURVEYS OVER A PT GROUP METAL PROSPECT NEAR KNOCK, GRAMPIAN REGION, SCOTLAND

P G GREENWOOD AND B C CHACKSFIELD

TECHNICAL REPORT WK/90/7/C

CONTENTS

ILLUSTRATIONS

1. INTRODUCTION

The Knock MRP prospect is located near the south eastern quadrant of the Knock mass at the edge of a complex N-S trending sheared zone of middle to upper Dalradian metasediments and basic rocks. The geological relationships in this area are complex and not fully understood; one major source of sulphide mineralisation is found within a sequence of cumulate and xenolithic rocks. Overall the mineralised zones seem as lensoid bodies, discontinuous disseminated horizons and graphitic pods presenting an en-echelon series of short length conductors which should be detectable by an appropriate geophysical electrical method (assuming the depth of penetration of the technique selected is adequate), yet the geophysical data cannot identify the nature of the mineralisation whilst the correlation of anomalies from adjacent survey lines is difficult.

An earlier survey conducted in June 1988 over a small area of the Bin Forest in essentially the same geological environment as at the Knock prospect suggested that only the Induced Polarisation technique would assist in the search for sulphide mineralisation whose presence might be associated with the PT group of metals. The Knock prospect is topographically dissected by a multitude of CEGB lines, power lines, telephone lines, multi-wire fences and drainage channels and is completely covered by a thick layer (10-30m) of drift. These features provide a wealth of cultural and geological noise as was proven during a reconnaissance magnetic and VLf traverse also made in June 1988 over the southern part of the Knock prospect 1989 survey grid.

Thus during Sept./Oct. 1989 a team of five (2 BGS geophysicists, 3 field assistants) spent two weeks at the Knock prospect conducting and IP survey over a grid comprising seven lines, each of average length 1500m and about 250m apart. Figure 1 illustrates this grid in relation to the 1:10 000 topographic map. Supplementary self potential, magnetic and VLF (magnetic field) measurements were also obtained, the expectancy of no useful data from the latter not being a bar to its use since VLF and magnetic observations are made concurrently and the data sets are acquired in hours and not days.

En passant, a brief note is appropriate regarding the time allocated for this field. As illustrated in this report, the induced polarisation method has successfully located three conductive targets for subsequent investigation by the drilling of boreholes. Any competant geophysicist would ask why two of the survey lines prematurely terminated over an anomaly, and why were no infill survey lines run parallel to the three anomalous zones in order to provide additional information about the conductor geometry. The authors of this report sought, and initially obtained, permission for a survey duration of three weeks to allow for such contingencies; this was subsequently reduced to two weeks (together with a reduction in staffing) by financial constraints. Nevertheless, the scientific validity of the present IP dataset is adequate to identify the three locations where boreholes can reasonably be expected to at least intersect the presumed sulphide mineralisation.

2. RESULTS OF THE MAGNETIC, VLF AND SELF POTENTIAL SURVEYS

2.1 Observations for both the magnetic (total field) and VLF (magnetic field) were made at 10m intervals along all seven survey lines. The results for the magnetic (as total field) are illustrated as stacked profiles at 1:10 000 scale in Figure 2, and the VLF (as in-phase and out-of-phase components) as stacked profiles at 1:10 000 scale in Figure 3 (25%/cm) and Figure 4

(50%/cm). The Scintrex digital equipment used was the IGS-2 system comprising the MP4 total field magnetometer and the VLF magnetic field receiver. Both geophysical sensors are mounted in one console so the survey lines need to be traversed once only to collect all the data. The source of the VLF primary field was GBR Rugby transmitting at 16.0 kHz.

2.2 Self potential observations were obtained by measuring the potential between two non polarising electrodes spaced 20m apart with a digital voltmeter and proceeding along each survey line at 20m intervals. The data was recorded manually and subsequently keyed into a computer for plotting as stacked profiles at 1:10 000 scale as seen in Figure 5.

2.3 Both the regional aeromagnetic data and a compilation of the ground magnetic survey for the 1988 Knock East Grampians project show the grid of lines located within a magnetically quiet zone. Within the present grid a west to east regional trend of a few tens of nanotesla per kilometer occur whiles immediately south of the grid large amplitude anomalies occur over the northern margin of the Huntly mass.

The results of the present magnetic survey, seen in Figure 2, show many anomalous features of 50-100nT all of which can be correlated with either a fence as powerline or a combination of both. The erratic, peaked nature of the profiles are thus typical of that expected in an area of cultural noise. The west to east regional gradient already referred to can be seen on all the profiles except that for line 350S, when the observer mentally filters out the superimposed peaky nature. For each of the seven lines surveyed there are identifiable sections where the "background" level changes by a few tens of nanotesla. These changes might be ascribed to geological causes but the authors are unable to suggest any correlations as their understanding of the complex geological environments is limited. However, these changes in background level may be of some significance to a geologist fully conversant with the known geology of the area.

2.4 The VLF (magnetic field) data are totally dominated by cultural noise effects and no information useful to the objectives of the geophysical survey was obtained. The results shown in Figure 3 and 4 are plotted with vertical scales of 25% and 50% per cm respectively. Given an absence of cultural noise a VLF profile with variations greater than 10 to 20% are considered anomalous and thus the choice of the vertical scale for Figure 3 (25%/cm) but because the cultural noise so predominates an additional plot at double the vertical scale is given (Figure 4) so that the anomalies due to cultural features can be visually separated from one another.

2.5 Negative self potential values of a few hundred millivolts commonly occur over zones of massive sulphides in a state of oxidisation or graphitic material. Variations of a few tens of millivolts can be generated by a non mineralised environment, eg electrochemical potentials, movement of interstitial fluids, groundwater movement, decaying organic material and topographic variations. The nature of the profiles illustrated in Figure 5 suggest a combination of the latter mechanisms as the source of the varying SP values. There are no SP anomalies that may be correlated with the IP anomalies discussed in section 2.6. In particular, the major IP anomaly near the baseline on line 650S (Claymires Farm) gives no SP response at all. This infers that the sulphides assumed to be causing the IP anomaly occur either as a dissemination or are massive but not oxidising.

A steadily increasing negative SP gradient beneath the eastern half of line 350S does, however, correlate in part with the significant IP anomaly which commences midway along the eastern half. Similar, but more tentative correlations can be made with the IP anomalies on the eastern halves of lines 1600S and 1800S although the form of the SP profiles for line 1600S and 1800S is that typical of an area with a steady regional SP gradient and without sulphidic as graphitic zones. Overall the SP data alone does not give any indication of zones of potential mineralisation and the SP gradients referred to are probably caused by mechanisms other than a sulphidic or graphitic conductor. In particular the negative gradient on line 350S is not readily explained; the presence of the CEGB supergrid powerline must also be remembered, yet the character of the SP profile for the adjacent line 650S, also intersected by the powerline, is different.

3. RESULTS OF THE INDUCED POLARISATION SURVEY

3.1 The induced polarisation survey utilised a co-linear dipole-dipole electrode array with 50m length dipoles whose separation varied from 2 to 7 units of dipole length. The Scintrex IPR-11 digital system was used for the receiver and a battery powered Huntec Lopo for the transmitter. The average transmitted current was 300 mA. Ideally, in order to secure the best possible signal to noise ratio, the Scintrex TSQ-3 3.5kw motor generator powered transmitter would be used. However, although logistic considerations precluded its use for the Knock survey, the signal to noise ratio using the Huntec Lopo was found to be very good, and thus in spite of the low value currents that were transmitted, the resultant IP dataset is considered to be of good scientific quality.

The induced polarisation results are illustrated as pseudo-sections of chargeability and apparent resistivity in Figures 7 to 13 at 1:2000 scale and the anomalous chargeability zones summarised in plan view at 1:10 000 scale as Figure 6.

The chargeability (or "IP effect") as measured by the Scintrex IPR-11 is expressed in mV/V and is the dimensions of the posted balues for "slice 4" seen as a contoured pseudo section beneath the apparent resistivity pseudo section in each of the figures. The IPR-11 samples the voltage delay curve (each time the transmitter switches off for 2 seconds) for ten successive periods (or "slices") and records these ten integrated values in a solid state memory. One appropriate integrated value, or "slice" is then chosen by the operator for subsequent plotting. The prime factor in deciding what "slice" to plot is dictated by the requirement to avoid the distortive effects of electromagnetic coupling. At Knock "slice" 4 was used, equivalent to an integration of the voltage decay curve between 120mS and 150mS after the end of each transmitted pulse. The transmitter had equal on and off periods for 2 seconds, thus a complete measurement cycle takes 8 seconds. The IPR-11 displays the running average and the measurements are terminated when the operator is satisfied a stable value has been reached.

In Figures 7 to 13 the numerals 1 to 6 printed beneath "slice" 4 refer to a pseudo depth in terms of dipole length. Thus using 50m dipoles the pseudo depths indicated are 50, 75, 100, 125, 150 and 175m respectively. Note that these pseudo depths are for convenience of presentation only, the actual depths cannot easily be determined but are approximately half the pseudo depths.

Site B Line 650S at 125E. Borehole inclined at 30° from vertical towards the west.

Site C Line 350S at 475E. Borehole inclined at 30° from vertical towards the east.

Site D Line 1800S at 600E. Borehole inclined at 30° from vertical towards the east.

Note that the inclined boreholes are referenced to the vertical plane contained in each survey line so that the borehole azimuths for sites B, C and D are the same as azimuth for the respective survey line.

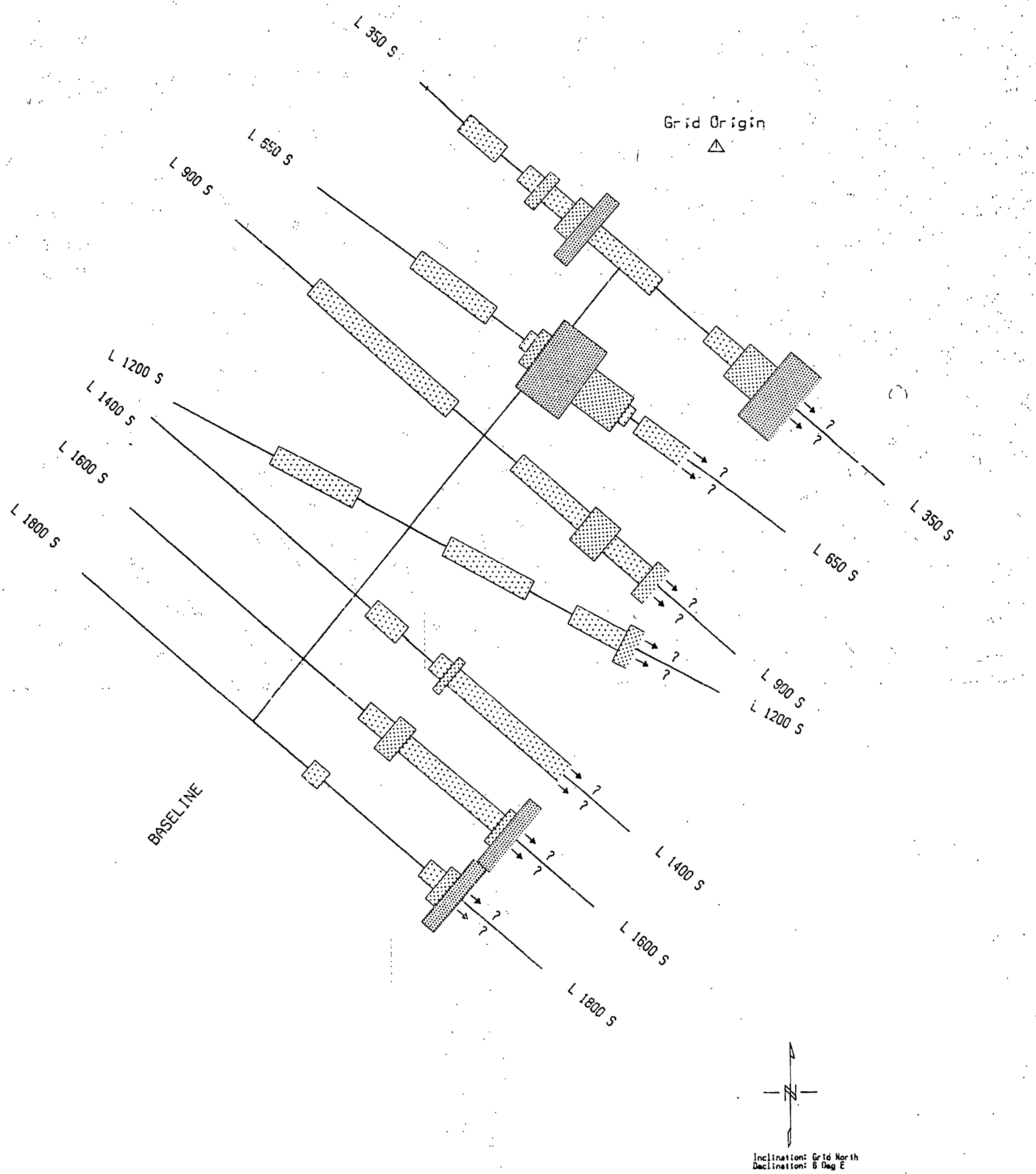
The sites are based solely on the induced polarisation data and may require minor lateral adjustment of a few tons of metres according to the local conditions obtaining in the field.

4. SUMMARY

The induced polarisation method is the most appropriate technique to use in the geophysical environment of the Knock prospect area. The limitations of the VLF method have been demonstrated in an area with a high level of cultural noise and a thick cover of recent overburden material. The magnetic method was likewise of limited value but the distortions not as great as observed for the VLF. The SP data shows a series of netative gradients but these are not readily ascribed to the zones of potential mineralisation suggested by the IP methods. Other mechanisms that that associated with an oxidising sulphide or graphitic body are the most likely cause.

Four boreholes are recommended to test the validity of the interpretation of the induced polarisation data; the interpretation being of very empirical nature, unfortunately, because of the paucity of IP data from the present survey.

FIGURE 6



KNOCK MRP PROSPECT. SEPT. 1989

Induced Polarisation Results (chargeability in mV/V)

Showing zones of chargeability greater than 30 mV/V for n = >4

Grid based on 0,0 at NJ 353680 849990

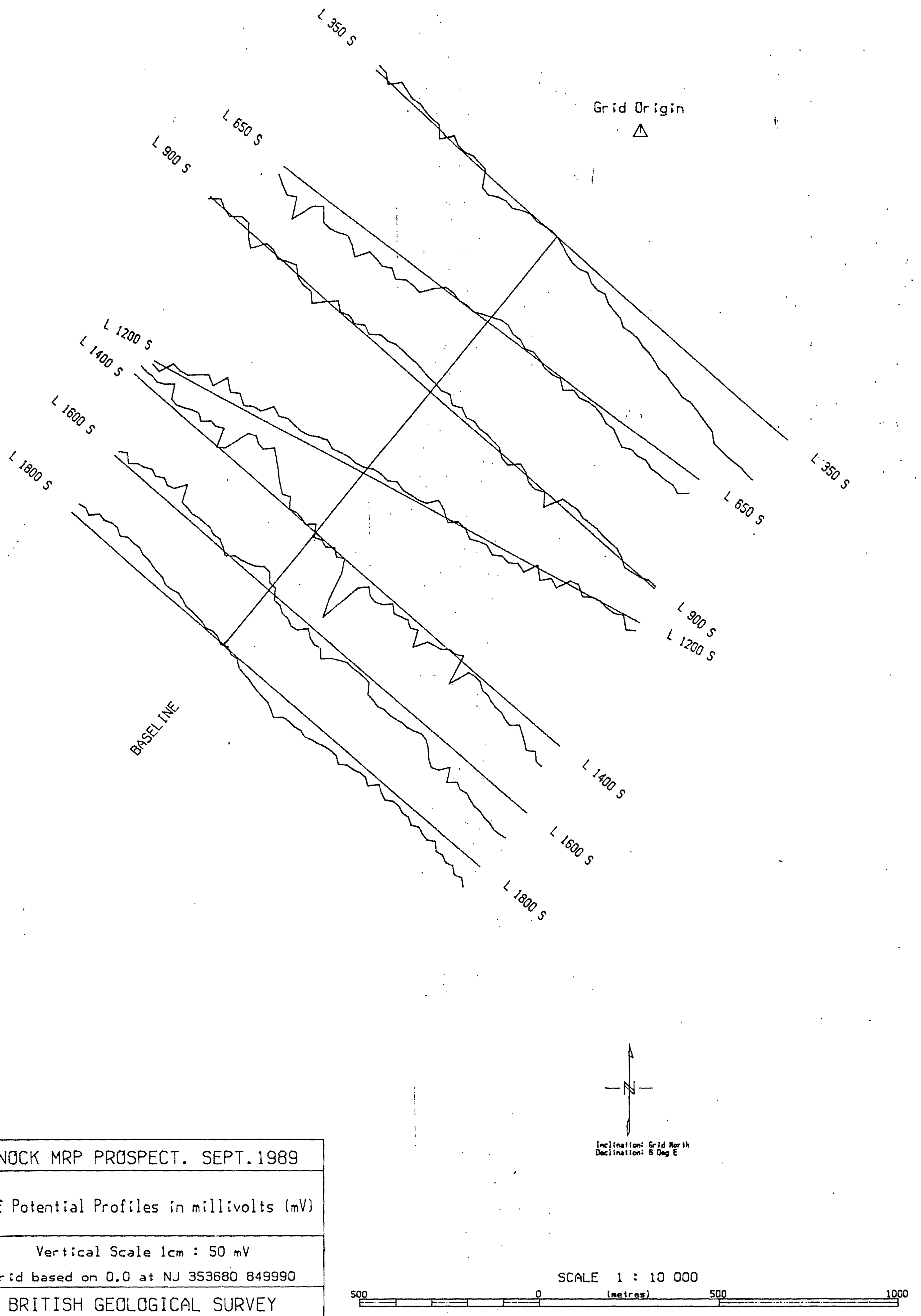
BRITISH GEOLOGICAL SURVEY

> 30 mV/V > 50 mV/V > 70 mV/V

SCALE 1 : 10 000

500 0 (metres) 500 1000

FIGURE 5



KNOCK MRP PROSPECT. SEPT. 1989

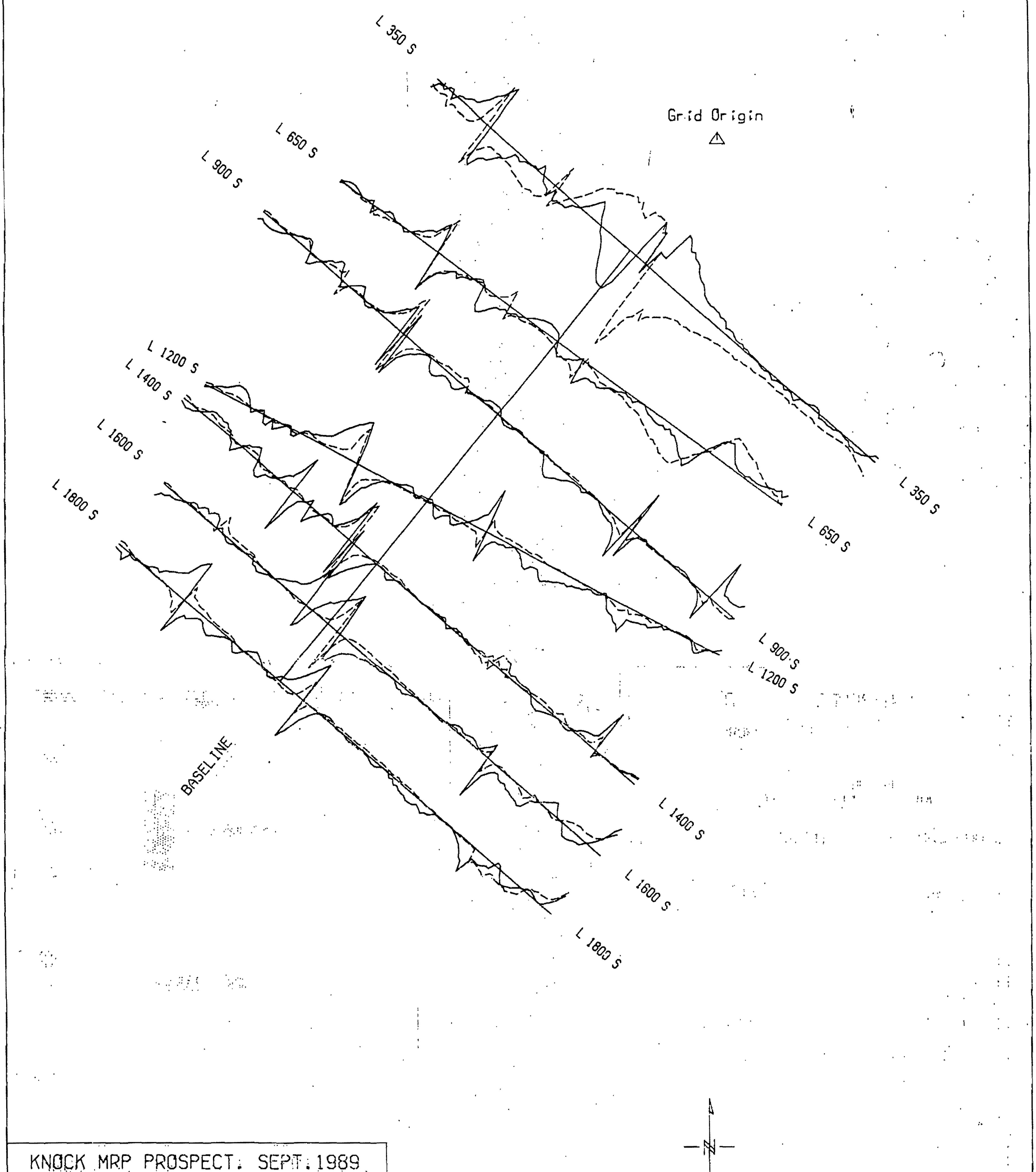
Self Potential Profiles in millivolts (mV)

Vertical Scale 1cm : 50 mV

Grid based on 0,0 at NJ 353680 849990

BRITISH GEOLOGICAL SURVEY

FIGURE 4



KNOCK MRP PROSPECT. SEPT. 1989

VLF (Magnetic field) Profiles in percent (%)
GBR Rugby England 16.0 kHz

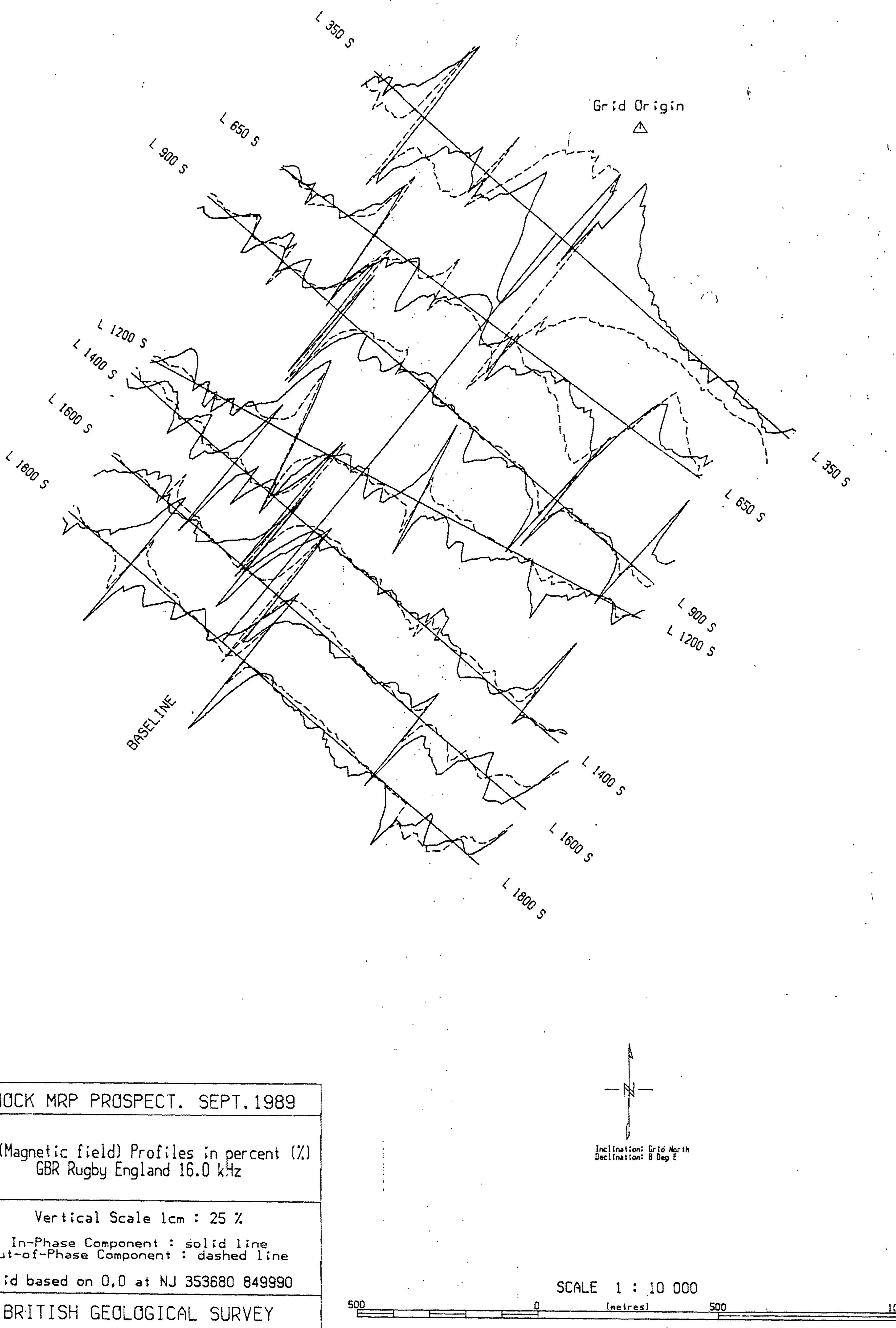
Vertical Scale 1cm : 50 %

In-Phase Component : solid line
Out-of-Phase Component : dashed line

Grid based on 0,0 at NJ 353680 649990

BRITISH GEOLOGICAL SURVEY

FIGURE 3



KNOCK MRP PROSPECT. SEPT. 1989

VLF (Magnetic field) Profiles in percent (%)
GBR Rugby England 16.0 kHz

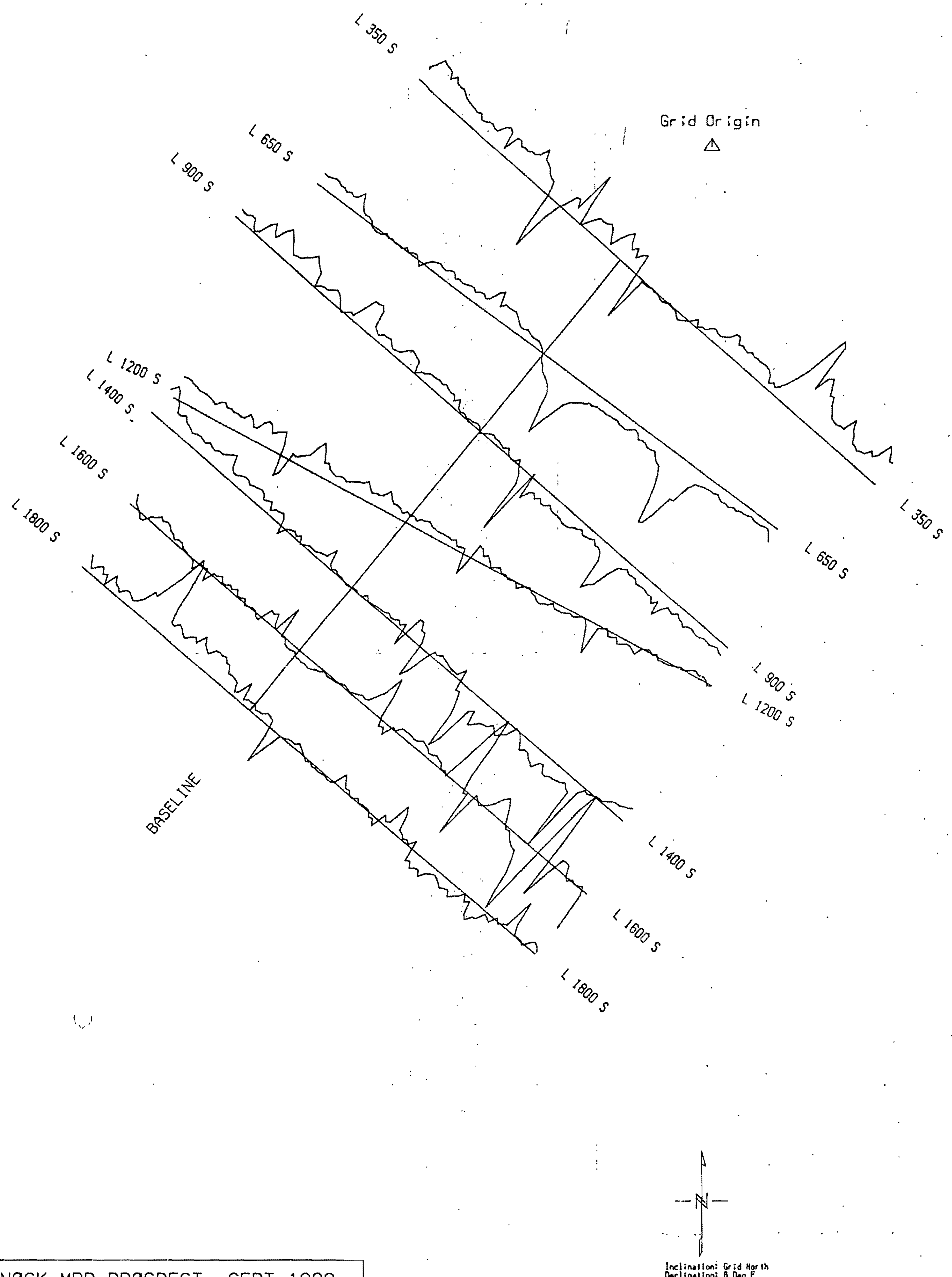
Vertical Scale 1cm : 25 %

In-Phase Component : solid line
Out-of-Phase Component : dashed line

Grid based on 0,0 at NJ 353680 849990

BRITISH GEOLOGICAL SURVEY

FIGURE 2



KNOCK MRP PROSPECT. SEPT. 1989

Magnetic Total Field Profiles in nanotesla (nT)

Vertical Scale 1cm : 50 nT

Grid based on 0,0 at NJ 353680 849990

BRITISH GEOLOGICAL SURVEY

SCALE 1 : 10 000

500 0 (metres) 500 1000

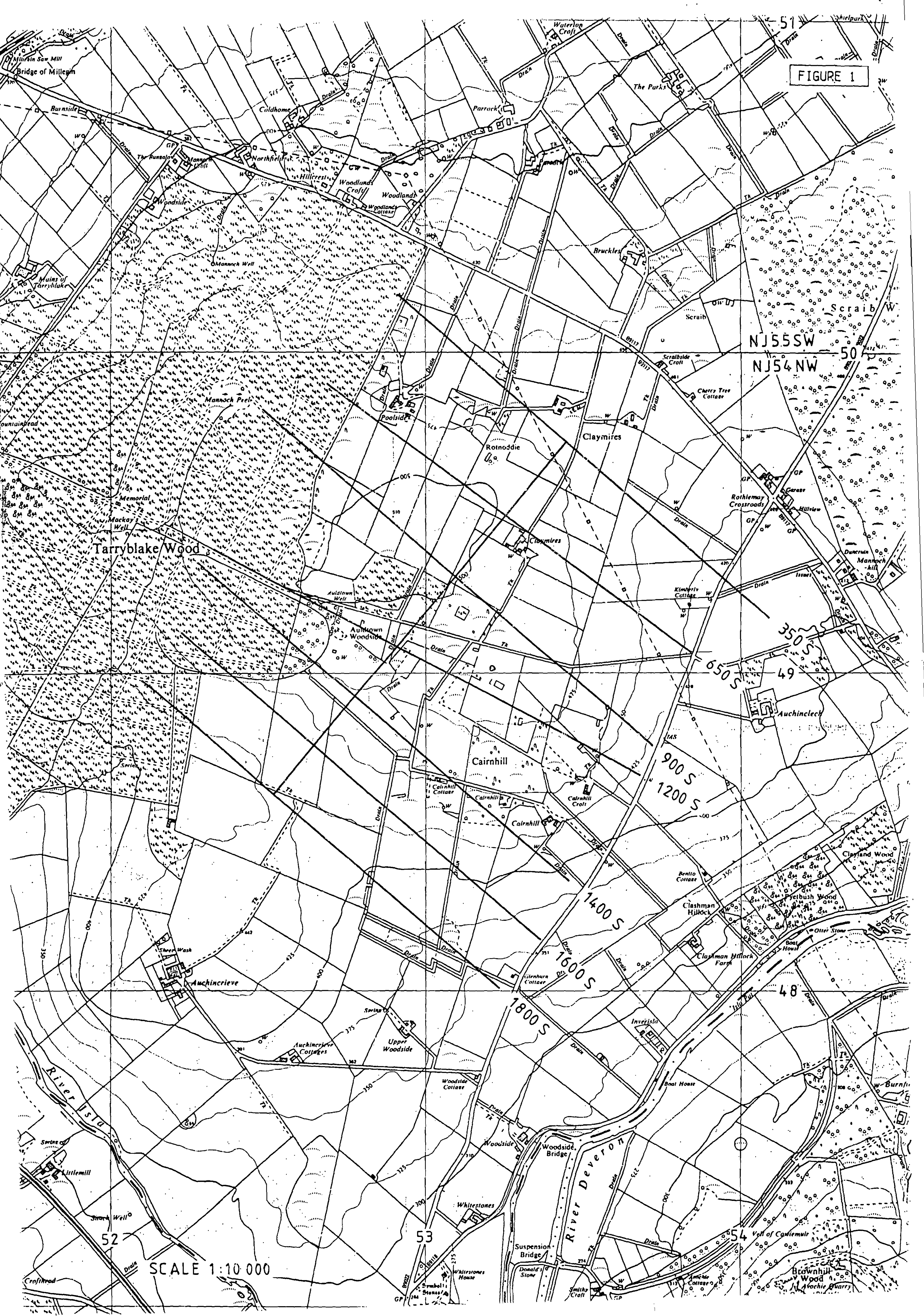


FIGURE 1
NJ55SW
NJ54NW
350 S
650 S
900 S
1200 S
1400 S
1600 S
1800 S
SCALE 1:10 000
Tarryblake Wood
Cairnhill
Claymires
Rotnoddie
Poolside
Auchincleck
Auchincrieve
Clashman Hillock
River Isla
River Deveron
Woodside
Whitestones
Suspension Bridge
Woodside Bridge
Scraib W
Bruckles
The Parks
Northfield
Coldhome
Woodlands
Parrock
Hillcrest
Memorial
Mannoch Peel
Mannoch Well
Bridge of Millegin
Burnside
Muins of Tarryblake
Littlemill
Upper Woodside
Auchincrieve Cottages
Inverisla
Boat House
Pyetbush Wood
Clayland Wood
Brownhill Wood
Rothiemay Crossroads
49
50
51
48
52
53
54

INDUCED POLARISATION AND MAGNETIC SUSCEPTIBILITY OBSERVATIONS FROM BOREHOLES IN IGNEOUS AND METAMORPHIC ROCKS, AT CLAYMIRES, NEAR KNOCK, BANFFSHIRE.

A D Evans

Summary

Four cored boreholes were drilled in winter 1990/91, at Claymires, Banffshire. Drilling was to test an IP anomaly, revealed by a Mineral Reconnaissance Programme survey aimed at PGE mineralisation. The locality is very close to the south-eastern margin of the Knock basic intrusive body, and complex sheared Middle/Upper Dalradian metasediments and basic rocks are also present in the area, which is however completely drift-covered. IP logs were recorded in boreholes 1a, 2 & 3, with a total drilled length of 347m. Presented here are the chargeability data, together with values for apparent resistivity and for the time constants of decay curves approximated from the IP data. Core recovery from the boreholes was excellent, and magnetic susceptibility observations were therefore subsequently measured on core samples. These data are also presented here. The IP and magnetic data together identify a number of well-defined changes in the electrical and magnetic properties of the rocks.

INTRODUCTION

The induced polarisation (IP) logs were run with the principal objective of determining more precisely the 'source rocks' for the IP anomaly which had been located in the course of a surface mineral exploration survey. That survey has been described by Greenwood and Chacksfield (1990), and the drillholes logged were sited approximately at the centres of the two principal IP maxima, as recommended by the project geophysicist.

The magnetic susceptibility measurements on core samples were made in order to provide some additional control on changes of rock type. The rocks in the area are known, from the results of the survey referred to above, to be not appreciably magnetised. However, small variations in susceptibility within only weakly magnetised rocks can nevertheless be significant.

The geology of the several square kilometres of surrounding ground is poorly known, but evidently complex. This is clear from the account by Munro (1970) of a drilling programme aimed at gaining an improved understanding of the field relationships between the various igneous bodies present between Huntly and Portsoy.

Note that the very first borehole (Borehole 1) was abandoned after 30m of drilling, and re-drilled as Borehole 1a from the same site. No geophysical logs were obtained from Borehole 1.

Note also that this data release provides data alone, without comment. For a brief review of various features of the geophysical logs, refer to Evans (1992).

THE IP LOGGING METHOD

General

The IP logging method used is a simple development of one of the surface configurations sometimes used for profiling; namely, the two-pole array. One transmitting and one receiving electrode are deployed in the borehole, at a fixed separation of two metres, whilst remote transmitting and receiving electrodes are positioned at surface, in opposite directions away from the borehole at a distance of approximately 100m. The electrode pair in the borehole is first lowered to the bottom of the hole, then raised in steps of one metre. At each pause a conventional IP reading is taken (comprising transmitted current, received primary and secondary voltages, and instrument gain settings), this taking some 50-60 seconds on average. The complete dataset for the borehole thus permits construction of logs, directly analogous to those geophysical logs which are recorded as a continuous trace. Three logs, each for a different electrical parameter, are plotted. These logs are presented here as Figures 1 to 9.

Details

Instrumentation : Huntec MkIII LOPO transmitter and receiver system.

Surface electrodes : stainless steel stakes.

Downhole electrodes : lead, cigar-shaped, 200mm x 20mm.

Cables : all single core, with thick durable insulation, unscreened.

Transmit/receive parameters : 2 seconds on/2 seconds off; integration periods 240-300, 300-420, 420-660, & 660-1140 milliseconds after switch-off.

Transmitted current : as low as accurate reading permits, typically 20mA. Current maintained throughout the pause/read/advance cycle, to avoid having to re-synchronise the receiver to the transmitter for each reading.

Depths : monitored by cable marks at 1m intervals, and by a sheave-mounted counter fixed to the borehole casing.

Calculation of apparent resistivity : 4π x primary voltage at receiver x (transmitted current)$^{-1}$ x geometric factor. No correction for imaging, distances to remote electrodes, or for conductivity of borehole fluid. Geometric factor taken as 0.5.

Calculation of chargeability : The sum of the products of each of the secondary voltages and their respective window widths.

Calculation of time constant : see separate paragraph below.

The time constant of the IP decay curve

An additional electrical parameter - the time constant of the measured portion of the IP decay curve - can be calculated from the four values of secondary voltage recorded by the Huntec MkIII receiver. The four values are assigned to times of 270, 360, 540 and 900 milliseconds after transmitter switch-off. These are the mean times of the four selected integration windows across which the secondary voltage is sampled as it decays away. Bertin and Loeb (1976) have suggested that the complete decay curve might be expressed as the sum of three separate exponential functions. However, it seems reasonable to suppose that when looking at a middle-range time span, as is the case for the borehole data here, then a single exponential function might be derived which describes that part of the decay curve fairly well. This is readily done by converting the four respective secondary voltage values to $\log_e$ values, which transforms the decay curve to a straight line (approximately), expressed in the form :

$$\mathrm{Log}_e V = -bt.\mathrm{Log}_e e + \mathrm{Log}_e a$$

The best-fit straight line is calculated by least-squares, and the y-intercept ($\mathrm{Log}_e a$) and gradient (b) evaluated.

The simple exponential expression which provides the best-fit approximation to the appropriate part of the decay curve is thus :

$$V = ae^{-bt}$$

and the time constant of this curve can be calculated having determined the coefficients a and b. (The time constant being the interval over which V falls to a fraction of $1/e$ of any chosen initial value.) The time constant is thus a measure of the slowness of decay of the secondary voltage. The advantage of calculating this in this way (rather than, say, by some ratioing of the four secondary voltage values) is that the goodness-of-fit of the least-squares line can also be calculated, providing a measure (if desired) of conformity to the simple exponential.

MAGNETIC SUSCEPTIBILITY LOGGING OF CORE

The magnetic susceptibility logs (Figures 10, 11 and 12) have been compiled from measurements made on core samples, using the MicroKappa hand-held susceptibility meter. Single-reading measurements were made at regular depth intervals - 0.3m wherever possible, though the condition of the core sometimes forced adoption of a wider spacing.

Measurements were made on the flat face of the core where the core had been split, or on the curved surface of the core where sections were still whole. It is necessary to make a correction to the MicroKappa reading in both cases. For whole core, the correction figures in the instrument manual were back-extrapolated to give a correction factor for the Claymires core size of 1.85. To obtain the correction factor for the split core samples, the raw data were analysed for two intervals where the data show little variation and where there is a 50/50 mix of split and whole sections. The two intervals are 135.1m-148.7m in B/h 1 and 81.1m-90.6m in B/h 2. The average values (uncorrected) for the split and whole samples respectively over these intervals are within 4% of one another. It therefore seemed reasonable to adopt the same correction factor (1.85) for the split core as for the whole core. Any errors arising from so doing will clearly be small relative to the 'geologic noise' in much of the data, and very small relative to the order of magnitude differences which are seen between some intervals and others.

LOGS AND DATA PRESENTED HERE

Electrical (IP) logs and data

Three electrical logs are presented for each borehole, these being for chargeability, time constant, and apparent resistivity (Figures 1 to 9). Note that the filled blocks which represent the data values are in colour on the original copies of the logs, with the colouring being determined by the chargeability value at each depth point. This avoids the need to overlay the logs when comparing the coincidence or otherwise of anomalies in each of the three parameters. The original colour copies may be consulted by arrangement with the Manager, Engineering Geology & Geophysics Group, BGS, Keyworth.

Tabulations of the original field data for each of the boreholes are also included here, on the pages following the logs. In these tables, the column-header abbreviations represent as follows :

D : Distance down-hole of the mid-point of the electrode pair.
V : Primary voltage reading.
R : Range switch setting ($x10^{-3}$). Primary voltage = V x R.
I : Transmitted current (milliamps).
RHO : Calculated apparent resistivity.
M1...M4 : Normalised secondary voltages.
CH : Calculated chargeability.
TC : Calculated time constant.

Note that TC values are calculated only where M1>M2>M3>M4 and M4>0. Note also that there are five depth points in B/h 2 where transmitter/receiver synchronisation was lost, and no reading obtainable.

Magnetic susceptibility logs and data

The magnetic susceptibility logs are presented as Figures 10, 11 and 12. The observed values are tabulated on the pages following the electrical log data. In this tabulation, each line of the tables represents a one-metre interval of core, with one, two, three or four pairs of values given, depending upon the number of samples measured in that interval. Each pair of values comprises the distance down-hole in centimetres (on the left) and the Kappameter reading multiplied by 100 (on the right). (This means of tabulation has been adopted so as to render all values integer.)

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Claymires B/h 1a

Electrical log observations and calculated parameters 147.0m-100.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
147.0	808	3.00	20	3046	3.70	3.30	2.80	2.20	23.5	1244
146.0	771	3.00	20	2906	4.20	3.80	3.20	2.50	26.8	1233
145.0	694	3.00	20	2616	4.90	4.40	3.70	3.00	31.5	1315
144.0	704	3.00	20	2654	4.60	4.10	3.50	2.80	29.5	1308
143.0	769	3.00	20	2899	4.50	4.10	3.40	2.70	28.7	1245
142.0	945	3.00	20	3563	4.80	4.30	3.60	2.90	30.6	1280
141.0	945	3.00	20	3563	4.80	4.30	3.60	2.90	30.6	1280
140.0	1115	3.00	20	4203	3.80	3.50	3.00	2.40	25.2	1385
139.0	323	10.00	20	4059	3.50	3.10	2.60	2.00	21.7	1154
138.0	1173	3.00	20	4422	3.50	3.20	2.70	2.10	22.5	1244
137.0	1176	3.00	20	4433	3.30	3.00	2.50	2.00	21.2	1274
136.0	1248	3.00	20	4705	3.10	2.80	2.40	1.90	20.1	1315
135.0	1229	3.00	20	4633	3.10	2.70	2.30	1.90	19.7	1352
134.0	940	3.00	20	3544	4.20	3.70	3.20	2.50	26.6	1261
133.0	952	3.00	20	3589	5.00	4.50	3.80	3.10	32.4	1350
132.0	1004	3.00	20	3785	5.80	5.20	4.40	3.50	37.1	1278
131.0	975	3.00	20	3676	5.60	5.00	4.30	3.40	36.0	1301
130.0	919	3.00	20	3464	5.20	4.70	4.00	3.20	33.7	1325
129.0	1007	3.00	20	3796	5.20	4.70	4.00	3.20	33.7	1325
128.0	1108	3.00	20	4177	4.80	4.30	3.70	3.00	31.3	1383
127.0	1057	3.00	20	3985	4.70	4.20	3.60	2.90	30.4	1346
126.0	1010	3.00	20	3808	4.70	4.30	3.60	3.00	31.0	1422
125.0	776	3.00	20	2925	6.20	5.70	4.80	3.90	40.8	1371
124.0	618	3.00	20	2330	8.20	7.40	6.40	5.20	54.1	1423
123.0	664	3.00	20	2503	7.70	7.00	6.00	4.90	50.9	1424
122.0	641	3.00	20	2416	8.10	7.30	6.30	5.10	53.2	1400
121.0	670	3.00	20	2526	8.20	7.40	6.40	5.20	54.1	1423
120.0	665	3.00	20	2507	6.80	6.20	5.30	4.30	44.9	1399
119.0	619	3.00	20	2333	7.20	6.60	5.70	4.70	48.5	1505
118.0	585	3.00	20	2205	6.50	6.10	5.40	4.40	45.3	1623
117.0	648	3.00	20	2443	6.10	5.60	4.80	3.90	40.6	1428
116.0	702	3.00	20	2646	6.10	5.50	4.70	3.80	39.8	1365
115.0	731	3.00	20	2756	5.50	5.00	4.30	3.50	36.4	1425
114.0	827	3.00	20	3118	4.80	4.30	3.70	3.00	31.3	1383
113.0	944	3.00	20	3559	4.30	3.90	3.40	2.70	28.4	1386
112.0	964	3.00	20	3634	4.20	3.80	3.30	2.70	28.0	1467
111.0	967	3.00	20	3645	4.40	4.00	3.40	2.80	29.0	1422
110.0	953	3.00	20	3593	4.50	4.00	3.40	2.80	29.1	1376
109.0	904	3.00	20	3408	4.90	4.50	3.80	3.10	32.3	1390
108.0	902	3.00	20	3400	5.00	4.60	3.90	3.20	33.2	1427
107.0	795	3.00	20	2997	4.70	4.30	3.70	3.00	31.3	1427
106.0	612	3.00	20	2307	4.10	3.70	3.20	2.50	26.6	1303
105.0	620	3.00	20	2337	4.30	3.90	3.30	2.70	28.1	1381
104.0	725	3.00	20	2733	4.70	4.30	3.70	3.00	31.3	1427
103.0	840	3.00	20	3167	4.30	3.90	3.30	2.70	28.1	1381
102.0	817	3.00	20	3080	4.40	4.00	3.50	2.80	29.3	1428
101.0	729	3.00	20	2748	4.40	4.00	3.40	2.80	29.0	1422
100.0	760	3.00	20	2865	4.20	3.80	3.20	2.60	27.2	1339

Claymires B/h 1a

Electrical log observations and calculated parameters 99.0m-52.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
99.0	789	3.00	20	2974	4.20	3.80	3.20	2.60	27.2	1339
98.0	744	3.00	20	2805	4.20	3.80	3.30	2.60	27.5	1345
97.0	690	3.00	20	2601	4.60	4.10	3.50	2.90	30.0	1415
96.0	777	3.00	20	2929	4.20	3.80	3.30	2.60	27.5	1345
95.0	921	3.00	20	3472	4.80	4.30	3.70	3.00	31.3	1383
94.0							*Reading*	*omitted*	*in*	*error*
93.0	1126	3.00	20	4245	4.50	4.10	3.50	2.80	29.5	1350
92.0	1259	3.00	20	4746	5.30	4.80	4.10	3.30	34.6	1358
91.0	1001	3.00	20	3774	5.60	5.10	4.40	3.60	37.3	1458
90.0	1183	3.00	20	4460	5.50	5.00	4.30	3.50	36.4	1425
89.0	1262	3.00	20	4758	6.70	6.10	5.30	4.30	44.7	1454
88.0	1311	3.00	20	4942	6.10	5.50	4.70	3.80	39.8	1365
87.0	431	10.00	20	5416	6.20	5.70	4.90	4.00	41.5	1458
86.0	525	10.00	20	6598	6.20	5.70	4.90	3.90	41.0	1374
85.0	585	10.00	20	7352	5.00	4.70	4.10	3.40	34.8	1637
84.0	864	10.00	20	10858	4.50	4.20	3.80	3.20	32.2	1888
83.0	1140	10.00	20	14327	5.10	4.70	4.00	3.20	33.7	1362
82.0	1177	10.00	20	14792	6.90	6.30	5.50	4.60	47.0	1596
81.0	1181	10.00	20	14842	8.70	7.90	6.80	5.50	57.4	1404
80.0	1186	10.00	20	14905	10.60	9.60	8.20	6.50	68.8	1313
79.0	1195	10.00	20	15018	12.60	11.60	10.10	8.30	85.6	1535
78.0	1201	10.00	20	15094	12.90	12.00	10.80	9.30	92.7	1977
77.0	1194	10.00	20	15006	12.40	11.50	10.10	8.50	86.3	1697
76.0	777	10.00	20	9765	11.60	10.70	9.50	8.00	81.0	1739
75.0	1062	3.00	20	4004	9.90	9.10	8.00	6.70	68.2	1653
74.0	807	3.00	20	3042	8.20	7.70	6.90	5.80	58.6	1841
73.0	761	3.00	20	2869	9.60	8.80	7.60	6.30	64.8	1525
72.0	893	3.00	20	3366	8.80	8.10	7.00	5.80	59.6	1536
71.0	1104	3.00	20	4162	7.70	7.00	6.10	5.00	51.7	1498
70.0	1106	3.00	20	4170	7.80	7.10	6.10	5.00	51.8	1448
69.0	942	3.00	20	3551	6.60	6.00	5.20	4.20	43.8	1426
68.0	898	3.00	20	3385	6.30	5.80	5.10	4.20	43.1	1586
67.0	948	3.00	20	3574	7.10	6.50	5.70	4.60	47.8	1482
66.0	1090	3.00	20	4109	5.80	5.30	4.50	3.70	38.4	1424
65.0	975	3.00	20	3676	5.60	5.10	4.40	3.60	37.3	1458
64.0	858	3.00	20	3235	6.30	5.70	4.90	4.00	41.6	1423
63.0	1124	3.00	20	4237	6.00	5.50	4.70	3.80	39.7	1398
62.0	1286	3.00	20	4848	5.50	4.90	4.20	3.40	35.6	1355
61.0	428	10.00	20	5379	6.70	6.20	5.40	4.10	44.1	1290
60.0	341	10.00	20	4285	6.60	6.00	5.20	4.20	43.8	1426
59.0	754	10.00	20	9476	6.00	5.50	4.80	3.90	40.4	1491
58.0	654	10.00	5	32877	6.60	5.90	5.00	4.00	42.2	1292
57.0	1037	10.00	5	52132	11.40	10.40	9.10	7.50	77.2	1544
56.0	1184	10.00	5	59522	10.80	10.10	9.00	7.80	77.6	1973
55.0	1111	10.00	5	55852	9.00	8.40	7.50	6.50	64.7	1978
54.0	1026	10.00	5	51579	8.60	8.00	7.10	6.00	60.6	1782
53.0	1108	10.00	5	55701	9.20	8.50	7.40	6.20	63.2	1624
52.0	1148	10.00	5	57712	8.10	7.50	6.70	5.80	57.8	1942

Claymires B/h 1a

Electrical log observations and calculated parameters 51.0m-3.0m

V	R	R	I	RHO	M1	M2	M3	M4	CH	TC
51.0	1123	10.00	5	56455	7.00	6.60	5.40	4.30	45.7	1272
50.0	1174	10.00	5	59019	8.50	7.80	6.60	5.20	55.3	1292
49.0	1186	10.00	5	59622	10.10	9.20	8.00	6.40	67.0	1410
48.0	1182	10.00	5	59421	9.20	8.40	7.40	6.00	62.2	1511
47.0	1179	10.00	5	59270	9.40	8.50	7.30	5.80	61.2	1334
46.0	1176	10.00	5	59119	7.50	7.00	6.10	4.90	51.1	1487
45.0	1182	10.00	5	59421	10.20	9.30	7.90	6.20	66.0	1282
44.0	1187	10.00	5	59672	12.60	11.30	9.40	7.40	79.2	1206
43.0	1190	10.00	5	59823	11.50	10.50	9.10	7.40	76.9	1459
42.0	1172	10.00	5	58918	7.70	7.00	6.10	4.90	51.2	1427
41.0	958	10.00	5	48160	7.60	6.80	5.80	4.50	48.2	1232
40.0	851	10.00	5	42781	6.50	5.80	4.90	3.70	40.4	1141
39.0	668	10.00	5	33581	7.30	6.60	5.50	4.30	46.1	1207
38.0	554	10.00	5	27850	6.10	5.50	4.70	3.60	38.8	1217
37.0	437	10.00	5	21968	4.90	4.40	3.60	2.80	30.3	1141
36.0	339	10.00	5	17042	5.30	4.70	3.90	3.10	33.1	1205
35.0	393	10.00	10	9878	5.70	5.10	4.20	3.30	35.5	1173
34.0	424	10.00	10	10657	7.20	6.40	5.30	4.20	44.9	1197
33.0	653	10.00	10	16413	6.40	5.70	4.70	3.60	39.2	1115
32.0	719	10.00	10	18072	6.30	5.70	4.80	3.70	39.9	1200
31.0	631	10.00	10	15860	6.40	5.70	4.70	3.60	39.2	1115
30.0	684	10.00	10	17193	6.30	5.60	4.60	3.60	38.8	1149
29.0	750	10.00	10	18852	6.50	5.80	4.80	3.70	40.1	1139
28.0	769	10.00	10	19329	7.00	6.20	5.10	4.00	43.1	1152
27.0	548	10.00	10	13774	6.50	6.00	5.10	4.10	43.0	1377
26.0	345	10.00	10	8671	3.70	3.40	2.80	2.20	23.6	1214
25.0	325	10.00	20	4084	3.60	3.20	2.70	2.00	22.1	1094
24.0	934	3.00	20	3521	3.00	2.70	2.20	1.70	18.5	1121
23.0	1140	3.00	20	4298	3.30	2.90	2.40	1.80	19.9	1065
22.0	1110	3.00	20	4185	4.40	3.90	3.20	2.50	27.0	1139
21.0	581	10.00	20	7302	6.10	5.50	4.60	4.40	42.4	2025
20.0	366	10.00	20	4599	3.70	3.30	2.70	2.10	22.7	1132
19.0	997	3.00	20	3759	3.50	3.10	2.60	2.00	21.7	1154
18.0	802	3.00	20	3023	3.00	2.70	2.20	1.70	18.5	1121
17.0	834	3.00	20	3144	3.20	2.80	2.40	1.90	20.2	1259
16.0	730	3.00	20	2752	3.30	2.90	2.40	1.90	20.3	1176
15.0	421	3.00	20	1587	2.50	2.20	1.90	1.50	15.9	1283
14.0	355	3.00	20	1338	2.30	2.00	1.70	1.30	14.1	1147
13.0	359	3.00	20	1353	2.20	2.00	1.70	1.30	14.0	1212
12.0	922	1.00	20	1158	2.20	2.00	1.70	1.30	14.0	1212
11.0	972	1.00	20	1221	2.20	1.90	1.60	1.30	13.7	1256
10.0	1017	1.00	20	1278	2.20	2.00	1.60	1.30	13.8	1204
9.0	962	1.00	20	1209	2.30	2.10	1.70	1.40	14.7	1277
8.0	921	1.00	20	1157	2.40	2.20	1.80	1.40	15.1	1170
7.0	960	1.00	20	1206	2.20	2.00	1.70	1.30	14.0	1212
6.0	834	1.00	20	1048	2.10	1.90	1.60	1.30	13.6	1339
5.0	845	1.00	20	1061	2.10	1.90	1.60	1.30	13.6	1339
4.0	688	1.00	20	864	1.80	1.60	1.40	1.00	11.2	1098
3.0	999	1.00	20	1255	1.80	1.70	1.50	1.20	12.5	1550

Claymires B/h 2

Electrical log observations and calculated parameters 126.0m-79.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
126.0	380	3.00	50	573	14.10	13.10	11.70	10.00	100.3	1877
125.0	608	3.00	50	916	10.10	8.80	7.20	5.80	61.7	1175
124.0	592	3.00	50	892	10.10	9.20	8.00	6.70	68.5	1578
123.0	483	10.00	50	2428	13.00	12.00	10.60	9.00	90.8	1755
122.0								*No reading obtainable*		
121.0								*No reading obtainable*		
120.0	685	3.00	50	1033	22.00	20.90	19.20	17.10	166.4	2548
119.0	536	3.00	50	808	19.00	17.90	16.10	13.90	138.2	2044
118.0	582	3.00	50	877	16.30	15.30	13.80	11.90	118.4	2040
117.0	614	3.00	50	926	14.00	13.10	11.70	10.00	100.2	1904
116.0	1263	3.00	50	1904	13.50	12.70	11.40	9.90	98.2	2064
115.0	1305	3.00	50	1968	16.40	15.70	14.50	12.90	125.4	2654
114.0	1075	3.00	50	1621	12.00	11.20	10.00	8.60	85.9	1929
113.0	877	3.00	50	1322	12.80	12.00	10.80	9.30	92.6	2010
112.0	438	3.00	50	660	17.40	16.30	14.50	12.30	123.8	1840
111.0	358	3.00	100	269	12.30	11.50	10.20	8.70	87.4	1847
110.0	917	1.00	100	230	11.70	10.90	9.60	8.10	82.0	1738
109.0	1026	1.00	100	257	15.20	14.30	12.90	11.10	110.5	2037
108.0	808	1.00	100	203	14.10	13.20	11.80	10.20	101.6	1982
107.0	869	1.00	100	218	13.70	12.80	11.30	9.60	96.8	1796
106.0	1218	1.00	100	306	14.00	13.00	11.60	9.90	99.4	1861
105.0	1129	1.00	100	283	14.00	13.10	11.70	10.00	100.2	1904
104.0	1018	1.00	50	511	14.90	13.90	12.30	10.50	105.5	1830
103.0	1365	1.00	50	686	11.40	10.60	9.40	8.00	80.5	1814
102.0	524	10.00	100	1317	20.20	19.20	17.50	15.50	151.6	2412
101.0	1047	10.00	50	5263	18.60	17.70	16.10	14.30	139.7	2425
100.0	552	10.00	50	2775	18.60	17.60	16.00	14.10	138.4	2314
99.0	457	3.00	50	689	15.90	15.10	13.70	11.90	117.7	2195
98.0	553	3.00	100	417	24.20	22.90	20.90	18.40	180.5	2342
97.0	970	1.00	100	243	12.00	11.40	10.40	9.20	90.0	2406
96.0	1164	1.00	100	292	8.20	7.50	6.40	5.30	54.7	1469
95.0	1496	1.00	50	752	14.90	14.30	13.20	11.80	114.4	2724
94.0	1340	3.00	50	2020	14.60	13.70	12.30	10.60	105.6	2002
93.0	864	1.00	50	434	9.70	9.10	8.20	7.10	70.5	2059
92.0	641	10.00	50	3222	19.50	18.30	16.40	14.10	140.7	1974
91.0	1198	10.00	20	15056	14.00	13.00	11.30	9.40	96.2	1600
90.0	1204	10.00	20	15131	17.20	16.40	15.00	12.90	127.9	2204
89.0	1204	10.00	20	15131	14.90	14.00	12.60	10.80	107.8	1989
88.0	1215	10.00	20	15270	17.70	17.00	15.70	13.80	134.9	2543
87.0								*No reading obtainable*		
86.0	1202	10.00	20	15106	16.70	15.80	14.20	12.00	120.7	1919
85.0	1240	10.00	20	15584	14.40	13.30	11.50	9.10	95.9	1385
84.0	1210	10.00	20	15207	4.50	3.30	1.50	-0.20	9.3	
83.0	1235	10.00	20	15521	0.70	-0.30	-2.40	-5.30	-31.1	
82.0	1204	10.00	20	15131	17.40	16.60	15.20	13.10	129.7	2234
81.0	1193	10.00	20	14993	16.00	15.10	13.50	11.40	114.8	1872
80.0	1197	10.00	20	15043	16.70	15.80	14.30	12.10	121.4	1973
79.0	1191	10.00	20	14968	16.60	15.60	14.20	12.20	121.3	2088

Claymires B/h 2

Electrical log observations and calculated parameters 78.0m-31.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
78.0	854	10.00	20	10733	11.90	11.00	9.60	8.00	81.8	1613
77.0	1180	10.00	20	14830	12.00	11.30	10.00	8.40	85.1	1776
76.0	1193	10.00	20	14993	16.60	15.50	13.80	11.70	117.8	1831
75.0	1204	10.00	20	15131	17.50	16.80	15.50	13.70	133.6	2589
74.0	1215	10.00	20	15270	14.70	13.90	12.60	10.90	108.1	2135
73.0	1204	10.00	20	15131	14.90	14.10	12.80	11.00	109.4	2101
72.0	1186	10.00	20	14905	11.70	10.60	9.10	7.40	77.1	1408
71.0	1186	10.00	20	14905	11.00	10.00	8.60	7.00	72.8	1425
70.0	1187	10.00	20	14918	9.50	8.60	7.40	6.00	62.6	1405
69.0	1176	10.00	20	14779	7.60	6.90	5.90	4.70	49.6	1336
68.0	1185	10.00	20	14893	11.50	10.50	9.10	7.50	77.3	1507
67.0	1206	10.00	20	15157	14.50	13.50	11.90	9.90	101.0	1673
66.0	1192	10.00	20	14981	12.90	12.00	10.60	8.80	89.8	1671
65.0	1190	10.00	20	14955	9.90	9.10	7.90	6.50	67.0	1524
64.0	1190	10.00	20	14955	9.70	8.90	7.70	6.30	65.2	1485
63.0	1185	10.00	20	14893	10.00	9.20	8.00	6.60	67.9	1544
62.0	1192	10.00	20	14981	10.90	9.80	8.40	6.80	71.1	1373
61.0	1199	10.00	20	15069	14.30	13.10	11.30	9.20	95.6	1453
60.0	1198	10.00	20	15056	14.00	12.90	11.30	9.20	95.2	1526
59.0	1191	10.00	20	14968	11.80	10.90	9.50	7.80	80.4	1544
58.0	1191	10.00	20	14968	12.10	11.10	9.50	7.80	80.8	1457
57.0	1180	10.00	20	14830	8.40	7.70	6.60	5.40	56.0	1448
56.0	1002	10.00	20	12593	6.70	6.10	5.30	4.30	44.7	1454
55.0	1026	10.00	20	12894	6.10	5.50	4.70	3.80	39.8	1365
54.0	1192	10.00	20	14981	10.50	9.60	8.30	6.80	70.4	1479
53.0	1198	10.00	20	15056	16.20	15.80	14.10	11.80	119.2	1934
52.0								*No reading obtainable*		
51.0								*No reading obtainable*		
50.0	1170	10.00	20	14704	13.30	12.60	11.40	9.90	98.0	2158
49.0	471	10.00	20	5919	12.90	11.80	10.30	8.60	87.9	1593
48.0	407	10.00	20	5115	15.50	14.40	12.80	10.80	109.1	1778
47.0	469	10.00	50	2357	13.90	13.00	11.70	10.00	100.0	1952
46.0	405	10.00	50	2036	11.70	10.80	9.40	7.80	80.0	1579
45.0	408	10.00	50	2051	15.70	14.60	12.90	10.90	110.2	1756
44.0	396	10.00	50	1990	16.70	15.60	14.00	12.00	119.9	1946
43.0	394	10.00	50	1980	15.40	14.40	12.80	10.90	109.6	1851
42.0	1132	3.00	50	1707	18.70	17.80	16.30	14.40	140.8	2444
41.0	659	10.00	50	3312	12.90	11.80	10.40	8.60	88.1	1596
40.0	715	3.00	50	1078	20.70	19.70	18.00	15.80	155.1	2360
39.0	641	3.00	50	966	16.10	15.00	13.30	11.30	113.8	1811
38.0	472	3.00	50	711	12.20	11.20	9.70	8.00	82.4	1521
37.0	367	3.00	50	553	10.40	9.50	8.20	6.60	69.0	1411
36.0	398	3.00	50	600	9.70	8.80	7.60	6.20	64.4	1443
35.0	525	3.00	50	791	6.40	5.80	5.00	4.00	42.0	1371
34.0	596	3.00	50	898	7.00	6.40	5.50	4.40	46.2	1378
33.0	504	3.00	50	760	5.80	5.30	4.50	3.60	37.9	1338
32.0	509	3.00	50	767	4.80	4.30	3.70	3.00	31.3	1383
31.0	446	3.00	50	672	4.60	4.20	3.60	2.80	29.9	1286

Claymires B/h 2

Electrical log observations and calculated parameters 30.0m-23.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
30.0	442	3.00	50	666	4.20	3.80	3.20	2.50	26.8	1233
29.0	460	3.00	50	693	3.90	3.50	3.00	2.40	25.3	1334
28.0	474	3.00	50	714	4.00	3.60	3.10	2.40	25.7	1261
27.0	433	3.00	50	653	3.90	3.50	2.90	2.30	24.5	1215
26.0	482	3.00	50	726	3.90	3.50	3.00	2.40	25.3	1334
25.0	521	3.00	50	785	4.20	3.80	3.30	2.60	27.5	1345
24.0	522	3.00	50	787	4.10	3.70	3.10	2.50	26.3	1298
23.0	531	3.00	50	800	4.10	3.70	3.10	2.50	26.3	1298

Claymires B/h 3

Electrical log observations and calculated parameters 72.0m-25.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
72.0	558	10.00	60	2337	3.20	2.90	2.50	2.00	21.0	1371
71.0	518	10.00	20	6510	3.30	3.00	2.50	2.00	21.2	1274
70.0	482	10.00	20	6057	3.10	2.80	2.40	1.90	20.1	1315
69.0	630	10.00	20	7917	2.50	2.30	1.90	1.50	16.0	1235
68.0	665	10.00	20	8357	2.60	2.30	2.00	1.60	16.8	1351
67.0	746	10.00	20	9375	2.60	2.40	2.00	1.60	16.9	1300
66.0	764	10.00	20	9601	3.30	3.00	2.50	2.00	21.2	1274
65.0	626	10.00	20	7867	4.00	3.60	3.10	2.50	26.2	1378
64.0	570	10.00	20	7163	3.80	3.50	3.00	2.50	25.7	1526
63.0	539	10.00	20	6774	3.40	3.30	3.00	2.50	25.2	2012
62.0	640	10.00	20	8043	3.10	2.80	2.40	1.90	20.1	1315
61.0	596	10.00	20	7490	2.80	2.50	2.20	1.70	18.1	1305
60.0	603	10.00	20	7578	2.30	2.10	1.80	1.40	14.9	1286
59.0	624	10.00	20	7842	2.30	2.10	1.80	1.50	15.4	1505
58.0	631	10.00	20	7930	2.40	2.20	1.80	1.50	15.6	1349
57.0	585	10.00	20	7352	2.70	2.50	2.10	1.70	17.8	1365
56.0	552	10.00	60	2312	2.50	2.20	1.90	1.50	15.9	1283
55.0	519	10.00	60	2174	2.50	2.30	1.90	1.50	16.0	1235
54.0	487	10.00	60	2040	2.40	2.30	2.00	1.70	17.2	1801
53.0	482	10.00	60	2019	2.40	2.20	1.90	1.50	15.8	1359
52.0	460	10.00	60	1927	2.70	2.40	2.10	1.70	17.7	1419
51.0	378	10.00	60	1583	3.50	3.20	2.70	2.20	23.0	1375
50.0	475	10.00	60	1989	3.70	3.30	2.90	2.30	24.2	1375
49.0	572	10.00	60	2396	3.80	3.50	3.00	2.40	25.2	1385
48.0	531	10.00	60	2224	3.70	3.30	2.80	2.30	23.9	1369
47.0	684	10.00	60	2865	3.40	3.10	2.60	2.10	22.1	1324
46.0	811	10.00	60	3397	3.90	3.50	3.00	2.50	25.7	1465
45.0	886	10.00	60	3711	4.90	4.40	3.80	3.10	32.2	1420
44.0	635	10.00	40	3990	5.60	5.10	4.40	3.60	37.3	1458
43.0	653	10.00	40	4103	5.30	4.90	4.40	3.70	37.4	1801
42.0	633	10.00	40	3977	4.30	4.20	3.80	3.40	33.1	2619
41.0	608	10.00	40	3820	5.10	4.70	4.20	3.50	35.6	1718
40.0	621	10.00	40	3902	5.60	5.20	4.70	3.90	39.6	1782
39.0	656	10.00	40	4122	5.60	5.10	4.30	3.50	36.6	1361
38.0	656	10.00	40	4122	6.40	5.90	5.10	4.10	42.8	1431
37.0	619	10.00	40	3889	7.70	7.10	6.30	5.20	53.2	1641
36.0	390	10.00	40	2450	6.80	6.30	5.70	4.80	48.4	1860
35.0	388	10.00	40	2438	7.10	6.60	5.80	4.90	49.6	1726
34.0	352	10.00	40	2211	8.00	7.40	6.40	5.30	54.5	1550
33.0	399	10.00	40	2507	6.10	5.70	5.20	4.40	44.1	1975
32.0	378	10.00	40	2375	5.90	5.50	4.80	4.00	40.9	1637
31.0	370	10.00	40	2325	5.20	4.80	4.20	3.50	35.8	1621
30.0	1062	3.00	40	2002	3.90	3.70	3.30	2.80	28.1	1905
29.0	1058	3.00	40	1994	3.80	3.50	3.00	2.40	25.2	1385
28.0	1120	3.00	40	2111	3.40	3.10	2.60	2.10	22.1	1324
27.0	1037	3.00	40	1954	3.00	2.70	2.30	1.90	19.7	1419
26.0	847	3.00	40	1596	2.70	2.50	2.10	1.70	17.8	1365
25.0	761	3.00	40	1434	2.70	2.40	2.00	1.60	17.0	1236

Claymires B/h 3

Electrical log observations and calculated parameters 24.0m-3.0m

D	V	R	I	RHO	M1	M2	M3	M4	CH	TC
24.0	867	3.00	40	1634	2.60	2.30	2.00	1.60	16.8	1351
23.0	823	3.00	40	1551	2.40	2.10	1.80	1.40	15.0	1215
22.0	690	3.00	40	1300	2.70	2.40	2.10	1.60	17.2	1243
21.0	524	3.00	40	987	2.80	2.60	2.20	1.70	18.2	1261
20.0	537	3.00	40	1012	2.30	2.00	1.70	1.40	14.6	1333
19.0	546	3.00	40	1029	2.40	2.10	1.80	1.40	15.0	1215
18.0	487	3.00	40	918	2.40	2.10	1.80	1.40	15.0	1215
17.0	432	3.00	40	814	2.50	2.20	1.90	1.50	15.9	1283
16.0	482	1.00	100	121	2.20	2.00	1.70	1.30	14.0	1212
15.0	640	1.00	100	160	2.20	1.90	1.60	1.30	13.7	1256
14.0	605	1.00	20	760	1.20	0.60	-0.20	-0.20	0.0	
13.0	652	1.00	20	819	2.40	2.20	1.90	1.50	15.8	1359
12.0	653	1.00	20	820	2.50	2.30	2.00	1.60	16.7	1432
11.0	656	1.00	20	824	1.90	1.50	1.60	1.20	12.5	
10.0	663	1.00	20	833	2.40	2.30	2.30	1.80	18.4	
9.0	660	1.00	20	829	1.90	2.00	1.20	1.20	12.2	
8.0	662	1.00	20	832	2.30	2.10	1.80	1.50	15.4	1505
7.0	666	1.00	20	837	2.50	2.20	2.00	1.70	17.1	1758
6.0	669	1.00	20	840	2.20	2.20	1.80	1.50	15.5	
5.0	685	1.00	20	861	2.40	2.60	1.90	1.50	16.3	
4.0	670	1.00	20	842	2.20	1.90	1.60	1.30	13.7	1256
3.0	687	1.00	20	863	2.20	2.20	1.90	1.50	15.7	

Claymires B/h 1a

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

16.5m-63.7m

1650	52	:	1680	45						
1710	52	:	1740	58	:	1770	18			
1800	56	:	1840	29	:	1870	31			
1900	59	:	1930	73	:	1960	72	:	1990	49
2020	56	:	2050	62	:	2090	52			
2120	28	:	2150	59	:	2180	56			
2220	63	:	2260	62	:	2290	67			
2320	78	:	2350	52	:	2380	61			
2420	58	:	2450	54	:	2480	55			
2520	77	:	2550	53	:	2590	54			
2620	106	:	2650	48	:	2680	52			
2710	66	:	2740	92	:	2780	49			
2810	45	:	2840	80	:	2870	45			
2900	64	:	2930	90	:	2960	113			
3000	77	:	3030	71	:	3060	72	:	3090	81
3100	1	:	3130	76	:	3160	66			
3200	73	:	3230	64	:	3260	83	:	3290	60
3320	46	:	3360	34	:	3390	41			
3420	60	:	3450	44	:	3490	57			
3550	95	:	3580	75						
3610	139	:	3640	59	:	3680	57			
3710	61	:	3740	79	:	3790	53			
3820	59	:	3850	64	:	3880	45			
3920	59	:	3950	60	:	3980	64			
4010	59	:	4040	55	:	4070	61			
4100	60	:	4130	2	:	4160	57			
4200	52	:	4230	55	:	4260	53			
4300	57	:	4340	57	:	4370	53			
4400	51	:	4430	54	:	4460	52			
4500	50	:	4530	50	:	4560	50			
4600	54	:	4630	46	:	4660	50	:	4690	49
4730	58	:	4770	41						
4800	51	:	4830	73	:	4860	67			
4900	42	:	4930	53	:	4960	42	:	4990	83
5020	68	:	5050	68	:	5080	57			
5120	72	:	5150	58	:	5190	51			
5230	151	:	5250	145	:	5290	271			
5320	57	:	5350	49	:	5380	57			
5400	103	:	5440	95	:	5480	318			
5510	66	:	5550	40	:	5590	77			
5610	51	:	5640	62	:	5670	70			
5700	55	:	5740	61	:	5770	27			
5800	112	:	5830	102	:	5870	81			
5900	25	:	5930	43	:	5960	38			
6000	63	:	6040	121	:	6070	65			
6100	69	:	6130	11	:	6160	25	:	6190	60
6220	44	:	6250	69	:	6290	32			
6310	24	:	6370	64						

Claymires B/h 1a

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

64.0m-111.9m

6400	60	6430	73	6460	69	6490	32
6520	33	6550	45	6580	95		
6640	15	6670	102				
6710	55	6740	56	6780	96		
6810	34	6850	41	6880	66		
6910	35	6940	46	6970	9		
7000	66	7040	43	7080	58		
7110	39	7140	26	7180	50		
7220	54	7250	30	7280	57		
7310	14	7330	26				
7400	11	7430	2	7460	37		
7500	144	7540	115	7570	51		
7600	81	7630	30	7650	32	7680	36
7710	6	7740	24	7770	30		
7810	32	7840	28	7870	30		
7900	20	7940	28	7970	29		
8000	32	8020	29	8050	27	8080	35
8120	33	8150	34	8180	35		
8210	21	8240	35	8270	37		
8310	39	8340	43	8390	30		
8420	38	8450	44	8480	25		
8520	21	8550	23	8580	31		
8620	55	8650	19	8680	33		
8710	24	8740	55	8770	26		
8800	45	8830	35	8860	69	8890	38
8920	17	8950	50	8980	33		
9010	22	9040	26	9070	37		
9100	20	9130	20	9170	38		
9200	19	9230	47	9260	20		
9300	22	9330	15	9360	34		
9400	32	9430	6	9460	31		
9500	26	9530	14	9560	26		
9610	10	9630	31	9660	34	9690	44
9720	26	9750	30	9780	14		
9820	27	9850	17				
9900	9	9930	23	9960	0		
10000	26	10030	38	10060	21	10090	16
10140	0	10170	19				
10200	12	10230	7	10270	12		
10300	35	10340	24	10360	8	10390	25
10420	21	10450	17	10480	0		
10510	0	10540	10	10580	29		
10610	0	10640	0	10680	0		
10720	0	10760	16	10790	19		
10820	26	10850	23				
10900	32	10930	25				
11000	27	11030	38	11060	14		
11100	12	11130	18	11160	39	11190	36

Claymires b/h 1a

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

112.2m-148.7m

11220	18	:	11250	17	:	11280	23			
11310	27	:	11340	33	:	11370	31			
11400	28	:	11440	16	:	11480	15			
11520	19	:	11550	27	:	11580	26			
11610	27	:	11650	12	:	11690	11			
11720	17	:	11750	25	:	11780	15			
11810	33	:	11840	20	:	11880	36			
11920	24	:	11960	27						
12000	22	:	12030	23	:	12060	26	:	12090	12
12120	18	:	12150	20	:	12180	19			
12220	26	:	12260	23						
12300	29	:	12340	19	:	12370	28			
12400	24	:	12430	25	:	12460	19	:	12490	25
12520	25	:	12550	25	:	12580	32			
12610	12	:	12640	20	:	12670	24			
12700	15	:	12740	22	:	12770	20			
12810	24	:	12840	17	:	12870	27			
12900	22	:	12930	22	:	12970	28			
13000	28	:	13040	15	:	13080	24			
13110	12	:	13140	9	:	13180	19			
13210	16	:	13240	20	:	13270	29			
13310	18	:	13340	21	:	13380	16			
13410	28	:	13440	19	:	13480	21			
13510	28	:	13580	17						
13610	24	:	13650	26	:	13680	29			
13710	37	:	13740	40	:	13780	26			
13810	26	:	13840	18	:	13880	27			
13910	15	:	13940	29	:	13980	23			
14010	23	:	14040	19	:	14070	21			
14110	35	:	14140	14	:	14170	43			
14200	27	:	14250	27	:	14290	22			
14330	21	:	14360	27						
14400	27	:	14430	21	:	14470	32			
14500	29	:	14530	22	:	14570	33			
14600	23	:	14640	39	:	14670	30			
14700	22	:	14730	24	:	14770	28			
14800	21	:	14830	26	:	14870	21			

Claymires B/h 2

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

20.9m-70.9m

2090	18										
2180	52										
2220	41										
2330	25	:	2380	29							
2420	18	:	2490	25							
2520	21										
2600	22	:	2690	22							
2760	19										
2820	12	:	2860	13							
3000	18	:	3050	18							
3110	24										
3200	64	:	3290	92							
3440	131										
3500	46	:	3540	51	:	3580	63				
3610	77	:	3640	158							
3810	106	:	3840	344	:	3870	415				
3900	472	:	3930	349	:	3960	47	:	3990	318	
4020	352	:	4050	423	:	4080	606				
4110	483	:	4140	319	:	4170	37				
4200	407	:	4230	350	:	4260	340	:	4290	84	
4320	444	:	4350	430	:	4380	432				
4410	82	:	4440	401	:	4470	503				
4500	234	:	4530	445	:	4560	248	:	4590	476	
4630	331	:	4660	487	:	4690	217				
4720	343	:	4750	390	:	4780	207				
4810	370	:	4840	111	:	4870	28				
4900	142	:	4930	54	:	4960	28				
5000	14	:	5030	9	:	5060	20	:	5090	22	
5120	53	:	5150	21	:	5180	15				
5210	15	:	5240	17	:	5270	23				
5300	45	:	5330	40	:	5360	53	:	5390	56	
5420	19	:	5470	42							
5510	45	:	5540	15							
5610	78										
5700	47	:	5730	30	:	5760	22	:	5790	20	
5820	17	:	5850	24	:	5880	25				
5910	46	:	5940	34	:	5970	50				
6000	39	:	6030	32	:	6060	21	:	6090	36	
6120	26	:	6150	37	:	6180	24				
6210	42	:	6240	28	:	6270	72				
6300	60	:	6330	15	:	6360	26	:	6390	45	
6420	30	:	6450	58	:	6480	49				
6510	43	:	6540	50	:	6570	64				
6600	55	:	6640	75	:	6670	69				
6700	120	:	6730	91	:	6760	83	:	6790	91	
6820	21	:	6850	21	:	6880	31				
6910	38	:	6940	22	:	6970	49				
7000	45	:	7030	17	:	7060	26	:	7090	23	

Claymires B/h 2

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

71.2m-118.7m

7120	16	7150	36	7180	41		
7210	27	7240	25	7270	30		
7300	32	7330	13	7360	21	7390	230
7420	150	7450	17	7480	28		
7510	66	7540	44	7570	58		
7600	57	7630	62	7660	55	7690	50
7720	80	7750	36	7780	55		
7810	24	7840	35	7870	9		
7900	18	7930	16	7960	21	7990	50
8020	63	8050	10	8080	0		
8110	16	8140	15				
8200	17	8230	14	8260	13	8290	16
8320	13	8350	15	8380	15		
8410	12	8460	20	8490	17		
8520	17	8550	19	8580	17		
8610	16	8640	16	8670	21		
8700	17	8730	13	8760	14	8790	10
8820	13	8850	14	8880	13		
8910	16	8940	13	8970	17		
9000	18	9030	13	9060	47	9090	47
9120	27	9150	23	9180	103		
9210	219	9240	530	9270	198		
9300	214	9330	334	9360	198	9390	469
9420	406	9450	331	9480	928		
9510	504	9560	387	9590	483		
9620	611	9650	325	9680	210		
9710	324	9740	331	9770	60		
9800	436	9830	134	9860	15	9890	39
9920	57	9950	144	9980	17		
10010	13	10040	22	10070	25		
10120	315	10150	359	10180	943		
10210	433	10240	875	10270	507		
10300	573	10330	165	10360	522	10390	458
10420	541	10450	295	10480	374		
10510	523	10540	767	10570	551		
10600	577	10630	597	10660	322	10690	732
10720	510	10750	568	10780	301		
10810	417	10840	488	10870	625		
10900	269	10930	588	10960	420	10990	364
11020	74	11060	260				
11130	32	11150	28	11180	29		
11210	222	11240	144	11270	134		
11300	150	11330	349	11360	78	11390	684
11420	431	11450	294	11480	281		
11510	54	11540	326	11570	298		
11600	221	11630	365	11660	456	11690	111
11720	762	11750	349	11780	361		
11810	384	11840	79	11870	159		

Claymires B/h 2

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

119.0m-125.7m

11900	387	:	11930	156	:	11960	273	:	11990	41
12020	31	:	12050	20	:	12080	22			
12110	42	:	12140	32	:	12180	31			
12210	51	:	12240	46	:	12270	166			
12300	152	:	12330	201	:	12360	128	:	12390	72
12420	316	:	12450	163	:	12480	56			
12510	277	:	12540	289	:	12570	317			

Claymires B/h 3

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

4.2m-55.6m

420	24	:	450	27	:	490	23
530	24	:	580	24			
620	26	:	670	25			
710	23	:	740	27	:	780	28
820	33	:	860	32			
900	22	:	940	37			
1000	33	:	1030	34	:	1080	73
1120	29	:	1160	37			
1210	34						
1500	30	:	1550	37			
1600	25	:	1640	35	:	1690	31
1850	22						
2000	17	:	2050	8			
2100	7	:	2150	41			
2200	27	:	2250	5			
2300	35	:	2360	16			
2420	18	:	2460	23			
2500	3	:	2550	10			
2630	0	:	2680	5			
2730	0						
2800	28	:	2850	12			
2910	18	:	2950	6			
3000	18	:	3050	0	:	3090	57
3150	11						
3220	7	:	3280	10			
3350	58						
3400	15	:	3460	31			
3520	27						
3630	45						
3710	9	:	3790	18			
3880	26						
3960	16						
4000	34	:	4060	18			
4120	12	:	4180	23			
4240	19	:	4290	19			
4330	18	:	4380	21			
4420	16	:	4480	29			
4520	19	:	4580	26			
4610	41	:	4660	33			
4700	30	:	4750	15			
4800	21	:	4850	13	:	4890	7
4950	36						
5000	22						
5100	27	:	5170	24			
5250	25						
5300	36	:	5350	38			
5400	55	:	5450	35			
5500	42	:	5560	38			

Claymires B/h 3

Magnetic Susceptibilities (SI x 10^{-5}, uncorrected)

56.1m-72.5m

5610	29	:	5660	20
5710	30	:	5760	53
5800	120	:	5860	76
5910	24	:	5960	67
6000	50	:	6050	26
6100	34	:	6150	25
6200	25	:	6250	42
6300	26	:	6350	31
6400	47	:	6450	19
6500	28	:	6550	22
6600	16	:	6650	26
6700	79	:	6750	31
6800	27	:	6850	33
6900	33	:	6950	31
7000	39	:	7050	31
7100	24	:	7150	26
7200	27	:	7250	32

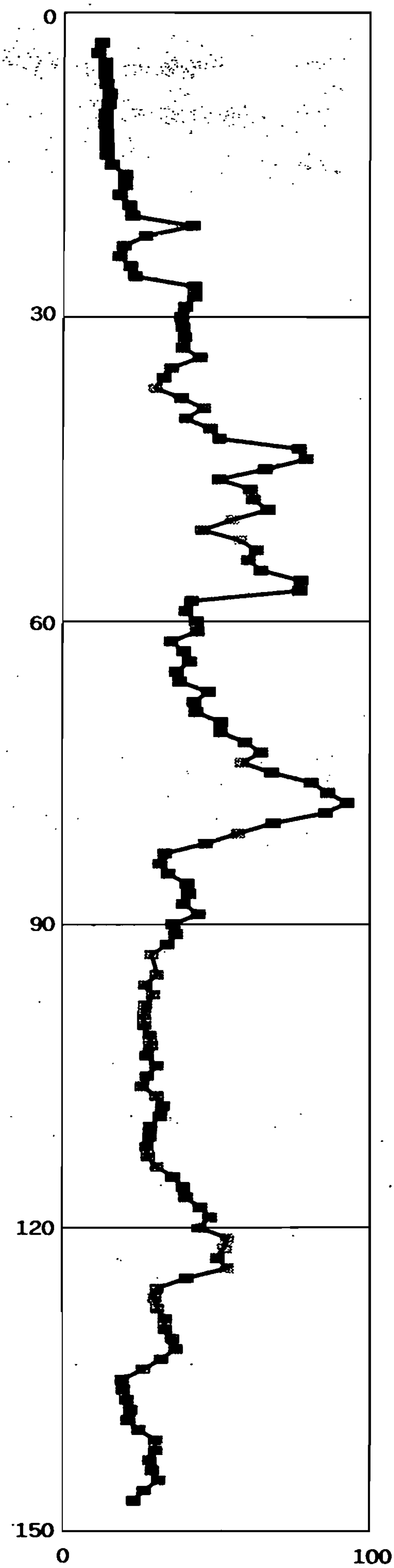


Figure 1

Claymires Borehole 1a

CHARGEABILITY LOG

Date logged : 21 Nov. 1990

Geophysicist : A D Evans

Vertical axis :

Distance down hole (metres)

Horizontal axis :

Chargeability (milliseconds)

Electrode array : 2-metre normal

Integration period : 240mS-1140mS

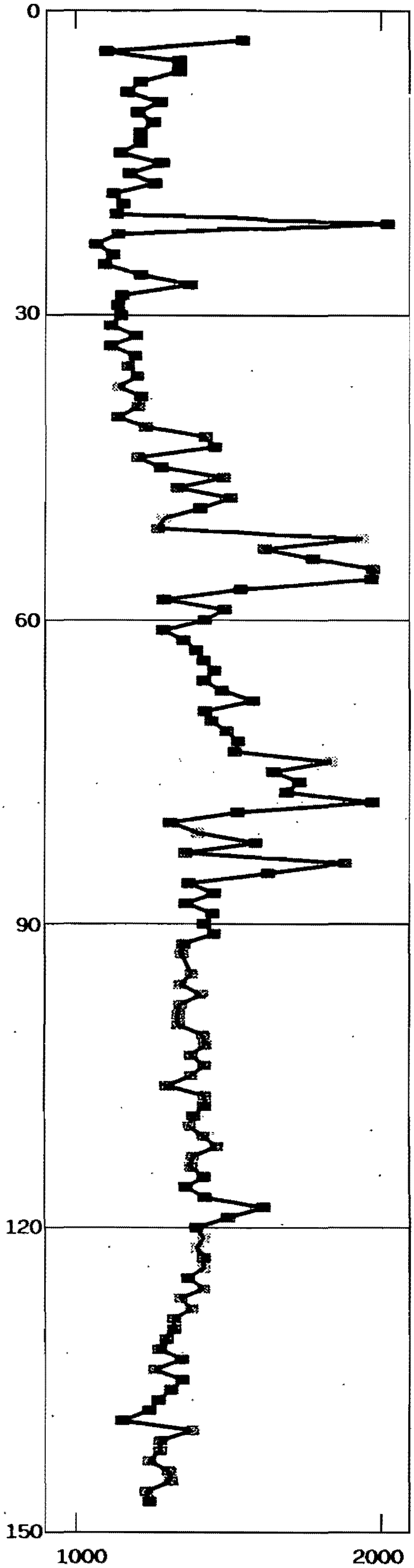


Figure 2

Claymires Borehole 1a

TIME CONSTANT LOG

Horizontal axis :

Time constant (milliseconds) of the best-fit simple exponential approximation of the IP decay curve from 270mS to 900mS after switch-off.

Other details as for Figure 1.

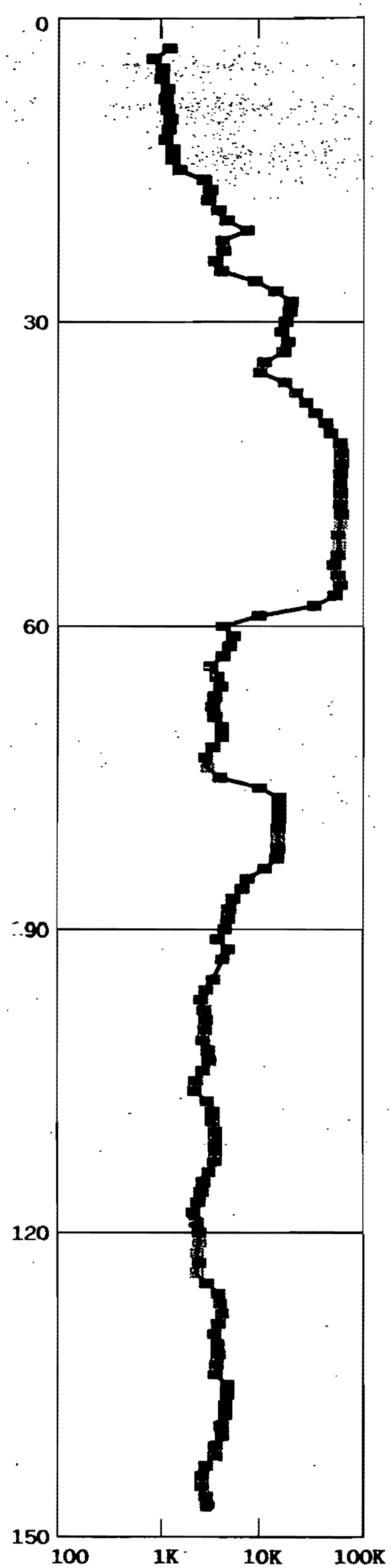


Figure 3

Claymires Borehole 1a

APPARENT RESISTIVITY LOG

Horizontal axis :

Ohm-metres (logarithmic scale).

Other details as for Figure 1.

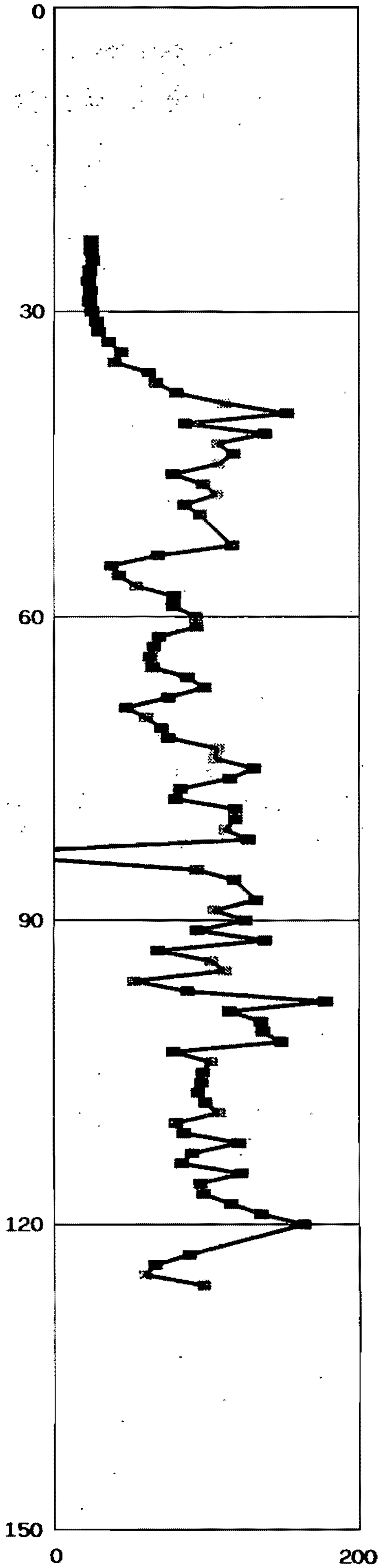


Figure 4

Claymires Borehole 2

CHARGEABILITY LOG

Date logged : 05 Dec. 1990

Geophysicist : A D Evans

Vertical axis :

Distance down hole (metres)

Horizontal axis :

Chargeability (milliseconds)

Electrode array : 2-metre normal

Integration period : 240mS-1140mS

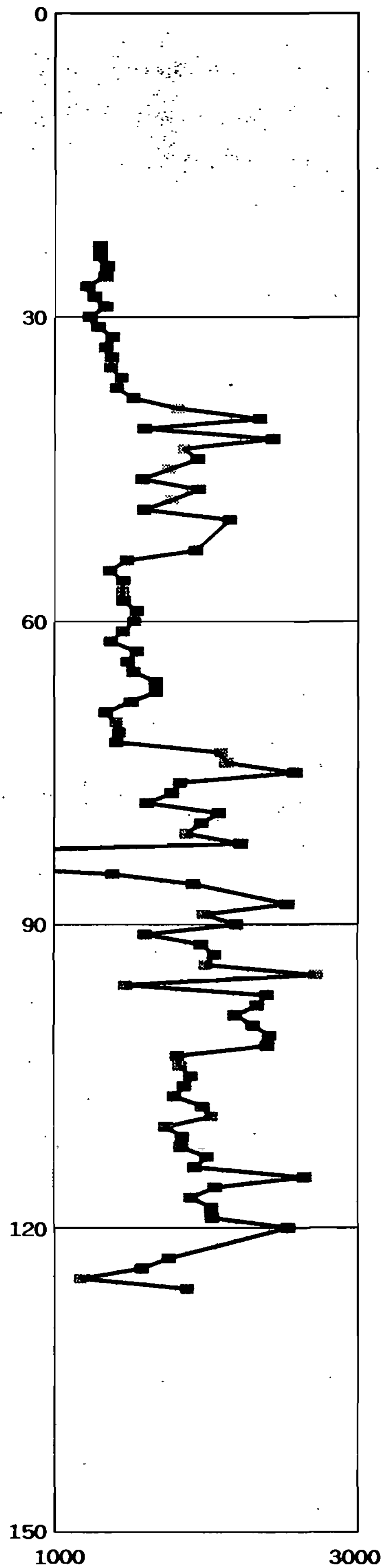


Figure 5

Claymires Borehole 2

TIME CONSTANT LOG

Horizontal axis :

Time constant (milliseconds) of the best-fit simple exponential approximation of the IP decay curve from 270mS to 900mS after switch-off.

Other details as for Figure 4.

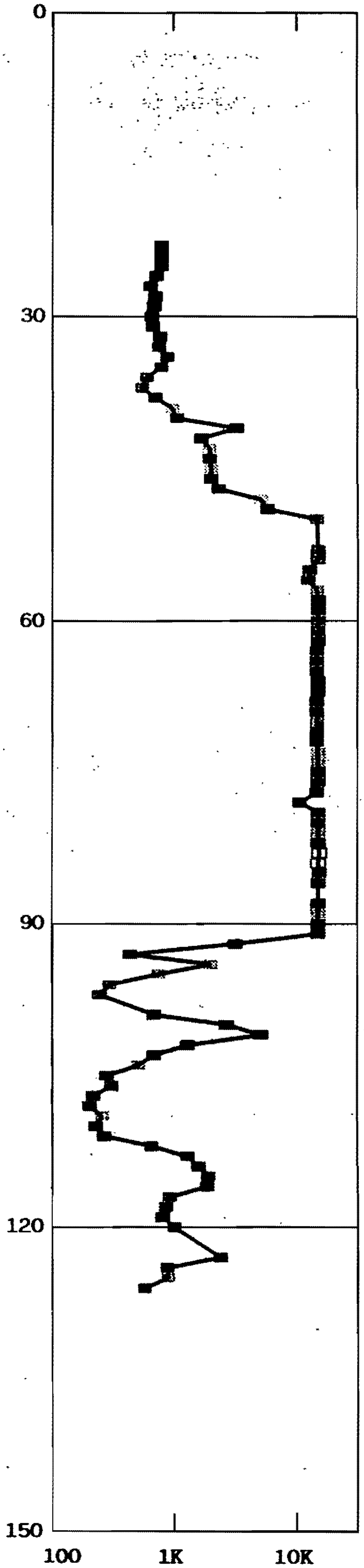


Figure 6

Claymires Borehole 2

APPARENT RESISTIVITY LOG

Horizontal axis :

Ohm-metres (logarithmic scale).

Other details as for Figure 4.

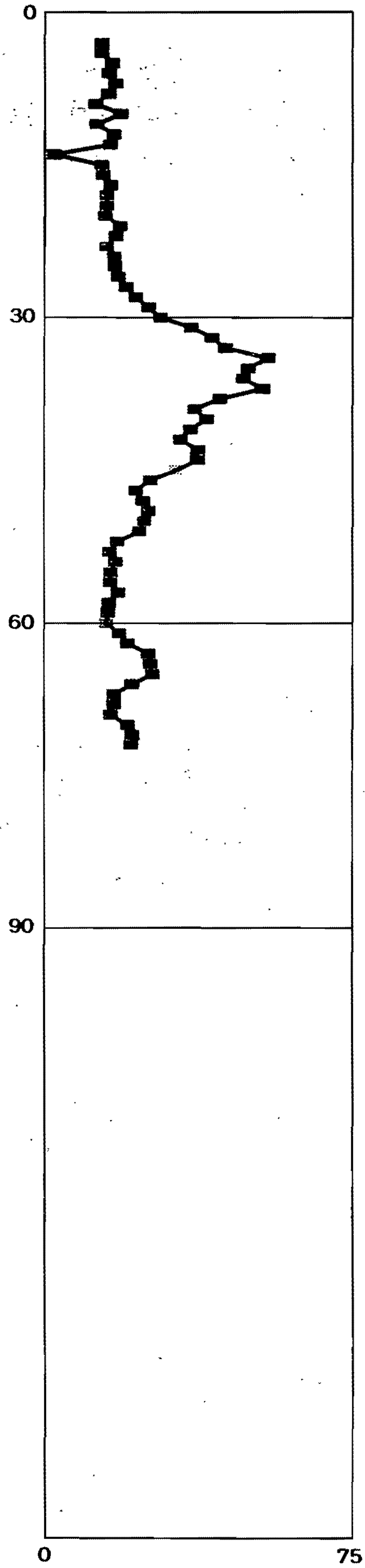


Figure 7

Claymires Borehole 3

CHARGEABILITY LOG

Date logged : 04 Jan. 1991

Geophysicist : A D Evans

Vertical axis :

Distance down hole (metres)

Horizontal axis :

Chargeability (milliseconds)

Electrode array : 2-metre normal

Integration period : 240-1140mS

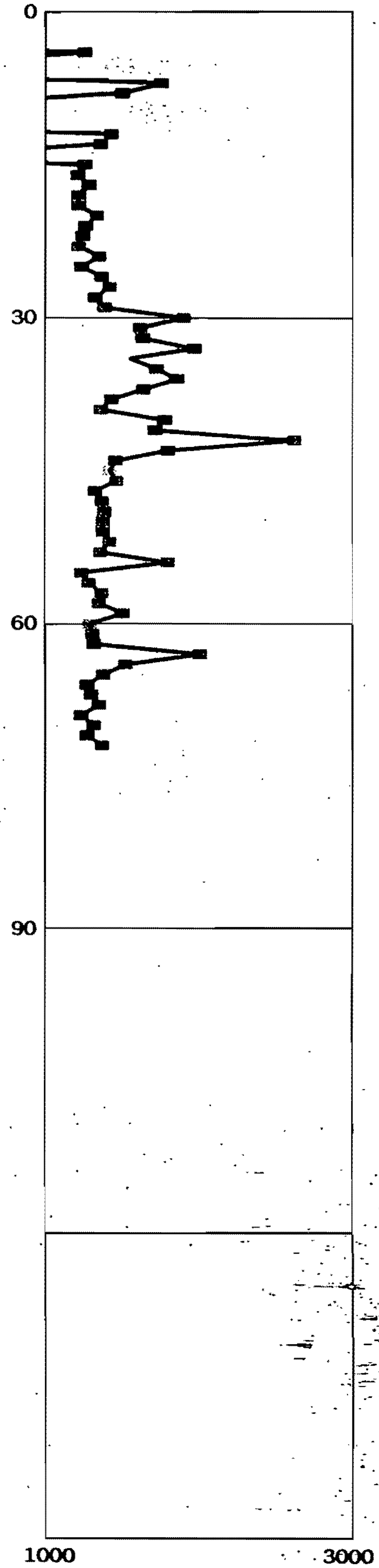


Figure 8

Claymires Borehole 3

TIME CONSTANT LOG

Horizontal axis :

Time constant (milliseconds) of the best-fit simple exponential approximation of the IP decay curve from 270mS to 900mS after switch-off.

Other details as for Figure 7.

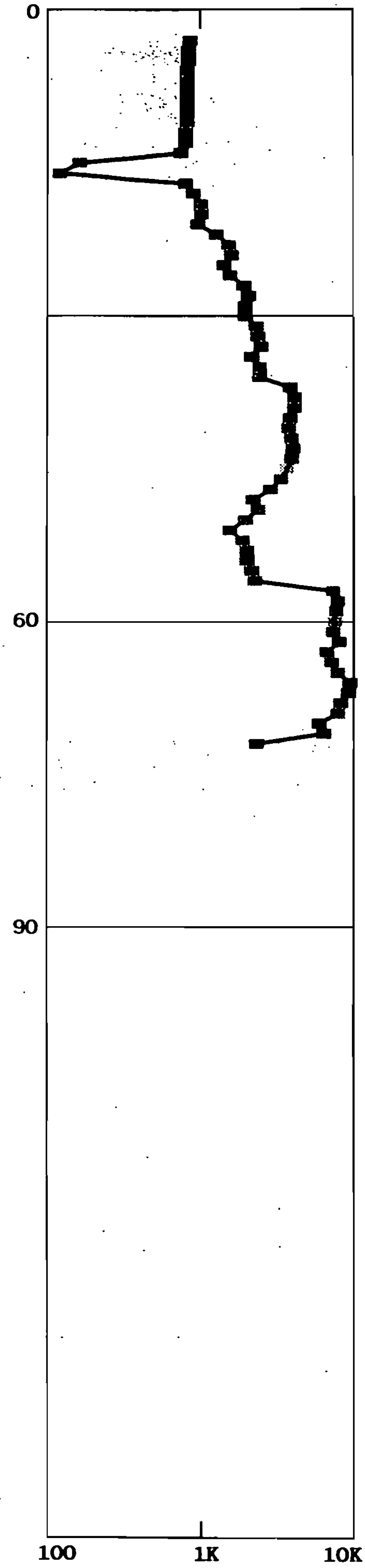


Figure 9

Claymires Borehole 3

APPARENT RESISTIVITY LOG

Horizontal axis :

Ohm-metres (logarithmic scale).

Other details as for Figure 7.

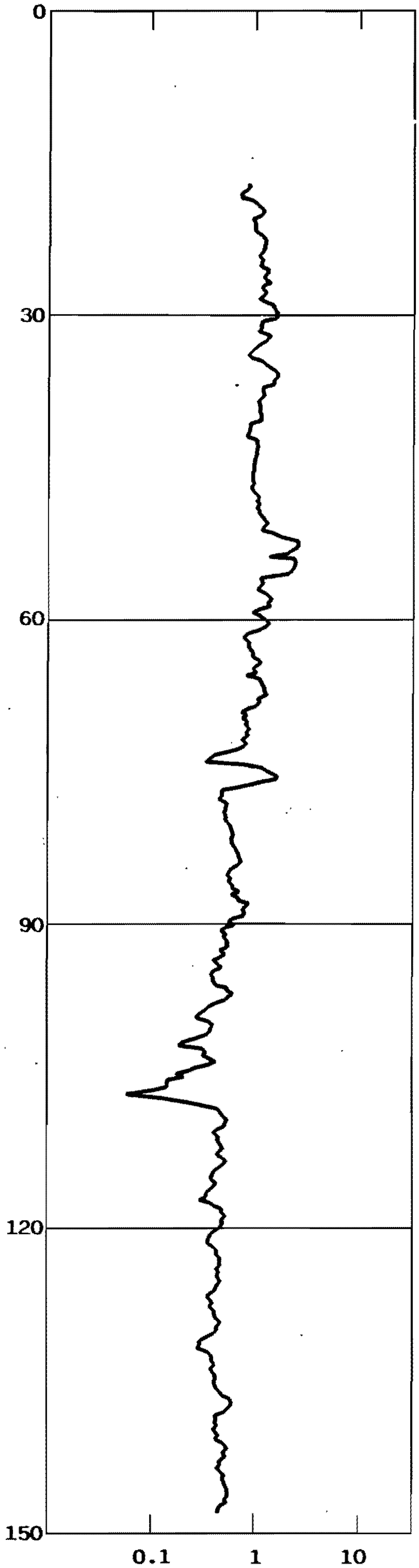


Figure 10

Claymires Borehole 1a

MAGNETIC SUSCEPTIBILITY LOG

Date logged : 07 Mar. 1991

Logged by : A D Evans & C Rowe

Vertical axis :

Distance down hole (metres)

Horizontal axis :

Magnetic susceptibility (SI units $x10^{-3}$)(logarithmic scale)

The log is compiled from measurements on drill core, made at intervals of approximately 0.3 metres, and corrected for core size. Statistical variation in the data has been attenuated by applying a five-point unweighted running average.

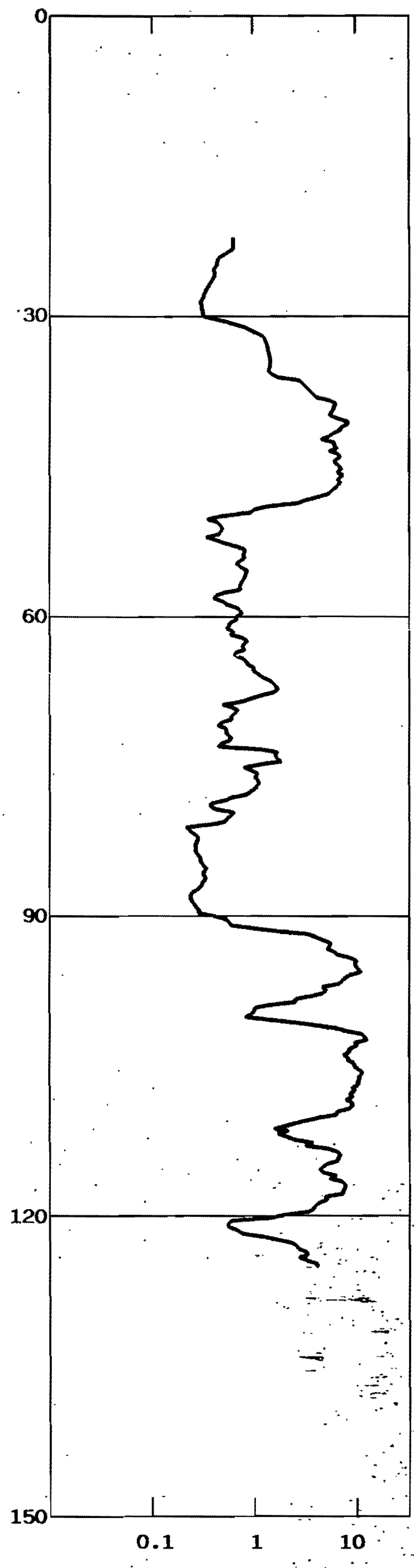


Figure 11

Claymires Borehole 2

MAGNETIC SUSCEPTIBILITY LOG

Details as for Figure 10.

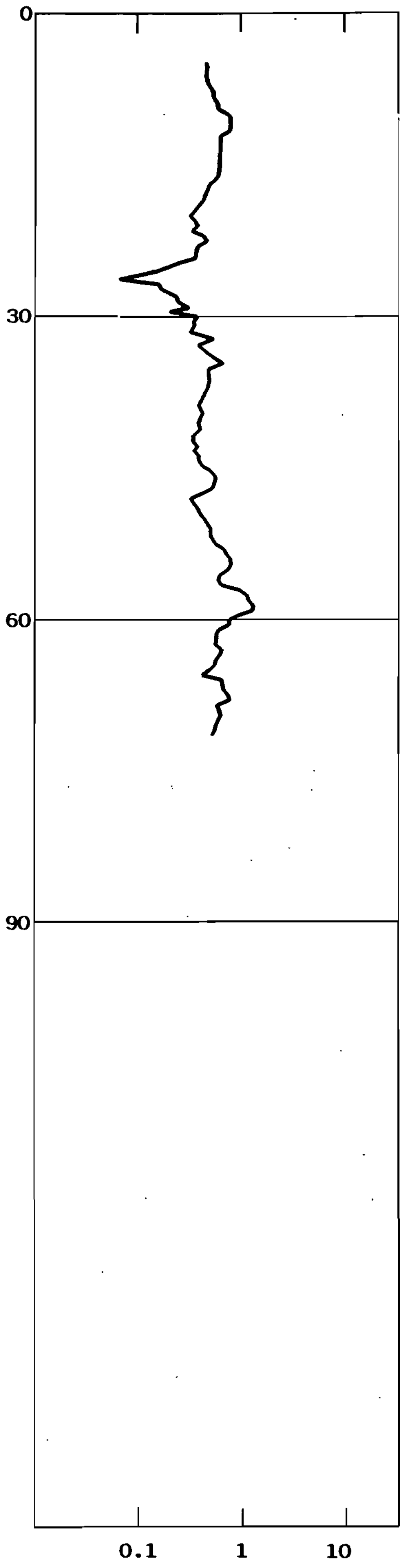


Figure 12

Claymires Borehole 3

MAGNETIC SUSCEPTIBILITY LOG

Details as for Figure 10.

BRITISH GEOLOGICAL SURVEY

KNOCK MRP PROSPECT. SEPT.1989

LINE NUMBER: 350 SOUTH

"A": 50.0 METRES N=1 TO 6

SCINTREX IPR-11 RECEIVER TX PULSE TIME: 2.0 SEC

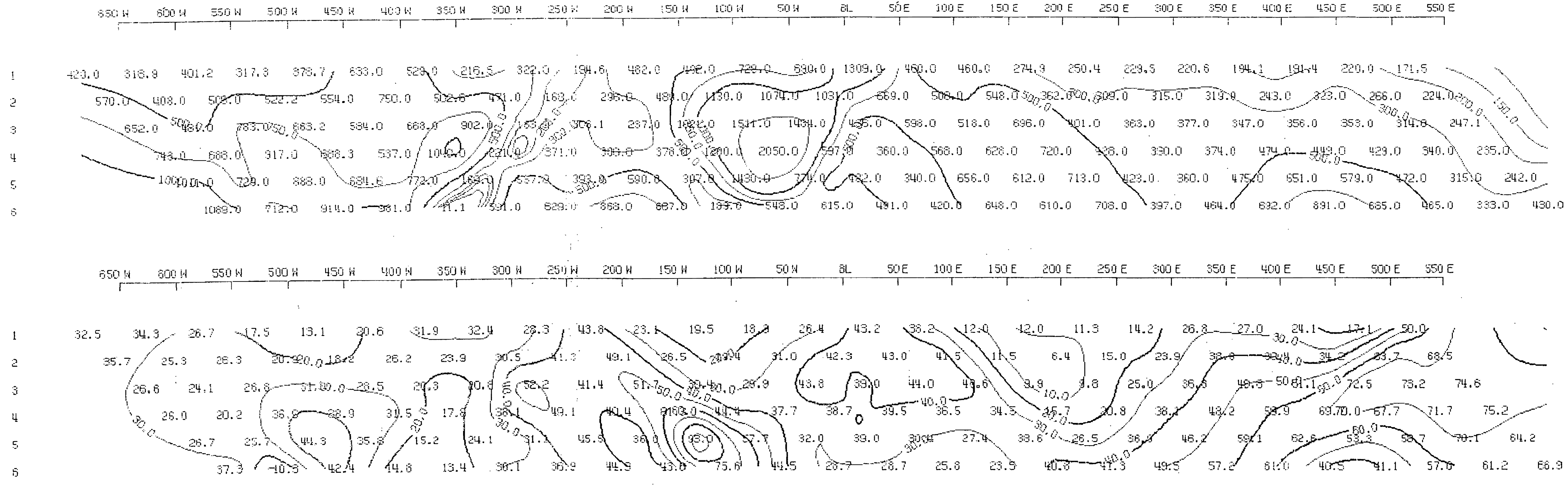
DIPOLE-DIPOLE ARRAY RECEIVE TIME: 2.0 SEC

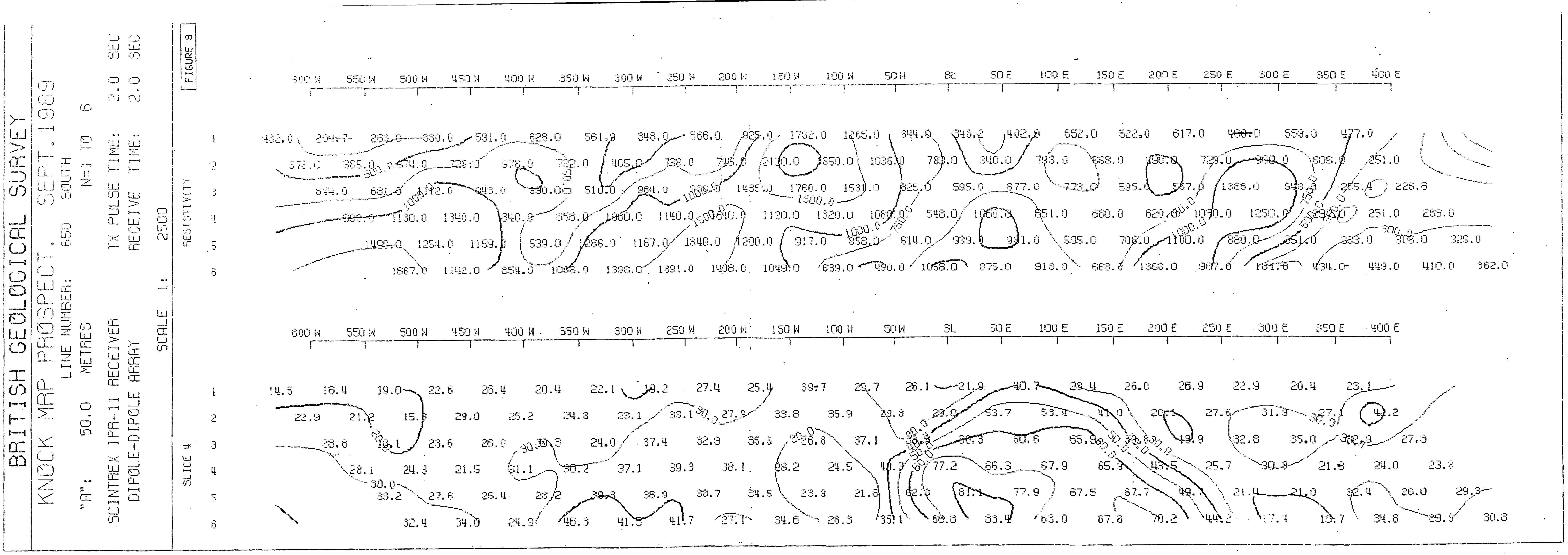
SCALE 1: 2500

FIGURE 7

RESISTIVITY

SLICE 4





BRITISH GEOLOGICAL SURVEY
KNOCK MAP PROSPECT, SEPT.1989
LINE NUMBER: 650 SOUTH
"A": 50.0 METRES
N=1 TO 6
SCINTREX IPR-11 RECEIVER
TX PULSE TIME: 2.0 SEC
DIPOLE-DIPOLE ARRAY
RECEIVE TIME: 2.0 SEC
SCALE 1: 2500
FIGURE 8
RESISTIVITY
SLICE 4
600 W 550 W 500 W 450 W 400 W 350 W 300 W 250 W 200 W 150 W 100 W 50 W BL 50 E 100 E 150 E 200 E 250 E 300 E 350 E 400 E


BRITISH GEOLOGICAL SURVEY
KNOCK MRP PROSPECT. SEPT.1989
LINE NUMBER: 900 SOUTH
"A": 50.0 METRES N=1 TO 6
SCINTREX IPR-11 RECEIVER TX PULSE TIME: 2.0 SEC
DIPOLE-DIPOLE ARRAY RECEIVE TIME: 2.0 SEC
SCALE 1: 2500
FIGURE 9
RESISTIVITY
SLICE 4
700 W 650 W 600 W 550 W 500 W 450 W 400 W 350 W 300 W 250 W 200 W 150 W 100 W 50 W BL 50 E 100 E 150 E 200 E 250 E 300 E 350 E 400 E 450 E 500 E 550 E

BRITISH GEOLOGICAL SURVEY

KNOCK MAP PROSPECT. SEPT.1989

LINE NUMBER: 1200 SOUTH

METRES

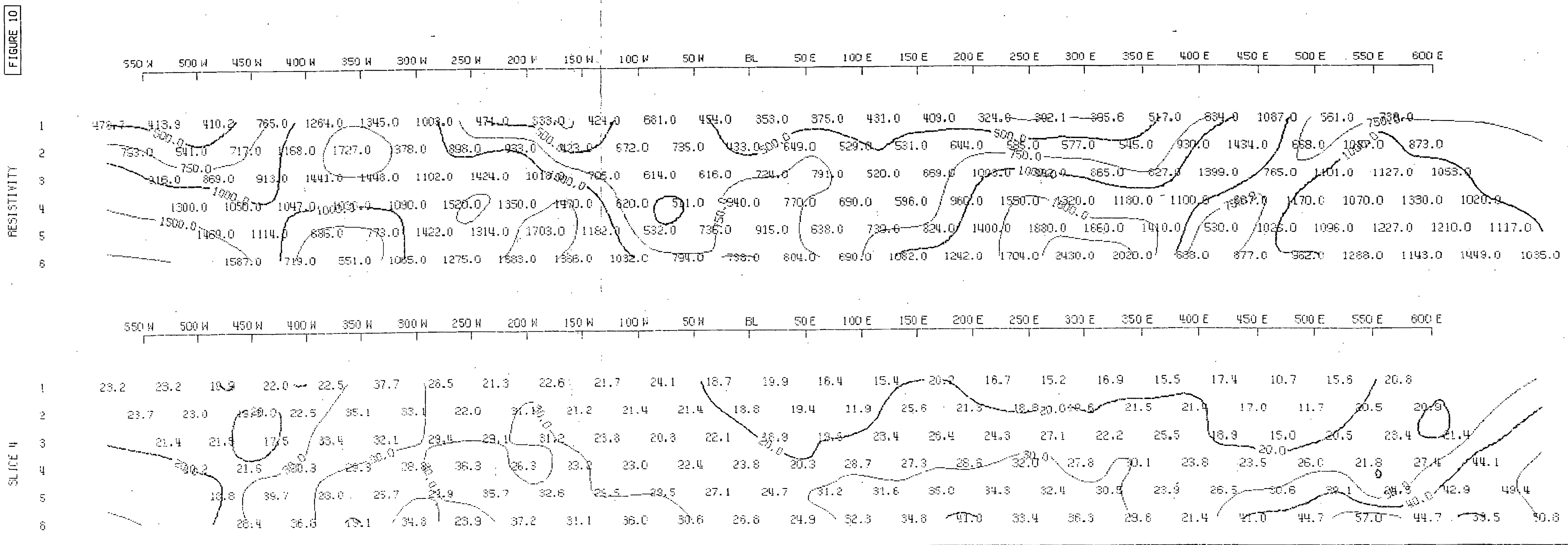
"A": 50.0 METRES N=1 TO 6

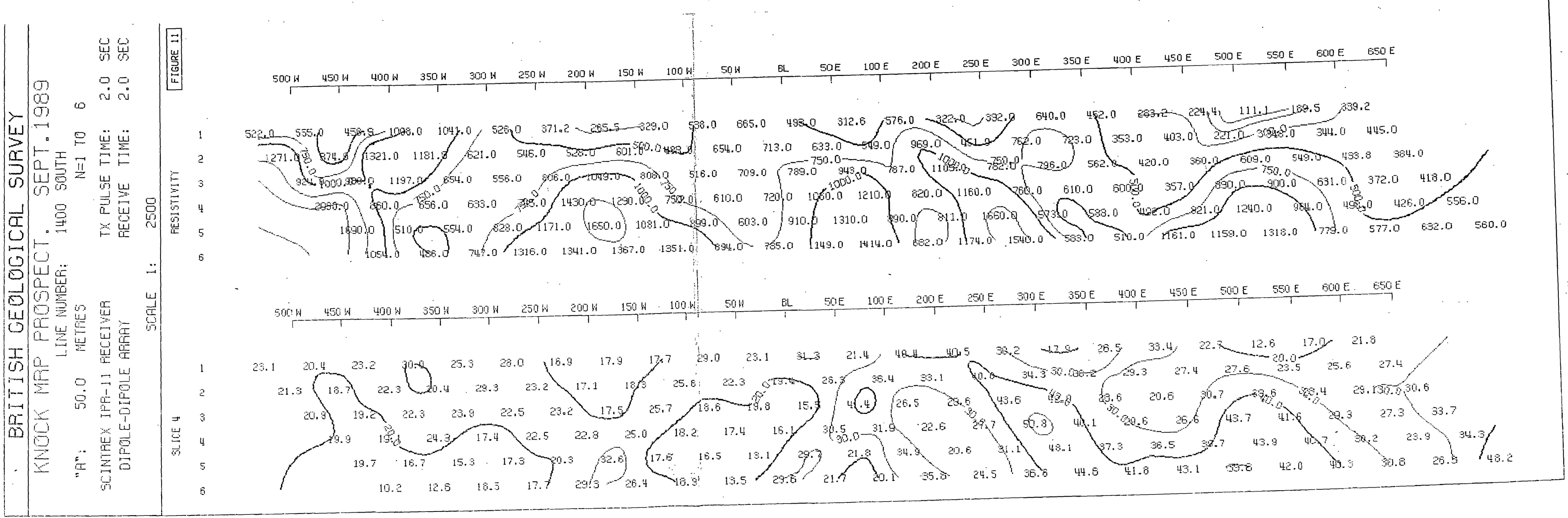
SCINTREX IPR-11 RECEIVER TX PULSE TIME: 2.0 SEC

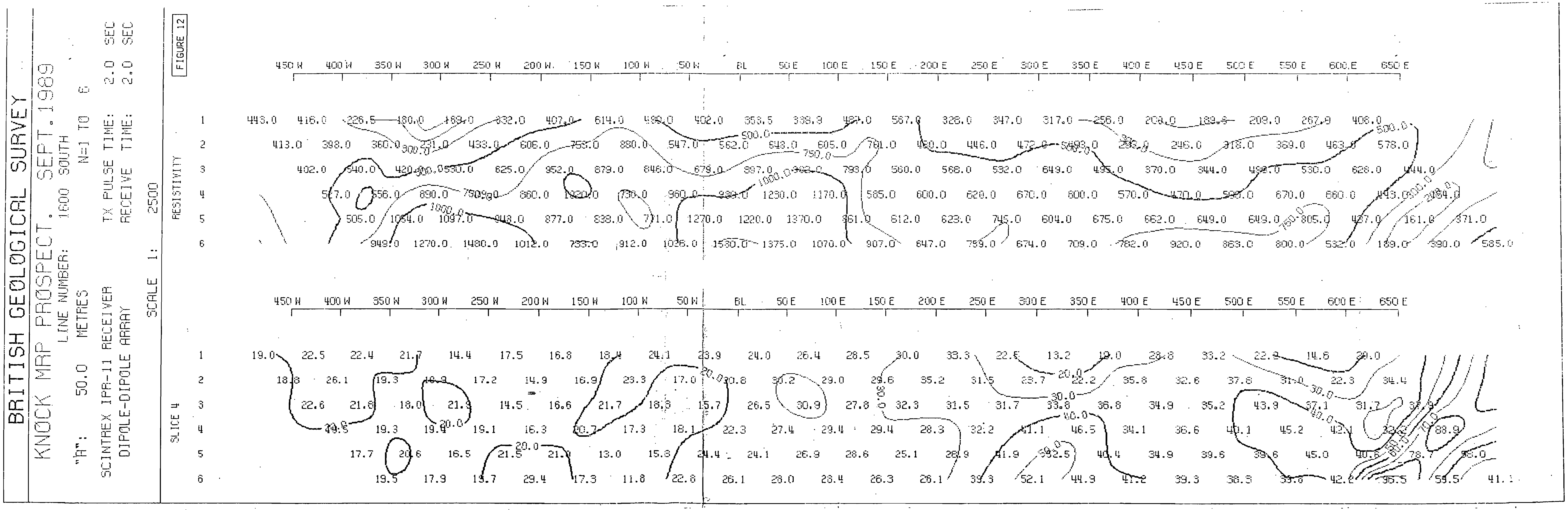
DIPOLE-DIPOLE ARRAY RECEIVE TIME: 2.0 SEC

SCALE 1: 2500

FIGURE 10




BRITISH GEOLOGICAL SURVEY
KNOCK MAP PROSPECT. SEPT. 1989
LINE NUMBER: 1400 SOUTH
"A": 50.0 METRES N=1 TO 6
SCINTREX IPR-11 RECEIVER TX PULSE TIME: 2.0 SEC
DIPOLE-DIPOLE ARRAY RECEIVE TIME: 2.0 SEC
SCALE 1: 2500
FIGURE 11
RESISTIVITY
SLICE 4
500 W 450 W 400 W 350 W 300 W 250 W 200 W 150 W 100 W 50 W BL 50 E 100 E 200 E 250 E 300 E 350 E 400 E 450 E 500 E 550 E 600 E 650 E


BRITISH GEOLOGICAL SURVEY
KNOCK MRP PROSPECT. SEPT.1989
LINE NUMBER: 1600 SOUTH
"A": 50.0 METRES
N=1 TO 6
SCINTREX IPR-11 RECEIVER
DIPOLE-DIPOLE ARRAY
TX PULSE TIME: 2.0 SEC
RECEIVE TIME: 2.0 SEC
SCALE 1: 2500
FIGURE 12
RESISTIVITY
SLICE 4
450 W 400 W 350 W 300 W 250 W 200 W 150 W 100 W 50 W BL 50 E 100 E 150 E 200 E 250 E 300 E 350 E 400 E 450 E 500 E 550 E 600 E 650 E

BRITISH GEOLOGICAL SURVEY

KNOCK MRP PROSPECT. SEPT.1989

LINE NUMBER: 1800 SOUTH

"A": 50.0 METRES N=1 TO 6

SCINTREX IPR-11 RECEIVER TX PULSE TIME: 2.0 SEC

DIPOLE-DIPOLE ARRAY RECEIVE TIME: 2.0 SEC

SCALE 1: 2500

FIGURE 13